Consumers Energy

A CMS Energy Company

Kurt M. Haas
General Manager

October 11, 2006

Mr. Brian Grennell
State Historic Preservation Office
Michigan Historical Center
P.O. Box 30740
Lansing, MI 48909-8240

Dear Mr. Grennell:

In accordance with the Memorandum of Agreement (MOA) between the United States Nuclear Regulatory Commission and the Michigan SHPO, with Consumers Energy Company as a cosignatory, please find enclosed an original copy of the completed Big Rock Point Nuclear Power Plant Recordation.

The Recordation was completed by Commonwealth Cultural Resources Group, Inc., in accordance with the professional standards of the National Park Service's Historic American Engineering Record (HAER).

If you have any questions regarding this document, please contact me at 231-547-8416 or kepallagi@cmsenergy.com.

Sincerely,

Kenneth E. Pallagi
Radiation Protection & Environmental Services Manager
Big Rock Point Restoration Project

cc: Consumers Energy Library Services (EP11-460W)
Charlevoix Public Library
JCShepherd, U.S. Nuclear Regulatory Commission
U.S. Nuclear Regulatory Commission Document Control Desk
MFParker, Consumers Energy Environmental Department (P22-510)

NMSS01

HISTORIC AMERICAN ENGINEERING RECORD
BIG ROCK POINT NUCLEAR POWER PLANT
10269 U.S. ROUTE 31 NORTH
HAYES TOWNSHIP, CHARLEVOIX COUNTY, MICHIGAN

Prepared For

CONSUMERS ENERGY COMPANY
BIG ROCK POINT RECEIVING
10269 US 31 NORTH
CHARLEVOIX, MICHIGAN 49720

Prepared By

COMMONWEALTH CULTURAL RESOURCES GROUP, INC.
2530 SPRING ARBOR ROAD
JACKSON, MICHIGAN 49203

Rachel E. Bankowitz, Principal Investigator
Donald J. Weir, Project Manager

August 2006

R-0641

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Charlevoix County
Michigan

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Written Historical and Descriptive Data
Reduced Copies of Measured Drawings and Figures

Photographer: Archives of Michigan
702 West Kalamazoo Street
Lansing, Michigan 48913

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HISTORIC AMERICAN ENGINEERING RECORD
BIG ROCK POINT NUCLEAR POWER PLANT

Location:	10269 U.S. Route 31 North Hayes Township Charlevoix County Michigan USGS Ironton Quadrangle 7.5' Transverse Mercator Coordinates Zone 16 641141E, 5024582N
Type:	Commercial Boiling Water Nuclear Reactor Power Plant
Present Use:	Decommissioned/Demolished
Dates of Operation:	1962 – 1997
Date of Construction:	circa 1960 – 1962
Cost of Construction:	$27,000,000 (Consumers Energy [CE] 1998a)
Contractor:	Bechtel Corporation (CE 1998a)
Designers:	General Electric (GE) and the Bechtel Corporation (Consumers Power Company [CPC] n.d.; NRC 2006)
Engineers:	The Bechtel Corporation and GE (CE 1998a; CPC n.d.)
Constructor:	Bechtel Corporation Chicago Bridge & Iron Company (subcontractor) [Miles 2006]
Present Owner:	Consumers Energy (Consumers) (formerly Consumers Power Company) 212 West Michigan Avenue Jackson, Michigan 49201

Significance:

The Big Rock Point Nuclear Power Plant (BRPNPP) was the world's first high-power-density boiling water reactor, the fifth commercial nuclear power plant constructed in the United States, and the first nuclear plant located in Michigan (CE 2006a; Miles 2006; PRNewswire 1997; Rouse et al. 1982; VQK Communications 1997). At the time of its closing in 1997, it was the nation's longest running and oldest operating nuclear power plant (thirty-five years) (PRNewswire 1997). Conceived in the late 1950s as part of the Power Reactor Demonstration Program of the Atomic Energy Commission (AEC), the plant utilized nuclear energy to provide electrical power to the surrounding local area, and was an important research site for the nuclear power industry (VQK Communications 1997). At its zenith, the BRPNPP produced 67 megawatts of electricity, enough to serve a community of 38,000 people (PRNewswire 1997). The plant was named a Nuclear Historic Landmark by the American Nuclear Society in 1991 for its award winning research program that helped develop more efficient nuclear fuels for the commercial nuclear power industry (CE 2006a; VQK Communications 1997). In fact, the plant's reactor was employed for eleven years to produce radioactive cobalt 60 for the medical industry, helping to save an estimated 120,000 lives (CE 2006b; VQK Communications 1997). As a pioneer of nuclear technology, BRPNPP set new standards for the industry, received numerous awards, became one of the largest employers in the area, and was at one time the second most popular tourist destination in Michigan, hosting as many as one hundred thousand people a year to tours of its facility (CPC 1985; PRNewswire 1997).

Historian: Rachel E. Bankowitz
Commonwealth Cultural Resources Group, Inc. (CCRG)
August 2006

Project Information:

This documentation was undertaken by CCRG, Inc., on behalf of Consumers Energy, in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and with a Memorandum of Agreement between the United States Nuclear Regulatory Commission (NRC) and the Michigan State Historic Preservation Officer (CE 2006c).

Introduction:

The former site of the BRPNPP encompasses approximately 560 acres situated in Section 24 of Hayes Township, Charlevoix County, Michigan (Figures 1 and 2). The terrain consists of gently sloping wooded and cleared land on the shore of Lake Michigan, at the western extremity of the southern shore of Little Traverse Bay. The site is approximately four miles northeast of the City of Charlevoix and approximately 11 miles west of Petoskey.

No above-ground buildings or structures are still standing at the plant site. Plant operations officially ended on August 29, 1997, and the decommissioning process began immediately thereafter (Goble 2006). The process, expected to be completed in August of 2006, will return approximately 550 of 580 acres to green field status (CE 2006b; Gohs 2005). The remaining thirty acres will continue to temporarily house the dry fuel storage facility (Gohs 2005).

The standard process of decommissioning was outlined by the NRC, and involves returning a former nuclear plant site to one that has lowered radioactivity levels. The goal is to achieve radioactivity levels reduced to the point that the property can be released for public or private sale without restriction. The end result of the decommissioning process at BRPNPP will be a green field, with approximately 1.5 miles of lakefront property. The plant is one of the first in the nation to decommission back to green field status and is one of nineteen plants in the county that have already been decommissioned or are currently undergoing the process (Gohs 2005).

By federal law, nuclear power plants have up to sixty years to decommission. The entire decommissioning process at Big Rock is expected to take up to two decades (Gohs 2005). The majority of decommissioning work will be finished by the fall of 2006 (Nuclear Regulatory Commission [NRC] 2006). The final phase of decommissioning at BRPNPP should last a year starting in 2012. This phase will ultimately include the removal of the spent fuel casks from the dry fuel storage facility, which must remain at BRPNPP until transferred to the national waste repository at Yucca Mountain, Nevada, or until an appropriate storage area is designated elsewhere (Gohs 2005).

Chronology of the Big Rock Point Nuclear Power Plant:

1959 Consumers (then Consumers Power Company) buys land in Hayes Township, Charlevoix County, and announces plans to build a nuclear power reactor (VQK Communications 1997).

1960 Construction permits are issued, groundbreaking begins (CE 1998a; CE 2006a; Miles 2006).

1962 (August 30) The operating license is granted (VQK Communications 1997).

1962 (September 27) The first nuclear chain reaction at BRPNPP occurs (CE 1998a; CE 2006a; Miles 2066a; Rouse et al. 1982).

1962 *Head Start On Tomorrow*, a short film narrated by Ronald Reagan, spokesman for GE, is shown at the BRPNPP Visitor's Information Center. The film highlights the positive aspects of nuclear energy to the numerous tourists visiting the site (Miles 2006; Rouse et al. 1982).

1962 (December 8) BRPNPP is connected to Consumers statewide grid, and commercial generation begins (CE 1998a; Rouse et al. 1982).

1963 (May 21) BRPNPP is officially dedicated. Governor George Romney is the keynote speaker. Representatives from the AEC and from the Charlevoix community in attendance (Miles 2006; Rouse et al. 1982).

1969-1977 BRPNPP receives a license to use mixed-oxide fuel through a cooperative research and development program sponsored by the Edison Electric Institute (CE 2006a; Rouse et al. 1982).

1976 Three former GE engineers testify to Congress for the immediate shutdown of the BRPNPP, citing more than 100 alleged design flaws (Rouse et al. 1982).

1977 (July) BRPNPP sets a world record for continuous operation by a power plant with a boiling water reactor: the facility operated for 343 consecutive days (CE 1998a; CE 2006a; CE 2006b; Miles 2006).

1977 (November) The Northern Michigan Alternative Development group stages the first public protest at BRPNPP. The arrest of the "Big Rock 14" marks the first time that nuclear protestors are arrested in Michigan as the result of planned disobedience (Rouse et al. 1982).

1979 (March 28) The Three Mile Island accident in Pennsylvania forced BRPNPP to implement recommendations developed by the newly established NRC. Total cost of improvements is approximately five million dollars (Rouse et al. 1982).

1980 Consumers announces the completion of a one-year, million-dollar study called the "Probabilistic Risk Assessment." The study aims to determine the risk of a nuclear catastrophe at BRPNPP, similar to what happened at Three Mile Island. As a result, Consumers proposes an additional million dollars worth of improvements at the plant for enhanced safety modifications (Rouse et al. 1982).

1982 (September 27) BRPNPP celebrates its twentieth anniversary with representatives from Consumers, the Bechtel Power Corporation, GE, the NRC, and the U.S. Department of Energy in attendance (CE 1998a).

1984 (August 3) BRPNPP becomes the first nuclear plant in the country to receive full approval of its upgraded emergency plan from the Federal Emergency Management Agency (FEMA) (CPC 1985; CE 1998a).

1986 (September 24) BRPNPP is designated a branch of the National Academy for Nuclear Training. Designation results from accreditation of employee training programs at the site by the Institute of Nuclear Power Operations of Atlanta, Georgia (CE 1998a).

1986 (December) The plant's 95.5 percent availability to generate electricity is the best of any GE-designed plant in the world that year (Miles 2006; VQK Communications 1997).

1991 (March 3) BRPNPP reaches a production milestone of 10 million megawatts (CE 1998a; CE 2006a).

1991 (June 4) BRPNPP is named a Nuclear Historic Landmark by the American Nuclear Society as the world's first high-power-density boiling water reactor and an important research site for the nuclear industry (CE 1998a; CE 2006a; Miles 2006).

1992 (February 26) BRPNPP officially becomes the oldest operating nuclear power plant in the United States (CE 1998a; CE 2006a; CE 2006b; Miles 2006).

1992 (December 8) Thirtieth anniversary of the first nuclear chain reaction at BRPNPP occurs on this date (CE 1998a).

1993 (June 29) BRPNPP becomes the longest-running nuclear plant in the United States, surpassing the previous record of thirty years and ninety-twp days set by the Yankee Rowe Nuclear Power Plant located in Rowe, Massachusetts (CE 1998a; CE 2006a; Miles 2006).

1994 (May 15) A group of six Russian employees from the Bilibino Nuclear Power Plant in Siberia visit BRPNPP. The trip is sponsored by the World Association of Nuclear Operators (CE 1998a).

1995 (December 22) BRPNPP generates the most electricity in its history for one year: approximately 516,205 million megawatt hours (CE 1998a).

1997 (March 11) Consumers Power Company becomes Consumers Energy (Demeter 2006).

1997 (June 11) Consumers announces the closure of BRPNPP. The shutdown decision is based on economics associated with the small size of the facility and impending electric industry deregulation. The shutdown is scheduled for August 29, 1997, the thirty-fifth anniversary of the plant (CE 1998a).

1997 (August 29) BRPNPP operations cease. The ceremony is attended by approximately one-thousand people, along with representatives from the Cable News Network (CNN) (CE 1998a; CE 2006a; Miles 2006).

1997 The site name is changed from BRPNPP to the *Big Rock Point Restoration Project* (BRPNPP) (NRC 2006).

1998 (April 29) Representatives from a Japanese nuclear power plant in Tokyo visit the BRPNPP. The Japanese, who are planning decommissioning efforts for their own facilities, recognize that the BRPNPP is the world's first commercial boiling water reactor plant to decommission (CE 2006b).

1998 (October 21) The turbine-generator is removed (CE 2006b).

1999 (May 12) The BRPNPP earns an award for its successful decommissioning efforts. Recognition is given to the facility for completing the first full chemical decontamination of a primary coolant system using the Electric Power Research Institute's Decontamination for Decommissioning process (CE 2006b).

2003 The reactor vessel and steam drum are both removed. The reactor is shipped to Barnwell, South Carolina, for burial, and the steam drum is shipped to Utah (Miles 2006; NRC 2006).

2004 The turbine building and stack are both demolished (Miles 2006).

2005 The sphere is dismantled (Charlevoix Historical Society 2006).

2006 The first phase of the decommissioning process is completed. Process will be finalized circa 2012, when the dry fuel storage facility is removed (Gohs 2005).

Operational Significance:

BRPNPP was the world's first high-power-density boiling water reactor (CE 2006a). In this type of facility, water flows around the reactor and is heated directly into steam (Figure 3). This action ultimately produces electricity. The entire process is fueled by uranium. At BRPNPP, the core of the cylindrically shaped direct-cycle, forced-circulation boiling water reactor contained eighty-four fuel assemblies. A stack of uranium oxide pellets in a zircaloy tube sealed at each end by welded end-plugs comprised a fuel rod with one-hundred twenty-two rods, making a typical fuel assembly. The eighty-four fuel assemblies contained more than ten tons of slightly enriched (about 3.2% of U-235) in the form of uranium oxide pellets (CPC n.d.).

In high-power-density boiling water facilities, when the fuel assemblies are placed in the reactor in correct formation, they undergo a nuclear chain reaction (called fissioning) that produces heat energy. Fissioning is achieved and regulated by moving control rods out of or into the core, producing an increase or a decrease in power production. This process causes the surrounding water to boil and form steam (CPC n.d.).

From the core, the steam-water mixture leaves the reactor through piping and enters the steam drum, where the steam is separated from the water. Upon separation, the steam enters an adjacent turbine. The steam is powerful enough to turn the turbine, which turns the generator rotor, producing electricity. The BRPNPP generator produced electricity at 13,800 volts. This voltage was increased to meet electrical transmission requirements for the Consumers transmission system (CPC n.d.).

At BRPNPP, the steam, after going through the turbine, passed over condenser tubes through which water from Lake Michigan was flowing (CPC n.d.). The lake water never came into contact with the water in the steam system, and therefore was never exposed to any nuclear contaminants; it entered back into the lake unchanged (Miles 2006). Meanwhile, the steam cooled and recondensed into water. This water was pumped through intermediate heaters back to the reactor steam drum and mixed with the water previously separated from the steam. The combined water then exited the drum and was pumped into the bottom of the reactor vessel, closing the cycle (CPC n.d.).

Site Plan:

Roughly 20 acres of the original 580-acre parcel actually contained any buildings and structures (Miles 2006). The complex was situated on acreage just south of Lake Michigan, surrounded by heavily wooded land and wetlands (Figure 4; Photographs 1 and 2). A winding access road connecting to U.S. 31 provided entryway to plant operations (Photographs 3-5). U.S. 31 provided convenient transportation.

Of particular note was a rail spur laid for the restricted use of BRPNPP operations only. The spur originated from the former Pere Marquette Railroad (later known as the Chesapeake & Ohio), which crossed through the area south of the plant, from southwest to northwest. The spur generally ran in a north-south direction, and split just before reaching the plant, with one track leading directly into the turbine building, and one terminating at a point just north of the containment building (Photograph 5) (Miles 2006). Both of these structures are discussed below.

Significant Buildings/Structures:

The buildings and structures that comprised the BRPNPP are indicated on various site plans of the facility (Figures 4 and 5). Many of the buildings and structures were seemingly non-descript and devoid of design, but nonetheless were reflective of 1960s modern architectural influences. The buildings and structures (other than the containment and turbine buildings and stack) were generally one story, resting on concrete foundations and they were typically sided in a mix of spectra-glaze (discussed later) and aluminum siding. The complex included a visitors information center (Photograph 7), lunch room, warehouse, chemical lab, machine shop, staff office, portable classrooms and simulator facilities, screen house (Photograph 8), security building, solid radwaste vaults and gantry crane (Photograph 9), a maintenance building, warehouses (Photograph 10), and a weather tower. Although these buildings and structures were significant in their own right, as they contributed to the daily operations of the plant, the principal buildings and structures at BRPNPP were the containment building, turbine-generator building, and stack. These three buildings and structures, the heart and soul of plant operations, were centrally located at the complex (Photographs 11-13).

1. Containment Building

Perhaps the most visually distinct element of the BRPNPP was the spherical containment building (also known as the reactor building) (Figure 6). The primary purpose of the building was to prevent a harmful spread of radioactive material into the environment in the event of a rupture in the reactor system or other accident. The leak-tight building was designed to withstand and contain any internal pressure that would arise from the most severe rupture accidents (CPC 1961). As a secondary function, the containment building provided weatherproof housing for the steam generating system and auxiliaries, including the steam drum, recirculation piping and pumps, reactor clean-up system, shutdown cooling system, liquid poison system, emergency cooling system, and storage and handling facilities for new and spent fuel (CPC 1961; CE 1997a). Each of these interior components was generally constructed of steel (CE 1997a).

The containment building, constructed of steel, stood about 13 stories and had a 130-foot diameter (Photograph 14) (CE 1997a). It extended 27 feet below grade, and 103 feet above grade. Pre-cast beams and piers served as structural supports for the vessel, of which a portion extended below-grade. The bottom level of the interior of the containment building had a concrete base. Its design made it accommodating to key personnel, by allowing them to enter the sphere and remain inside as necessary during normal operation, shutdown, and refueling (CPC 1961).

The primary component in the containment building was the reactor vessel (Figure 7; Photographs 15-18). Vertically mounted, the cylindrically shaped vessel included a spherical shaped vessel head and sealed spherical shaped lower end through which control rod drive assemblies operated. The removable vessel head allowed the reactor to be refueled (CE 1997a). Measuring 30 feet in length with a diameter of 106 inches, the reactor vessel was suspended vertically by 2.5-inch diameter rods and vessel support brackets anchored in concrete (CPC 1961; CE 1997a). Horizontal loads were resisted by four stabilizer brackets evenly spaced near the bottom of the vessel. Thermal expansion of the vessel and connected piping was facilitated by the vessel brackets and the flexibility of the piping support system (CE 1997a). The reactor was designed to withstand heat up to 650 degrees Fahrenheit, and was surrounded in concrete three stories tall (Miles 2006).

2. Turbine Building

Although known as the turbine building, after its primary function of housing the turbine-generator, it also included other conventional plant components and facility offices. The multi-story building had an irregular footprint and rested on a poured concrete foundation. Exterior walls were clad in a combination of aluminum and spectra-glaze block. Spectra-glaze block is a lightweight modular concrete block with a glazed face on one or more surfaces. It was likely chosen as a building material for its resistence to soiling, chemicals, impacts, and fire. Window openings and entryways were trimmed in aluminum, giving the facility a modern appearance, typical of 1960s industrial design (Photograph 19).

The building's main component, the turbine-generator system, converted the energy of steam to electrical energy, and also provided a control system for maintaining constant stable pressure in the reactor (Figure 6) (CE 1997b). The turbine, a 3,600 rpm tandem-compound double-flow condensing unit was directly connected to a hydrogen-cooled generator (CPC 1961; CE 1997b). The generator had a self-contained ventilating system, with fans mounted on the generator shaft. The machine was designed to operate continuously, delivering power from the electrical terminals (CE 1997b).

3. Stack

The purpose of the stack, a familiar landmark from both water and land due to its distinctive red and white stripes, was to discharge and disperse gaseous effluents produced by the plant into the atmosphere (visible in Photograph 10). Standing 240 feet tall, the stack ejected waste gases, not radioactive smoke (Miles 2006). The gases were retained for up to thirty minutes before they were released through the stack. A gas monitoring system contained within the stack measured the amount of particulates/radioiodine released into the air. This safety feature monitored the released gases to ensure that they had levels low enough so as not to be an environmental hazard (CE 1997b).

History:

In the years following World War II, the destructive power of nuclear energy was fresh in the minds of many Americans. In 1953, President Eisenhower sought to erase these negative opinions in his speech, *Atoms for Peace.* Eisenhower used the opportunity to enumerate the ways that nuclear energy was being harnessed for peaceful purposes. Following the president's lead, Congress passed the Atomic Energy Act in 1954, which created the AEC. In 1957, Moorpark, California, became the first town in the United States to be illuminated by nuclear generated electricity. Two years later, with the success of Moorpark, Senator Albert Gore Sr. (Tennessee) urged Congress to build additional commercial nuclear plants, with the hopes that nuclear energy would reach other areas of the United States (Miles 2006).

In 1959, Consumers (then Consumers Power Company) announced their plans to construct a nuclear power reactor on Lake Michigan (VQK Communications 1997). Their selected site was near the resort town of Charlevoix, a popular summer playground for residents of the state. The company recognized the need for more electrical generation in the region, as it was burgeoning with new industrial and tourist development. The Jackson, Michigan-based company plan for the facility was two-fold: to utilize the plant for the production of electricity and as a nuclear research facility. Robert Briggs, then executive vice president of Consumers, was optimistic about the proposed new development. In a speech, Briggs explained that Michigan was perhaps "the most attractive area in the entire United States, and had the potential for progress and prosperity far exceeding those of almost any other region" (Miles 2006).

BRPNPP was located in northern Michigan for several reasons. First, the greater part of the company's power demands and sources were concentrated south of a line that ran between Saginaw and Bay City on the east to Muskegon on the west side of the state. Constructing more transmission lines northward would not alleviate the long-term electrical needs of the northern Michigan area. Second, to fuel operations the traditional way, coal would be needed, and it would have to come from the southern United States, at a time when was beginning to cost more to transport coal than to buy the tonnage at the mine. Furthermore, Consumers' hydroelectric facilities were already at full capacity. Finally, in 1957, the Argonne National Laboratories, operators of a nuclear power facility in Chicago, announced that its experimental boiling water reactor produced over twice the heat than scientists had predicted for this type of reactor (Miles 2006). This was an important and influential bit of good news that ultimately drove the design and intent of BRPNPP.

The federal government fully supported Consumers' decision to develop a nuclear facility. In fact, the two entities teamed up together to also use BRPNPP as a nuclear research center. The government, anticipating the possibilities of nuclear power, intended to use the new facility to study methods for the efficient production of power from various atomic fuels (CE 1998a). The government and Consumers hoped that the methods explored at BRPNPP might someday prove that nuclear activity was a cheaper means of providing power than traditional methods. A study revealed that, to conventionally power a generator at this location for two years, 600,000 tons of coal would be needed, the equivalent of a freight train ten miles long and composed of one thousand coal cars. Scientists further projected that the same output could be accomplished with 12 tons of much less expensive nuclear fuel carried by three trucks (Miles 2006).

An agreement was reached with the AEC, Consumers, GE (responsible for the design of the plant), and the Bechtel Corporation of San Francisco (plant construction contractors) (Miles 2006; CE 2006b). The AEC agreed to finance up to $500,000 for initial construction costs, provided Consumers cover the remaining construction costs and all future operating costs. Additionally, Consumers agreed to provide a portion of the plant to the AEC and GE for a four-and-one-half year fuel-research program (Rouse et al. 1982).

GE also signed a separate contract with the AEC in which the AEC agreed to cover research and development costs up to 3.7 million dollars (Rouse et al. 1982). In support of the AEC's research and development goals, BRPNPP efforts focused on increasing fuel life and reducing fuel fabrication costs. The results of this nuclear research would be passed on to subsequent nuclear plants across the country (CE 2006b).

Consumers acquired the necessary land through a real estate transaction with Charles LaHaie of Main Realty in Cheboygan, Michigan. LaHaie had originally purchased the roughly 600 acres of land from Ed and Phila Shanahan on May 15, 1959, for approximately $100,000.00. Just one day later, Consumers purchased the same acreage from LaHaie, for an unknown amount (Rouse et al. 1982). The Belding Real Estate Agency in Charlevoix assisted with the transaction (Miles 2006; Rouse et al. 1982).

The estimated cost for the construction of BRPNPP was set at $30 million. This amount was just $10 million more than a conventional plant of equivalent capacity, but without the expense of having to purchase or ship coal. At the time, only four similar commercial nuclear plants existed in the United States, including the plant at Argonne National Laboratories in Chicago; a plant in Idaho Falls, Idaho; one in Pleasanton, California; and finally, one in Eureka, California (Rouse et al. 1982).

BRPNPP was named after a large, glacial boulder situated approximately one-quarter mile west of Big Rock Point, along the shore of Lake Michigan. Standing eight feet tall, The Big Rock is four meters high and four meters wide at its widest point. It has been known for years as a symbolic icon of the Odawa/Chippewa Indians. Named *Kitcheossening* (also *Gitchichisining*) in the Odawa language (Blackbird 1887), the rock was historically used by the tribe as a sacred site, navigational aid, and a meeting place, and it continues in these uses to this day (Blackbird 1887; Schacher 2003).

The site of BRPNPP was chosen for several reasons. Unlike most uneven, shifting shorelines in the area, this particular parcel has a level limestone bedrock base located below the surface. The sturdy bedrock was capable of supporting at least 20,000 pounds per square foot. Furthermore, Lake Michigan conveniently provided cool, steady water temperatures required to cool water exiting the reactor. Moreover, U.S. 31, a federal highway located approximately a half-mile away, providing easy, accessible transportation, as did the former Pere Marquette Railroad. Perhaps the most important factor in deciding the plant's location was the fact that the nearest residential property was located a half-mile away, and the plant was not near a heavily-populated metropolitan area in the event of an accident (Miles 2006).

The official groundbreaking ceremony for BRPNPP was held in the summer of 1960, although construction had begun several months earlier (Miles 2006) (Supplemental Photographs 20-21). The following words, spoken by Robert P. Briggs, executive vice president of Consumers, reflect the tenor of the times and the success of the AEC's effort to prod private industry into the development of nuclear technology:

> This country must not be left behind in the field of nuclear energy. This country must keep up or ahead of other nations in order to maintain its national defense, to preserve the free enterprise system against socialism or communism, and to maintain prestige of the United States throughout the world. (Rouse et al. 1982)

When construction was completed in 1962, BRPNPP was the first commercial nuclear power plant in Michigan (CE 2006a). The plant was built by the Bechtel Power Corporation, who subcontracted the containment building construction to the Chicago Bridge and Iron Company (Miles 2006). Construction lasted 29 months, and was completed for a total cost of approximately $27 million (CE 1998a; VQK Communications 1997). Only about 20 acres of the property actually encompassed buildings or structures (Miles 2006).

Nuclear fission was first achieved at BRPNPP on September 27, 1962 (CE 1998a; CE 2006a). Several months later, the facility generated its first electrical output (CE 1998a; CPC n.d.). BRPNPP was officially dedicated on May 21, 1963, by Michigan Governor George Romney (Miles 2006). Romney continued to stress the general objective of the facilities in his speech, reminding the public that the immediate objective of the plant was "research, and that objective is just as important as the ultimate purpose of providing power to meet the expanding needs of a growing area" (Rouse et al. 1982). In November 1962, a computer system was installed at BRPNPP, the first of its kind to be utilized in a nuclear power plant (Miles 2006).

The first five years of plant operations were devoted to research and development as part of the AEC's Power Reactor Demonstration Program. The plant was the world's first high-power-density boiling water reactor, and the research there led to the development of more efficient nuclear fuels for the commercial nuclear power.

With the promise of a new technology, American opinion of nuclear power was fairly optimistic during the 1960s; however, in 1979, the nuclear accident at Three Mile Island in Pennsylvania triggered a concern about the perils of nuclear technology. This concern did not bypass BRPNPP. Some local residents became particularly concerned when Consumers announced that it was evaluating mixed oxide fuel at the plant, otherwise known as plutonium. Plutonium, a by-product of the fissioning of uranium, became a target of concern for a number of reasons, the most important being that it is the element used to make nuclear bombs and is lethally toxic. The plant used mixed-oxide fuel from 1969 to 1976 as part of its research program (Rouse et al. 1982).

After the accident at Three Mile Island in 1979, BRPNPP was faced with implementing additional recommendations developed by the Nuclear Regulatory Commission. In response to the disaster, the plant performed a risk assessment between 1979 and 1981 (Rouse et al. 1982). As a result of this analysis, BRPNPP proposed modifications to enhance the safety of the plant, and the NRC agreed to the recommendation (Rouse et al. 1982; VQK Communications 1997).

The additional costs of new safety requirements almost triggered the closure of BRPNPP; however, closure was averted, and the plant was upgraded accordingly (Rouse et al. 1982; VQK Communications 1997). In 1982 warning sirens were placed at twelve locations within a five-mile radius of the plant and were tested on the first Saturday of every month (Miles 2006). In 1984, Big Rock became the first plant in the country to receive full approval of its upgraded emergency plan from FEMA (CPC 1985; CE 1998a).

In 1997, Consumers announced that the BRPNPP operating license would not be renewed when it expired on May 31, 2000. Economics proved that it was not feasible to keep the plant running to the license's expiration date. BRPNPP's relatively small generating capacity of 67 megawatts made it too expensive in an increasingly competitive marketplace (PRNewswire 1997). Also contributing to the inevitable closure were the deregulation of the electrical industry in the 1990s, aging equipment, and limited spent fuel storage space (Miles 2006). Faced with a choice to shut down immediately or retire the plant with dignity, Consumers chose to operate the plant to its thirty-fifth anniversary. This not only allowed employees ample time to prepare for plant closure, but it also allowed time for a proper ceremony to honor BRPNPP's contributions to the nuclear industry, and also its many years of safe and reliable operation. The reactor was shutdown, or in nuclear terminology, "scrammed," at 10:33 A.M. EST on August 29, 1997, thirty-five years to the day that BRPNPP's license had been issued (Miles 2006; NRC 2006). All buildings and structures, including foundations and underground utilities, and excluding the dry fuel storage (built in 2002), were demolished between 1997 and 2006 (Figure 8; Decommissioning Photographs 22-28) (Goble 2006).

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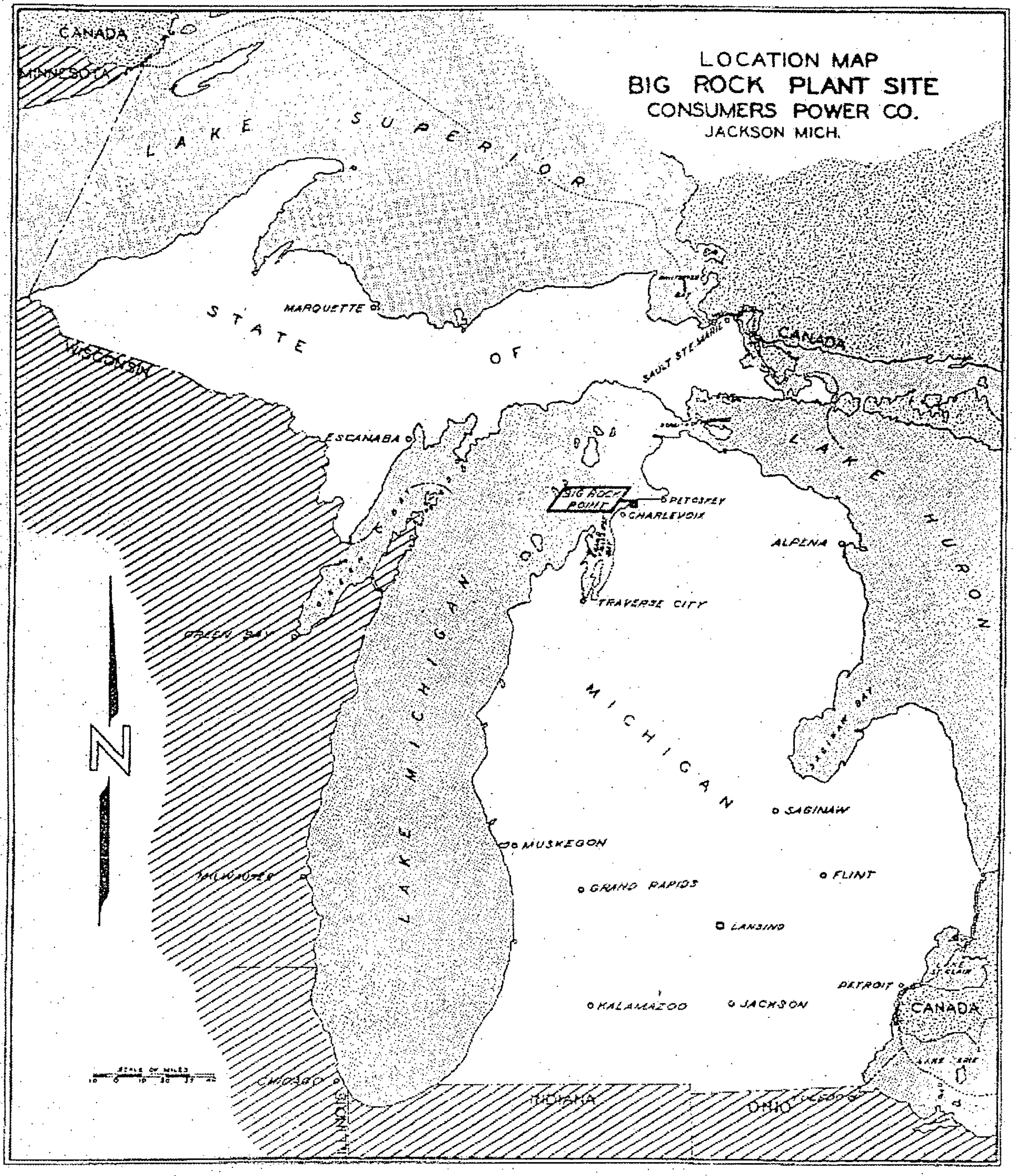
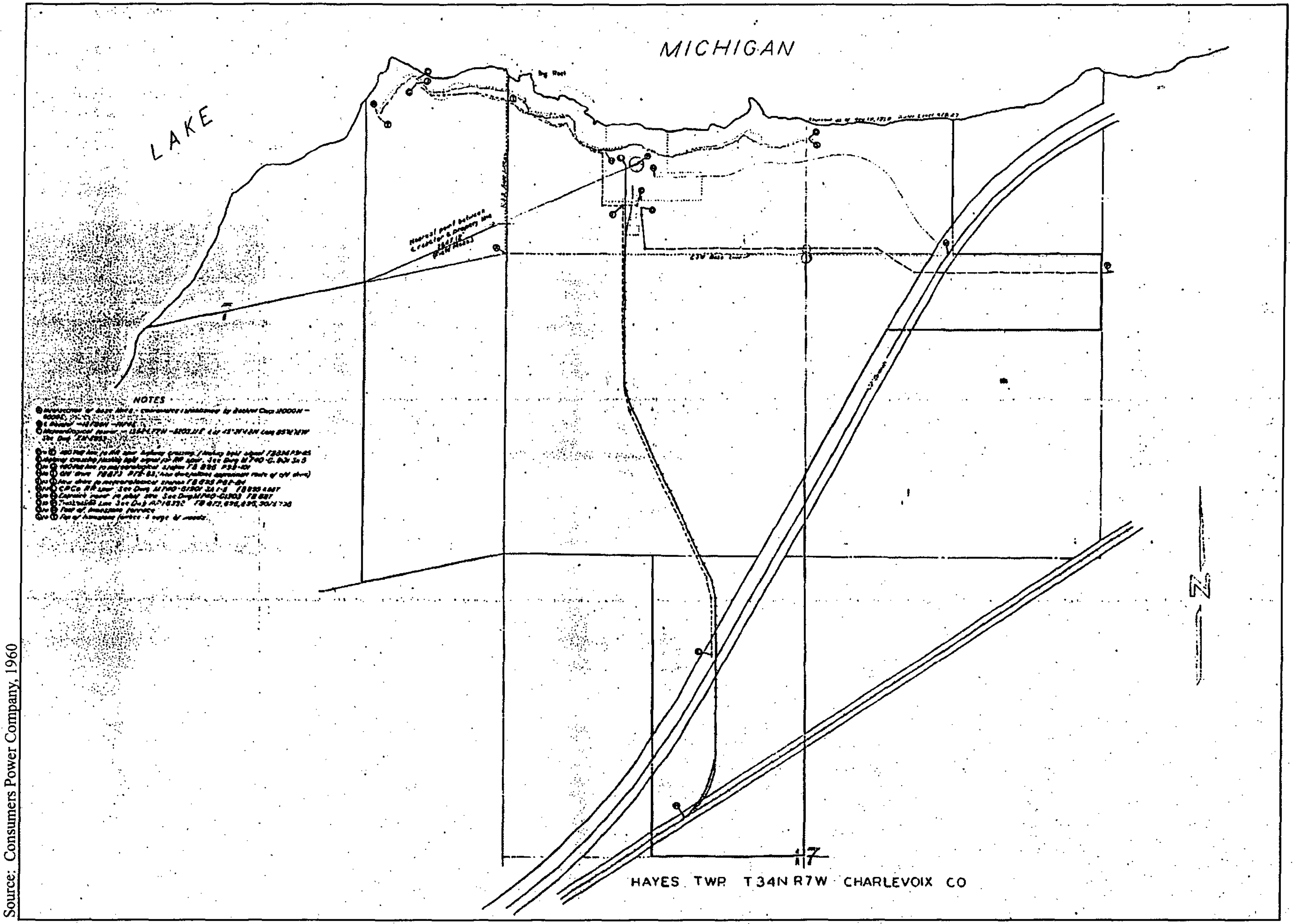
FIGURES



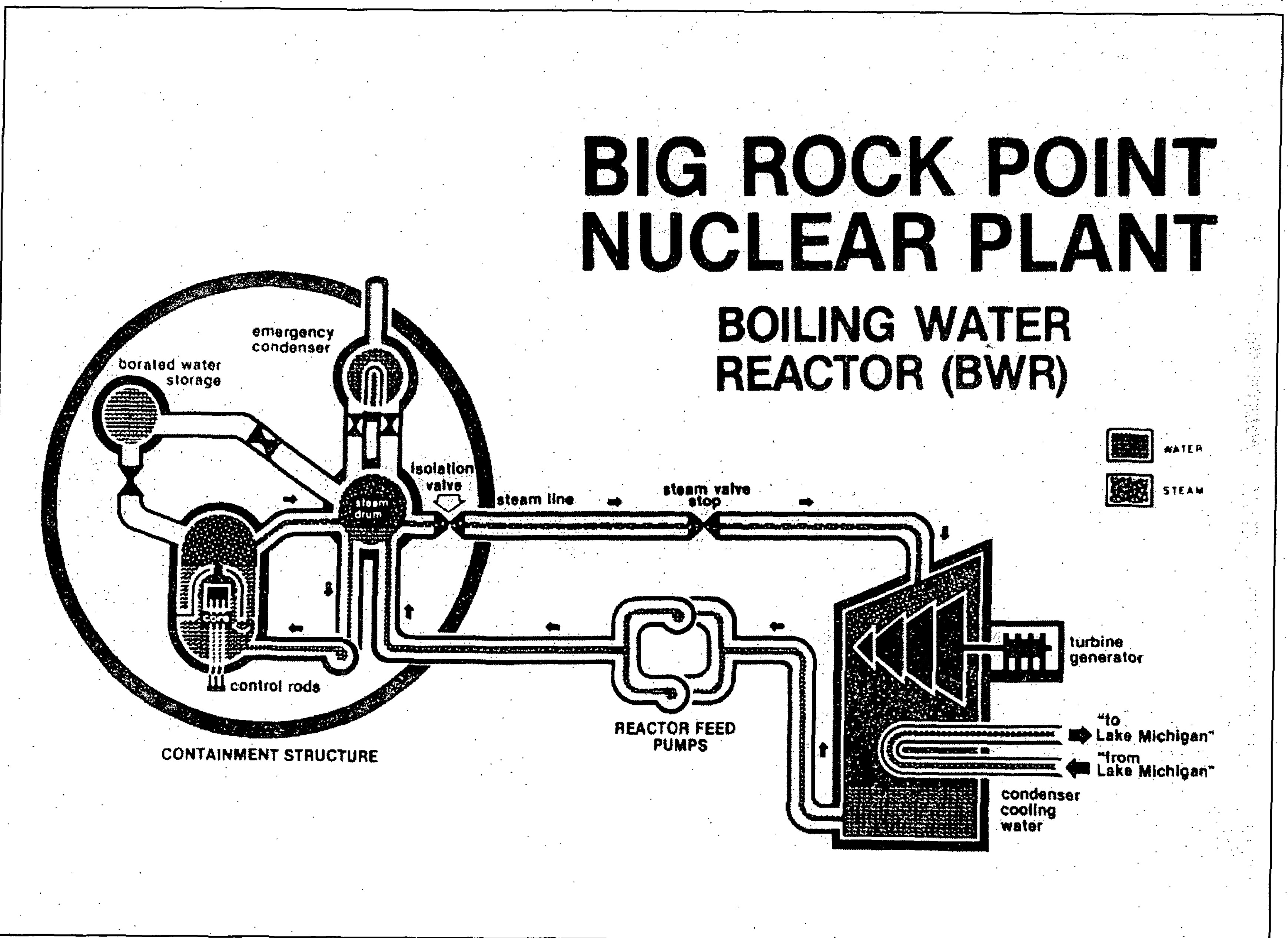
Source: Consumers Power Company, 1961

Figure 1. Location Map of the Big Rock Point Nuclear Power Plant Site



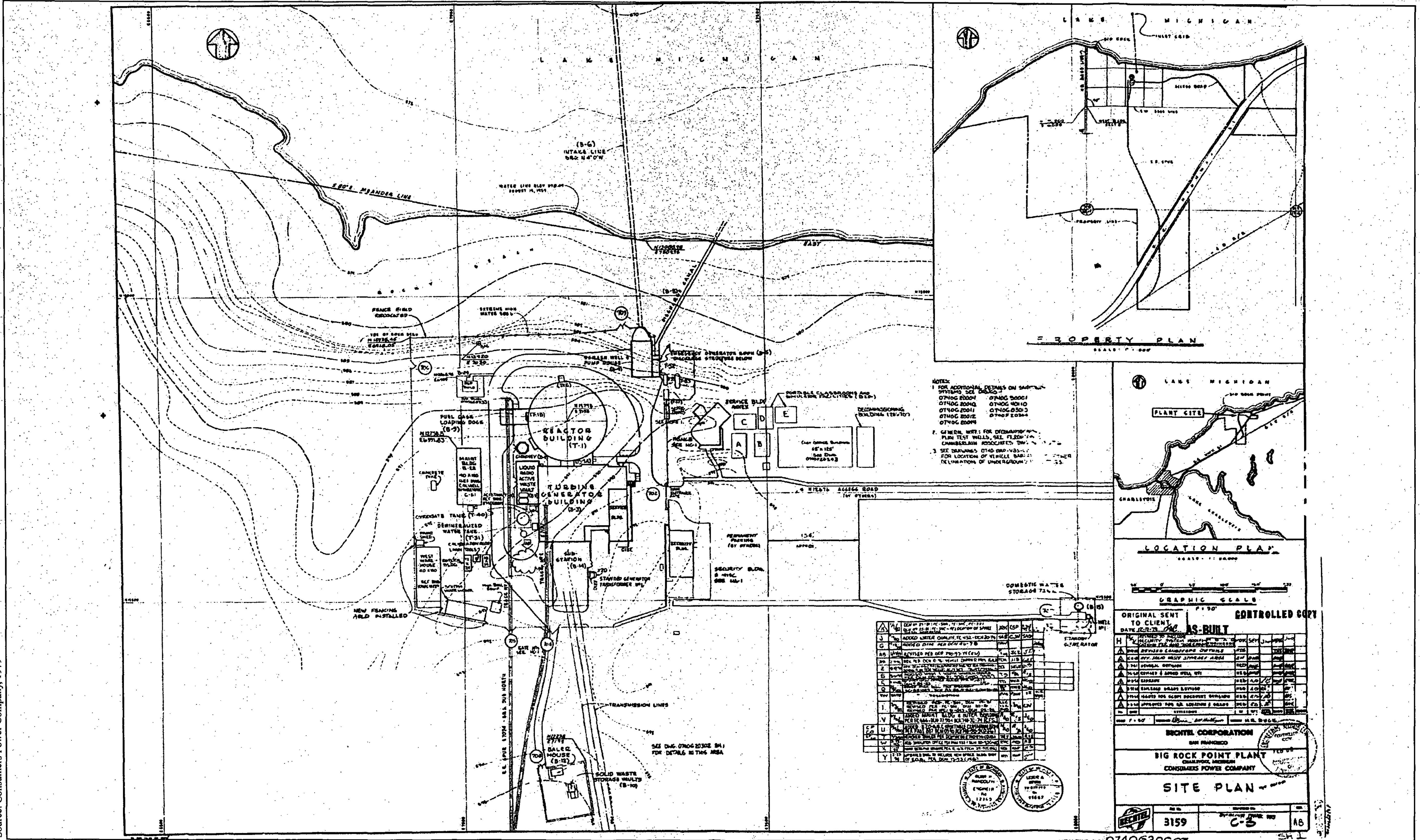
Source: Consumers Power Company, 1960

Figure 2. Big Rock Point Nuclear Power Plant Site, Site Development



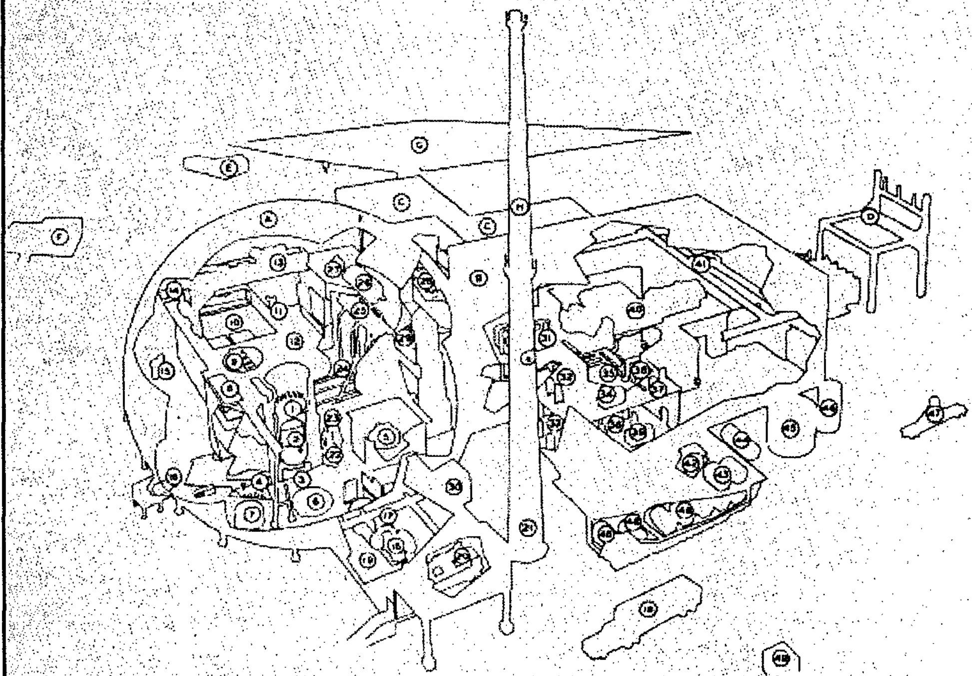
Source: Charlevoix Historical Society, 2006

Figure 3. Big Rock Point Nuclear Power Plant Boiling Water Reactor Process



Source: Consumers Power Company, 1979

Figure 4. Big Rock Point Nuclear Power Plant Site Plan



CUTAWAY DRAWING OF THE BIG ROCK POINT NUCLEAR PLANT

1. Reactor Vessel
2. Reactor Core
3. Control Rod Drives
4. Control Rod Drives - Hydraulic System
5. Reactor Vessel Head
6. Reactor Vessel Shield Plug
7. Reactor Vessel Head Thermal Insulation
8. New Fuel Storage Area
9. Refueling Platform
10. Fuel Storage Pool
11. Transfer Cask
12. Reactor Area Floor
13. Overhead Semi-Gantry Crane (75 Ton)
14. Monorail Crane
15. Heating and Ventilation Unit
16. Escape Lock
17. Equipment Lock
18. New Fuel Shipping Containers
19. Unloading Dock
20. Unloading Crane
21. Ventilation Fans
22. Reactor Recirculating Pump
23. Downcomer
24. Steam Water Riser
25. Offset Steam Drum
26. Emergency Condenser
27. Liquid Poison Tank
28. Control Room (Rear View)
29. Personnel Lock
30. Containment Sphere Ventilation Room
31. Reactor Feedwater Pumps
32. Sand Filters
33. Condensate Demineralizer
34. Neutralizer Tank
35. Reactor Feedwater Heaters
36. Main Turbine Condenser
37. Make-Up Water Demineralizer Tank
38. Condensate Pumps
39. Caustic Storage Tank (NaOH)
40. Turbine-Generator Unit (75 Mwe)
41. Turbine Building Crane (75 Ton)
42. Liquid Radioactive Waste Strainer
43. Liquid Radioactive Waste Hold Tanks
44. Acid Storage Tank (H_2SO_4)
45. Condensate Storage Tank
46. Demineralized Water Storage Tank
47. Spent Fuel Shipping Cask
48. Liquid Radioactive Waste Tanks
49. Calibration Facility

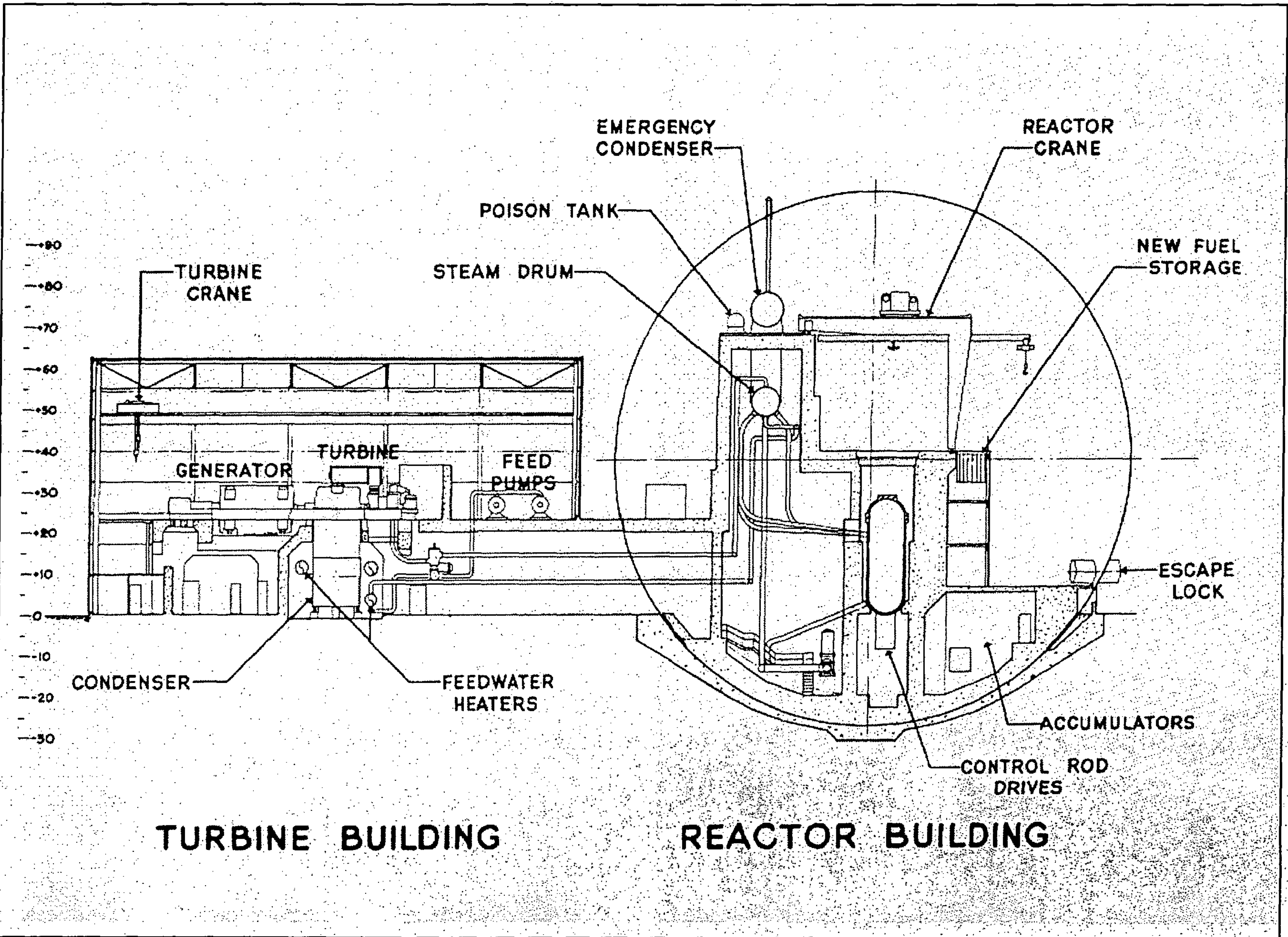
A. Containment Sphere
B. Turbine Building
C. Office Building
D. Substation
E. Information Center
F. Screen Well and Pump House
G. Parking Area
H. Ventilation Stack

CROSS SECTION (CUTAWAY) OF PLANT

Figure 3

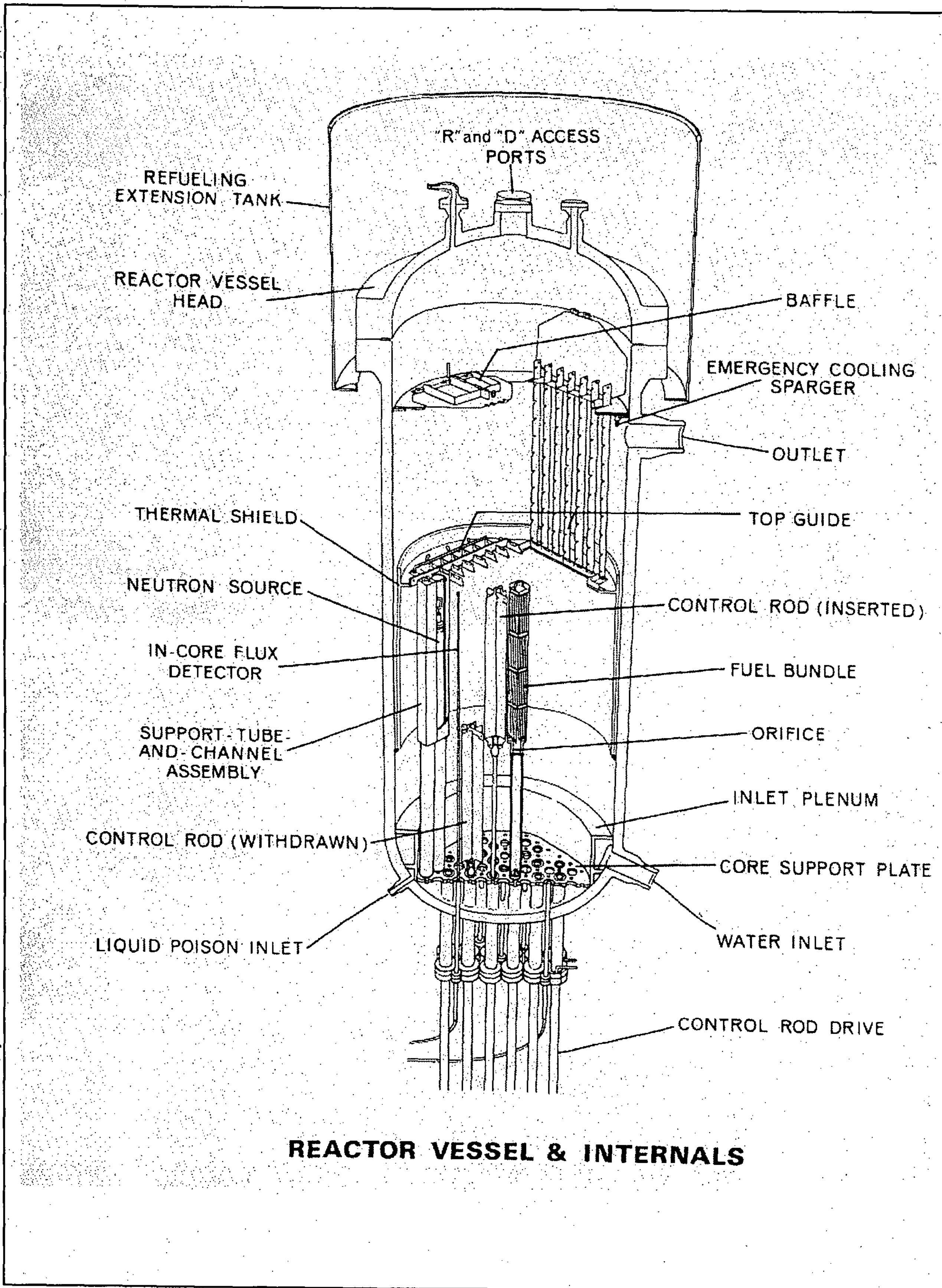
Source: Charlevoix Historical Society 2006

Figure 5. Cutaway Drawing of the Big Rock Point Nuclear Power Plant



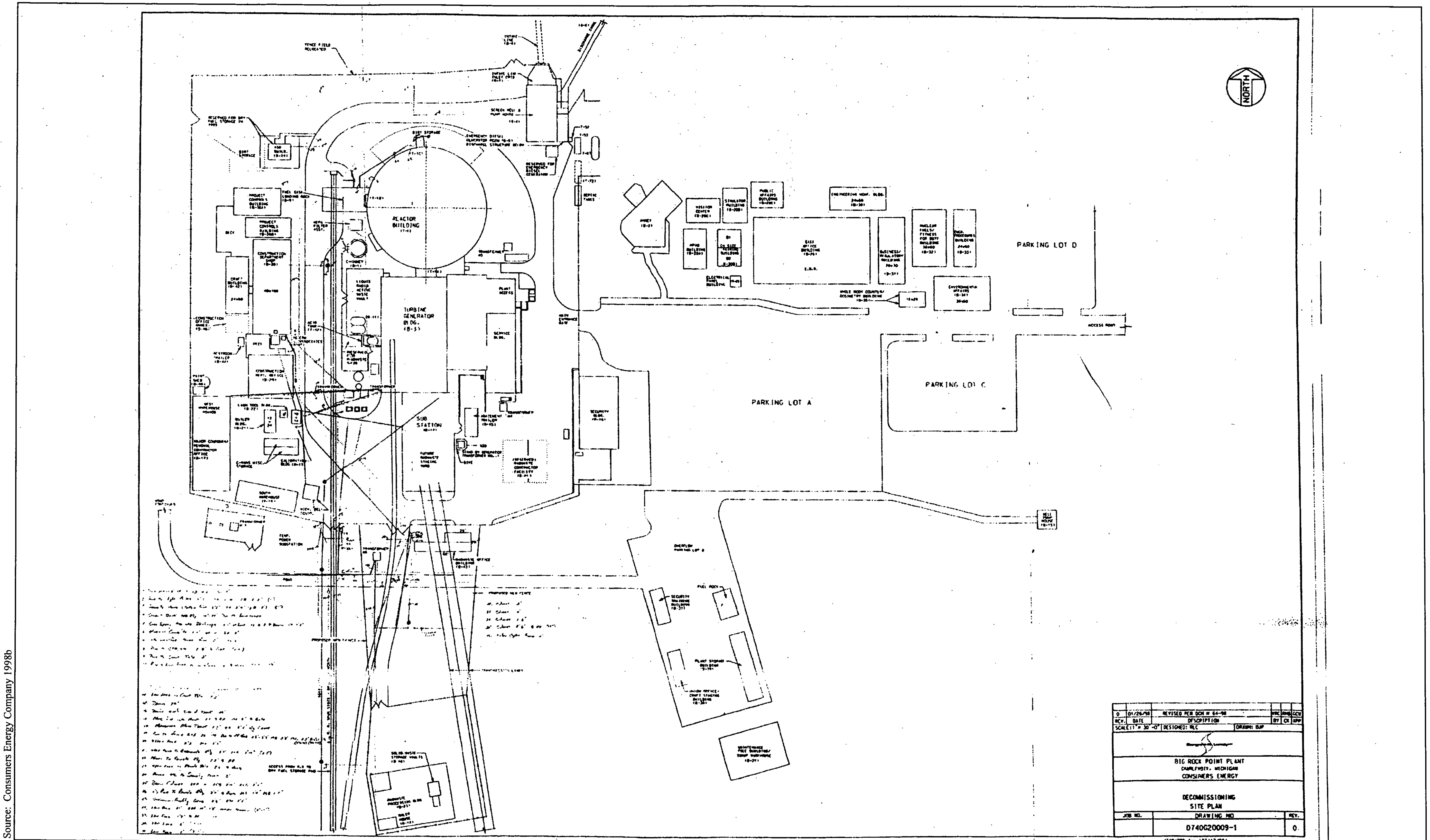
Source: Charlevoix Historical Society 2006

Figure 6. Significant Interior Components of the Turbine and Reactor Buildings



Source: Charlevoix Historical Society 2006

Figure 7. Interior Components of the Reactor Vessel



Source: Consumers Energy Company 1998b

Figure 8. Big Rock Point Nuclear Power Plant Decommissioning Site Plan

INDEX OF CD CONSTRUCTION PHOTOGRAPHS

BIG ROCK POINT NUCLEAR POWER PLANT
1960-1962

INDEX OF CD CONSTRUCTION PHOTOGRAPHS

Photo Number	Date	Description
1	5/18/1960	General Site View of Clearing Operation Looking West
2	5/18/1960	Looking Northwest from Field Office Along Turbine Building Line 6
3	5/18/1960	View from South fence line, looking North Along Line 6
4	5/18/1960	Looking West at Turbine Building Area Dewatering
5	5/18/1960	Turbine Building and Field Office Areas Looking Southeast
6	5/24/1960	Installing East Storm Sewer Looking North from Access Road
7	5/24/1960	Looking South Along C/L Reactor – Center of Sphere in Foreground
8	5/24/1960	Turbine Building Excavation Along Line 6 Looking South
9	5/24/1960	Looking South from Site Showing Clearing for Railroad
10	6/1/1960	Permanent Parking Storm Sewer Line Looking East
11	6/1/1960	View North Across Reactor Excavation
12	6/1/1960	First Concrete is Poured Turbine Building Footing A-1
13	6/8/1960	Turbine Building Foundation and Sphere Excavation Looking North
14	6/8/1960	Looking West Along Line 2 Warehouse and Fire Line Excavation
15	6/15/1960	Looking South Across Reactor Excavation Along Line 1
16	6/15/1960	Looking Southwest Across Turbine Building Foundation
17		Looking South Along Future Rail Road Tracks Construction Sub on Left
18		Turbine Building Footing Form Work on Lines 5 and 6 – Looking East
19		Looking South Along Completed Spur by Bechtel Corp.
20	6/22/1960	View West Across Reactor Excavation
21		View Southwest Across Turbine Building
22		Cyclone Fence Co. Installing Posts on East Boundary of Project
23	6/29/1960	Form Work on Concrete Support Ring Piers
24		Turbine Building and Reactor Excavation Looking Northeast
25	6/30/1960	View Southwest Across Turbine Building with 6 Line in the Foreground
26	7/1/1960	Form Work and Pouring of Concrete for Condenser Foundation
27	7/7/1960	Wedding of the Rails Looking South
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29	7/6/1960	Grading and Compaction Prior to Installing 54" Circulation Water Line
30		Chicago Bridge and Iron Company, Erection Tower Arriving on Job
31	7/12/1960	Installing First Section of Concrete Pipe for Circulation Water Lines
32	7/13/1960	Looking North Along a Line Form Work and Tunnel Footings
33		Pre-Cast Beams and Piers for Reactor Sphere Support Ring
34		Installation of 36" Circulation Water Lines in Turbine Building Looking West
35	7/19/1960	General View Looking Northeast
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37	7/26/1960	Raising Section of Erection Tower for Chicago Bridge and Iron
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40	7/27/1960	View Southeast Across Side Showing Forming of Tunnel Walls
41		Concrete Pour on Wall Line E, From 3-4, to Elevation 616'
42		Turbine Pedestal Re-Steel Mat Looking Northwest
43	8/7/1960	Reactor Sphere Excavation and Tunnel Formwork
44		Final Section of Erection Tower Being Lifted into Place
45		Turbine Pedestal Mat and Tunnel Walls at B and C Lines – Looking Northwest

Photo Number	Date	Description
46		Turbine Building Walls and Erection Tower and Boom – Looking Northwest
47	8/10/1960	Installation of Transite Conduit Looking Along Line 6
48		Turbine Pedestal Mat During Concreting Operations – Looking East
49		Erecting Support Columns for Reactor Containment Vessel
50	8/17/1960	Turbine Pedestal Forming and Re-Steel to Elevation 593' – Looking Northwest
51		Erection of Structural Steel by Whitehead and Kales – Looking Northwest
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60		Containment Vessel Showing Complete Equator Course – Looking Southwest
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90	10/25/1960	Plant Site, Looking Northeast
91	10/25/1960	Plant Site, Looking West from US 31 Tourist Park

Photo Number	Date	Description
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117	1/4/1961	Installing Escape Lock on Containment Vessel
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128	1/14/1961	Recording Chart and Gauges fir Sphere Pressure Test
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Photo Number	Date	Description
137	1/18/1961	Personnel Lock and Penetrations from Inside Sphere
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156	3/29/1961	Lathing on Exterior Wall, Service Building
157	3/29/1961	Form Work – North End of Reactor Building – Looking East
158	4/5/1961	Excavation for Liquid Radwaste Vault Looking Northeast
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161	4/14/1961	Reactor Feed Pumps – Turbine Building
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165	5/3/1961	Excavation for 36" and 54" Circulation Water Lines – Looking West
166	5/3/1961	Circulating Water Anchor Block "A" Looking Southeast
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168	5/3/1961	Re-Steel for Liquid Radwaste Slab Looking Northeast
169	5/13/1961	Forming Walls of Liquid Radwaste Vault Looking Northeast
170	5/16/1961	Reactor Building Form Work and Re-Steel Looking Southeast
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175	5/23/1961	Information Building - Looking East
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177	5/24/1961	Excavation for Solid Waste Storage Vaults, Looking Northeast
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180	5/26/1961	Information Building - Looking East
181	6/1/1961	Station Service 2400V Cable Bus Duct with Aluminum Enclosure
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Photo Number	Date	Description
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184	6/7/1961	Reactor Cavity Concrete Pour at Elevation 600'
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190	6/26/1961	Spent Fuel Pit Slab During Concrete Pour – Looking Southeast
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196	7/3/1961	Main Turbine Parts Arrive on Job
197	7/3/1961	Reactor Building Form Work Looking Southeast
198	7/5/1961	Entrance to Information Building
199	7/5/1961	General View of Buildings – Looking Northwest
200	7/5/1961	Excavating for Intake Duct, Looking North
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202	7/21/1961	Lundtke Company Temporary Dock, Round Lake, Charlevoix
203	7/21/1961	Stack Foundation and Miscellaneous Piping Looking Northwest
204	7/24/1961	Setting Length of 5'-0" Diameter Re-Circulation Pump (RCP) Intake Line
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209	8/2/1961	West Side Yard Area, Looking South
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211	8/2/1961	Start of Form Work for Concrete Vent Stack
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Photo Number	Date	Description
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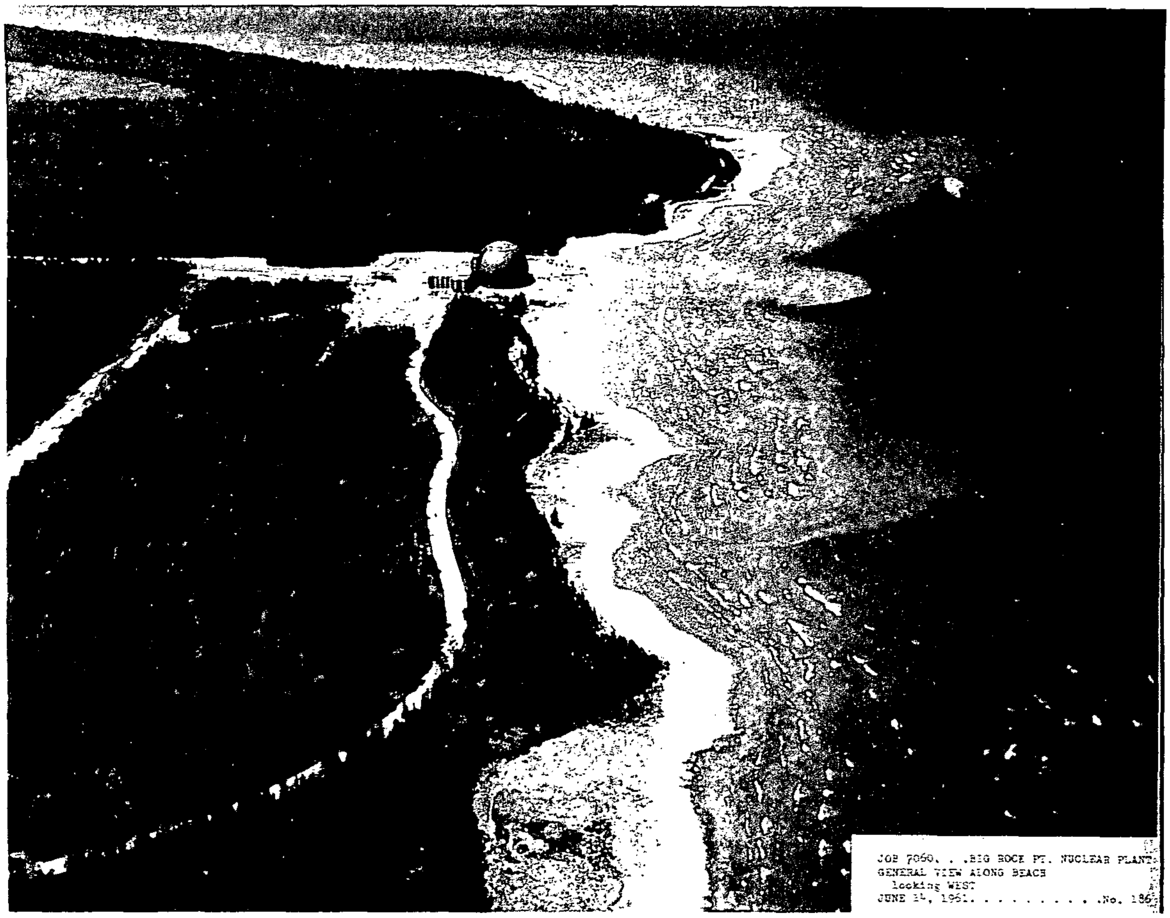
238	9/28/1961	Fuel Pit and Heat Exchanger, Room 418, Reactor Building
239	9/28/1961	North Wall Steam Drum Enclosure Looking South
240	9/28/1961	Domestic Water Tank and well House, Looking East
241	9/28/1961	General View of Site, Looking Northwest
242	10/5/1961	Steam Drum Support Steel at Elevation 660'-6", Looking East
243	10/11/1961	Circulating Water Intake Structure Ready for Installation
244	10/16/1961	Intake Crib Being Submerged, Looking Northeast
245	10/24/1961	Screen House from Centerline of Discharge Canal
246	10/24/1961	Room 318, Chemistry Lab Equipment, Looking North
247	10/24/1961	Portion of Reactor Building Crane and Reactor Cavity, Looking Southeast
248	10/31/1961	Applying Built-Up Roof on Screen House, Looking North
249	10/31/1961	Solid Waste Storage Vaults, Looking South
250	10/31/1961	Condenser and Miscellaneous Equipment Looking East
251	10/31/1961	Permanent Out Door Sub Station Looking South
252	11/14/1961	East Elevation Showing Company Sign
253	11/15/1961	Bechtel Corporation Installation Permanent Sub Grounding Loop – Looking North
254	11/15/1961	Installing Screen House Equipment, Looking South
255	11/15/1961	Reactor Building Crane – Looking East
256	11/15/1961	Electrical Penetrations at Reactor Building Interior
257	11/15/1961	Stainless Steel Nuclear Steam Supply System (NSSS) Piping in Bottom of Steam Drum Enclosure
258	11/27/1961	Preparing Steam Drum for Main Lift
259	11/28/1961	Steam Drum During Lift, Looking East
260	11/28/1961	Steam Drum at Top of Lift, Showing Temporary Support Beams
261	12/1/1961	General View in Turbine Building Looking Southeast
262	12/1/1961	Main Control Room Panels, Looking East
263	12/1/1961	Main Steam Drum in Place Looking Southeast
264	12/1/1961	Aerial View of Plant Looking West
265	12/1/1961	Aerial Vies of Plant – Looking North
266	12/1/1961	Aerial View of Plant – Looking South East
267	12/1/1961	Aerial View of Plant – Looking South West
268	12/13/1961	Potential Transformer Compartment 1st Floor Turbine Building
269	12/13/1961	Main Turbine Front Standard
270	12/15/1961	Bailer House for Solid Radwaste Storage Vaults
271	12/20/1961	Insulating High Pressure Suction of Main Turbine
272	12/20/1961	Installing Riser at Main Steam Drum

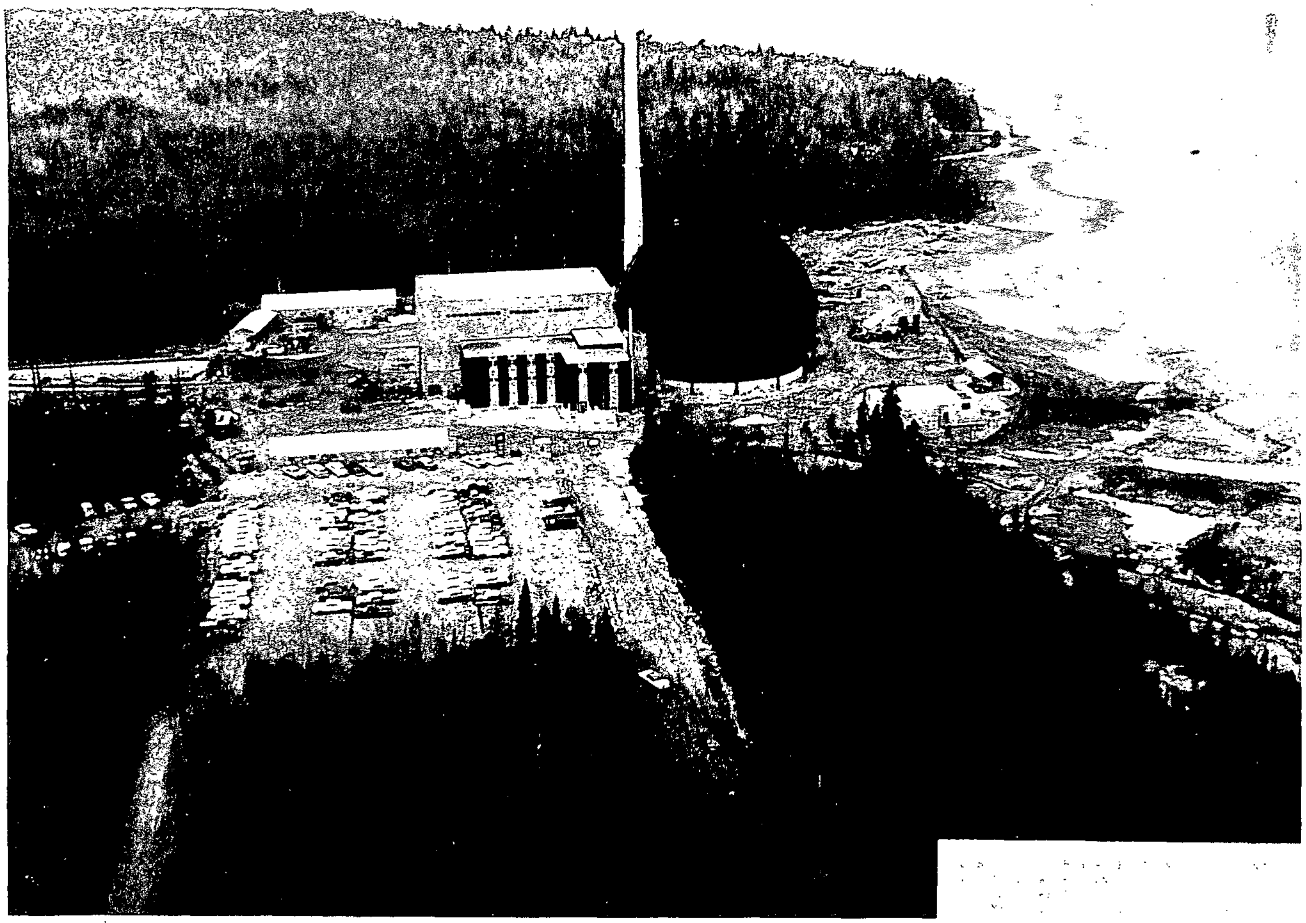
Photo Number	Date	Description
273	1/2/1962	Reactor Vessel Head Arrives on Job
274	1/10/1962	Addition to Construction Sub Station for Temporary 2400 Volt Service
275	1/10/1962	Temporary 2400 Volt Service Tied to Permanent Station Power Bus
276	1/15/1962	Nuclear Steam Supply system risers in Place, Looking South
277	1/15/1962	Steam Drum Enclosure Looking Southwest
278	1/15/1962	Form Work and Re-Steel for Turbine Shield Wall
279	1/15/1962	Furniture in Plant Superintendent's Office
280	1/15/1962	No. 1 Reactor Re-Circulation Pump Casing
281	1/15/1962	Make-Up Demineralizer Tank, Looking South
282	2/6/1962	Preparing to Move Reactor Vessel Off Rail Road Car
283	2/8/1962	Reactor Cavity Ready for Vessel, Looking South
284	2/8/1962	Setting Oil Circuit Breakers Main Sub-Station
285	2/8/1962	Vessel Moving to Reactor Building, Looking North
286	2/9/1962	Vessel Being Lifted to Vertical Position in Reactor Building
287	2/9/1962	Preparing to Remove Skid from Vessel
288	2/9/1962	Vessel Hanging Over Reactor Cavity – Looking East
289	2/9/1962	Vessel Being Lowered Into Reactor Cavity
290	2/14/1962	Reactor Vessel Support Bracket No. 1 North Side
291	2/14/1962	Thermo-Flex Insulation at Control Rod Drive Assemblies
292	2/14/1962	Looking Down into Reactor Vessel
293	2/14/1962	Nuclear Steam Supply System (NSSS) Risers Being Tied Into Reactor Vessel
294	2/14/1962	Turbine-Generator and Shielding Wall Looking Northeast
295	2/14/1962	Emergency Condenser Piping at Elevation 660"-6" Reactor Building
296	3/8/1962	Fuel Transfer Coffin in Storage Rack
297	3/8/1962	Poison Tank Set in Place Looking Southeast
298	3/8/1962	Work Station in Control Rod Drive Equipment Room
299	3/18/1962	View of Discharge Canal and Off-Shore Ice
300	3/18/1962	Looking Down in Reactor Shield Cooling Jacket and Retainer Ring
301	3/18/1962	Piping and Valves on Anion and Cation Tanks, Condensate Demineralizer Room
302	3/18/1962	Mechanical Equipment in Operating Gallery of Liquid Radwaste Area
303	3/18/1962	Erection of Blow-Out Panel at Steam Drum Enclosure
304	3/20/1962	Flange of Reactor Vessel Seat With "O" Rings In Place
305	3/20/1962	Reactor Vessel Head in Decontamination and Wash Down Area
306	3/20/1962	Reactor Vessel Head Being Lowered In Place
307	3/22/1962	Reactor Vessel Head Stud Tensioners Being Lowered Into Position
308	3/22/1962	Stud Tensioner In Place on Vessel Head
309	3/22/1962	Main Transformer Arriving on Job
310	3/22/1962	Work Progress on Out Door Sub Station, Looking West
311	4/4/1962	Fuel Pit Service Platform, Looking Northeast
312	4/4/1962	Piping System at Liquid Poison Tank
313	4/10/1962	Reactor Core Spray Sparger Being Tested
314	4/11/1962	Emergency Condenser Tube Bundles Being Installed
315	4/12/1962	Setting Exterior Tank on Top of Reactor Vessel
316	4/16/1962	Main Reactor Re-Circulation Pump Impeller
317	4/16/1962	Reactor Support Hanger Segments In Place
318	4/25/1962	Grading Work Around Screen House Looking North

Photo Number	Date	Description
319	4/25/1962	Re-Circulation Pump No. 1 With Motor Installed
320	4/25/1962	Erecting Temporary Steam Boiler South of Turbine Building
321	4/25/1962	Annular Retainer and Hi-Density Aggregate - Bottom of Reactor
322	4/25/1962	View Looking West Along Beach
323	4/25/1962	Preparing for Zone III Concrete Pour to Elevation 616' – Looking Southeast
324	4/25/1962	Main Out Door Sub Station Looking Northwest
325	4/27/1962	Core Support Plate Arriving on Job
326	5/8/1962	Screen House During Test on Fire Equipment
327	5/14/1962	Pouring Concrete at Reactor Cavity to Elevation 616'
328	5/14/1962	General View, South Elevation of Plant
329	5/231962	Lifting Concrete Reactor Top Shield Ring
330	5/241962	Main Front Entrance, Looking West
331	6/6/1962	General Electric Personnel Working on Turbine Front Standard
332	6/6/1962	Air Compressors in Room 105, Looking North
333	6/6/1962	Reactor Feed Water Pump and Piping, 1 E, Looking East
334	6/6/1962	Turbine Room 121, Decontamination Wash Down Area – Looking South
335	6/6/1962	Replacing Steel Sphere Plates at Temporary Access Hole
336	6/6/1962	Core Support Plate With Guide Tube Supports Installed
337	6/7/1962	Temporary Pipe Through Turbine Building Wall During Main Steam Drum Blow
338	6/25/1962	Reactor Re-Circulation Pump No. 1 and Aux. Piping
339	6/25/1962	Control Rod Driver Withdrawal and Inset Lines Beneath Reactor
340	6/25/1962	Portion of Control Rod Drive Piping Room 405 Lower Elevation
341	6/27/1962	Painting of Sphere Exterior, Looking North
342	6/27/1962	Parking Lot and Entrance Road During Blacktop Operation
343	6/27/1962	Information Building, Looking East
344	6/29/1962	Main Steam Drum With Internals Installed
345	7/11/1962	Testing Fire Protection Spray System on Out Door Sub Station
346	7/19/1962	Control Rod Drive Piping, Room 405, Upper Level
347	7/19/1962	Start-Up Source Holders Arrive on Job
348	7/19/1962	Baffle Plate and Spray Sparger
349	7/19/1962	Preparing Top Grid Guide for Installation
350	7/21/1962	Reactor Vessel Head Installation
351	7/27/1962	Spray Painting of Sphere Interior
352	7/27/1962	Warehouse and Instrument Test Facility Buildings, Looking Southwest
353	7/27/1962	General View Looking South With Temporary Sub Station Removed
354	7/27/1962	Sphere Penetrations in Turbine Building Pipe Tunnel, Looking North
355	7/27/1962	Preparing to Install Vessel Internals, Elevation 632'-6", Operating Floor, Reactor Building
356	7/31/1962	Plant and General Electric Personnel Inspecting Fuel Bundles
357	8/2/1962	Fuel Bundle Ready for Lowering Into Storage Racks, Elevation 632'-6"
358	8/7/1962	Installing Control Rod Drives, Bottom of Reactor
359	8/12/1962	Reactor Vessel During Installation of Internals
360	8/14/1962	Reactor Vessel with Internals Completely Installed
361	9/3/1962	Screen House Elevation Looking Northeast
362	9/3/1962	Tanks at Liquid Radwaste Area, Looking Northeast
363	9/3/1962	Elevation of Reactor Building Looking East

Photo Number	Date	Description
364	9/3/1962	Solid Radwaste Vaults and Gantry Crane Looking Northeast
365	9/3/1962	Room 104, Machine Shop, Looking North
366	9/3/1962	Sand Filtering for Make-Up Demineralizer System, Elevation 616', Turbine Building
367	9/3/1962	New Fuel Shipping Container in the Reactor Building
368	9/3/1962	Control Rod Drives, Bottom of Reactor Vessel, Looking Up
369	9/3/1962	Reactor Re-Circulation Pump and Piping, Room 400, Looking East
370	9/3/1962	New Spent Fuel Pit Filter, Elevation 599', Reactor Building
371	9/3/1962	Spent Fuel Pit, Reactor Building, Elevation 632'-6", Looking East
372	9/3/1962	Room 451, Refueling Floor, Elevation 632'-6", Looking Northwest
373	9/3/1962	Area West of the Reactor, Looking South
374	9/3/1962	Miscellaneous Control Panels, Reactor Building, Room 445, Looking West (Ventilation)
375	9/3/1962	Outside Opening of Equipment Lock, Looking Southeast
376	9/3/1962	Poison Tank and Emergency Condenser, Elevation 660'-6", Looking Southeast
377	9/12/1962	Stainless and Zircaloy Fuel Channels
378	9/12/1962	Turbine Generator and Shield Wall, Looking Southeast
379	9/12/1962	Reactor Feed Pumps, Looking East
380	9/12/1962	Reactor Control Rods Before Installation
381	9/3/1962	Main Control Panel and Console, Looking Northwest
382	11/12/1962	Emergency Condenser Tube Bundle
383	11/12/1962	Computer "Memory Unit" Looking at Rear of Panel



Photograph 1

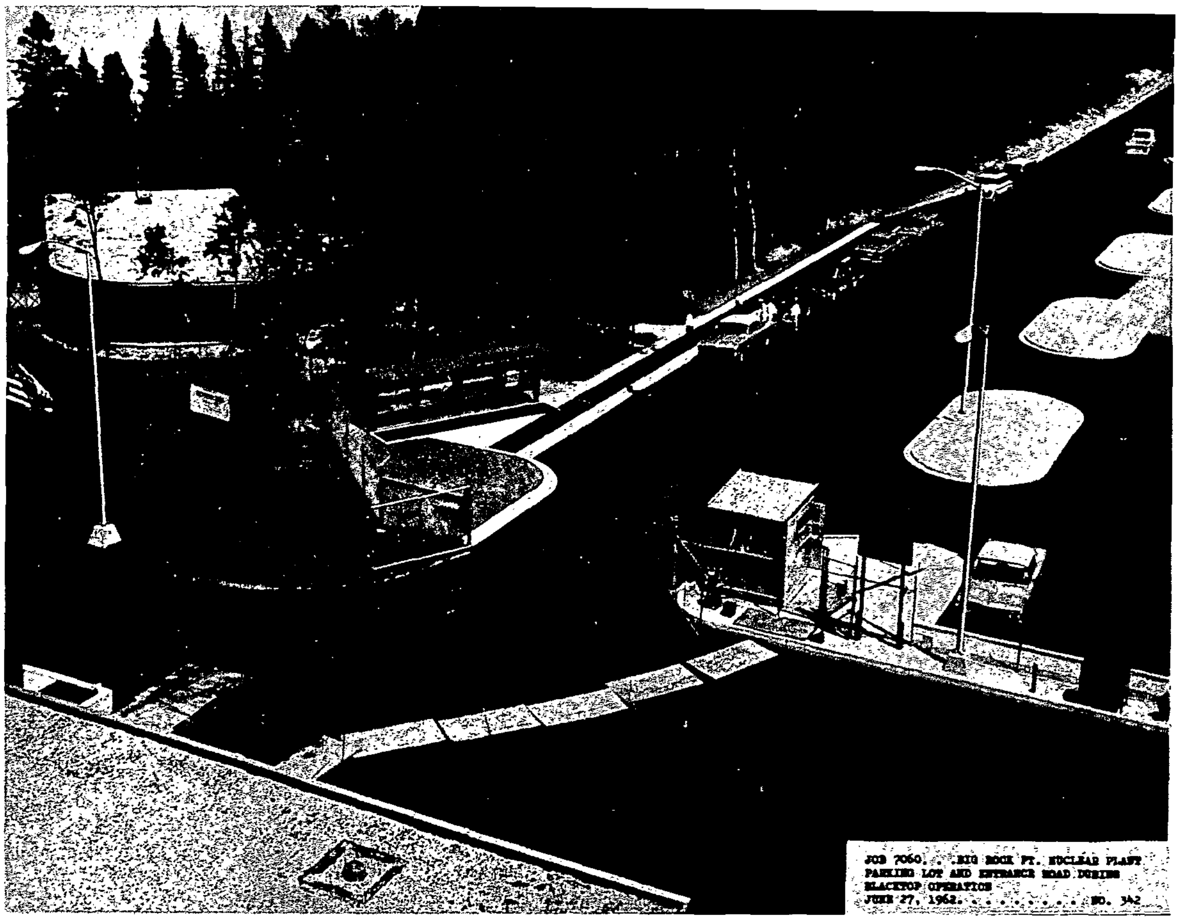


Photograph 2

Photograph 3

JOB 7060. . .BIG ROCK PT. NUCLEAR PLANT
VISITORS & EMPLOYEE PARKING LOT
looking EAST
AUGUST 29, 1961. . . . . .No. 224

Photograph 4



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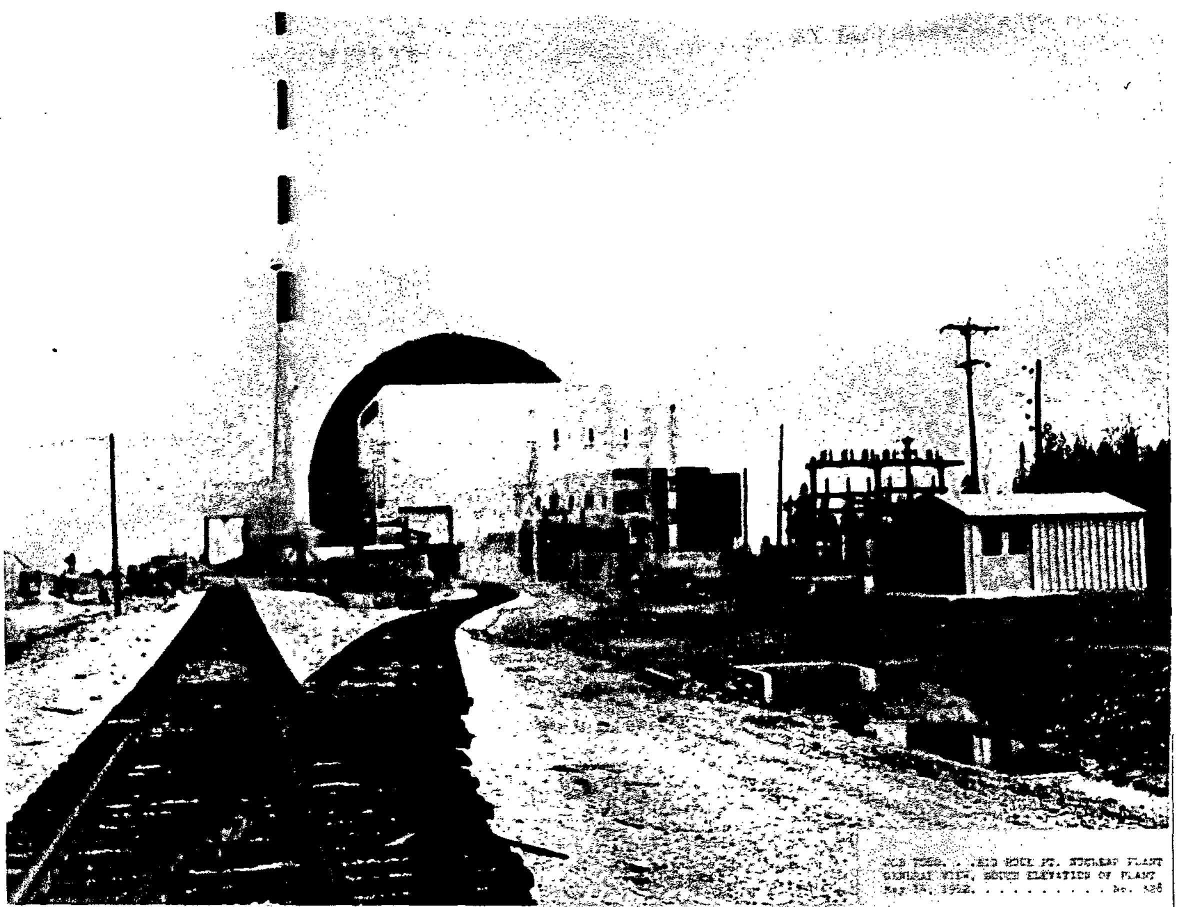
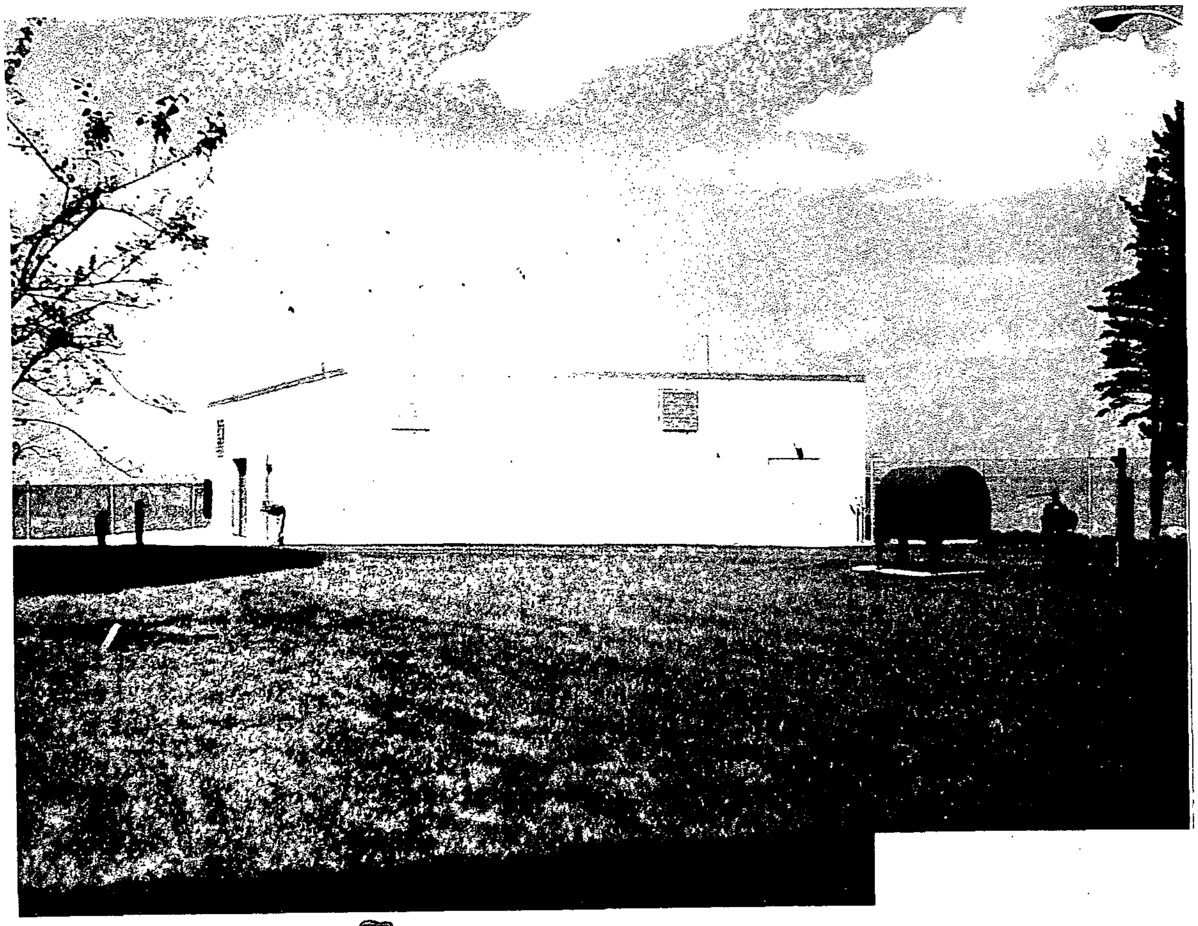


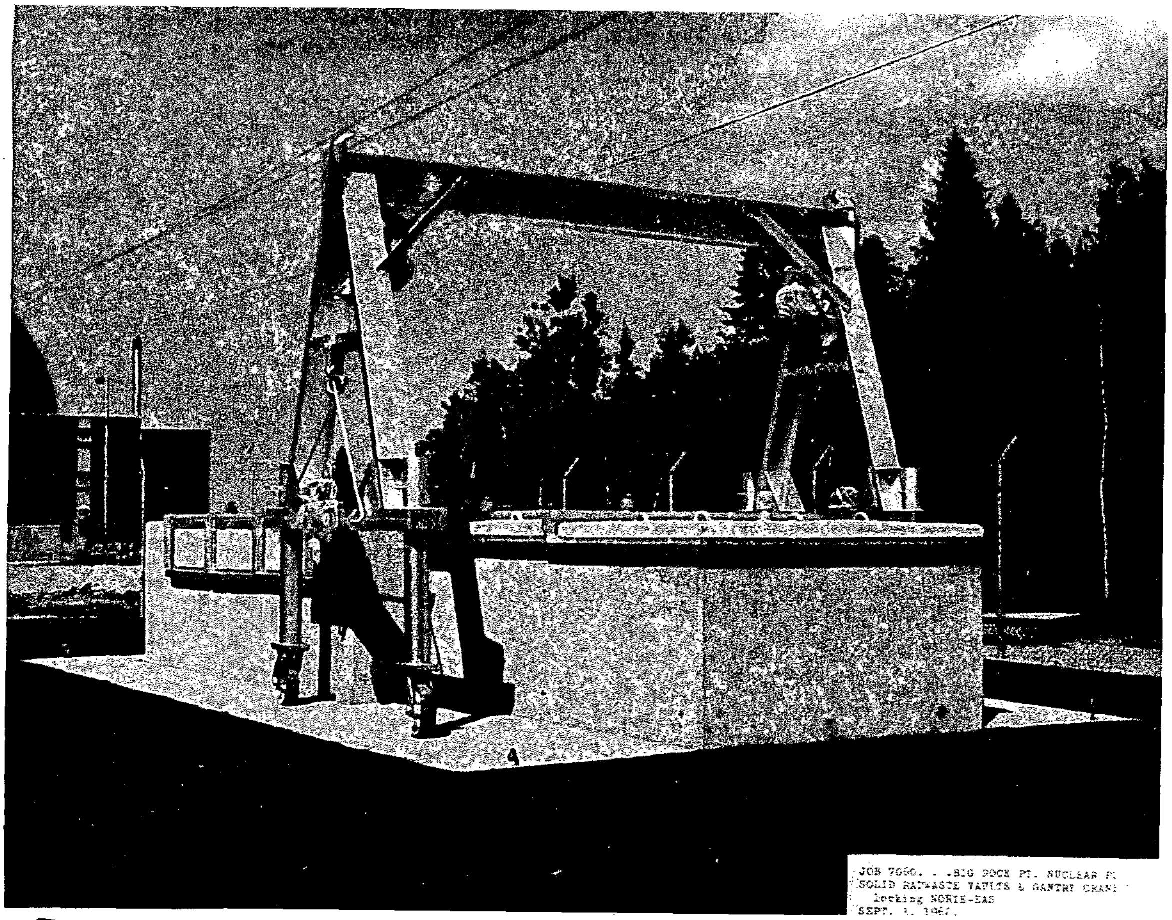
Photograph 6

JOB 7060. . .BIG ROCK PT. NUCLEAR PLANT
INFORMATION BLDG. LOOKING EAST
JUNE 27, 1962. . . . . NO. 343

Photograph 7

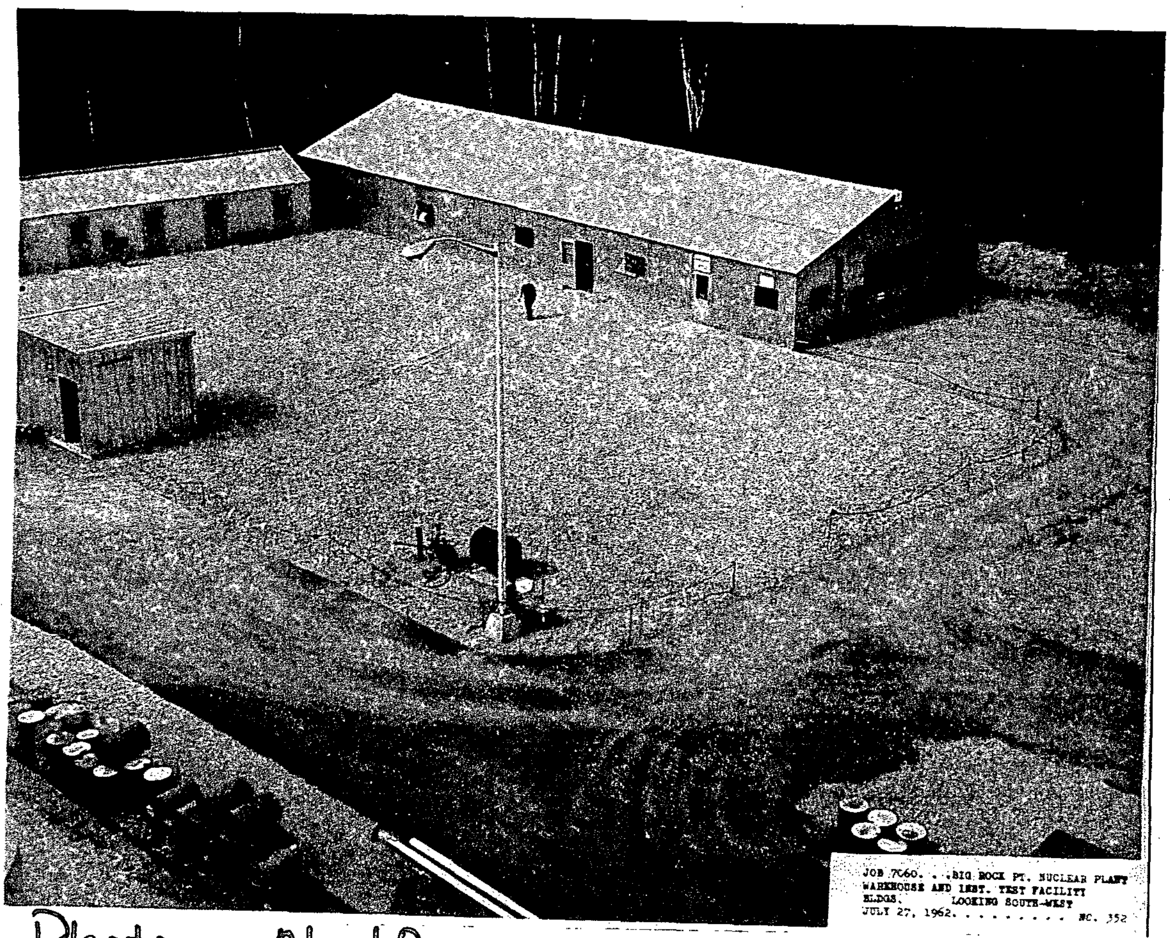


Photograph 8



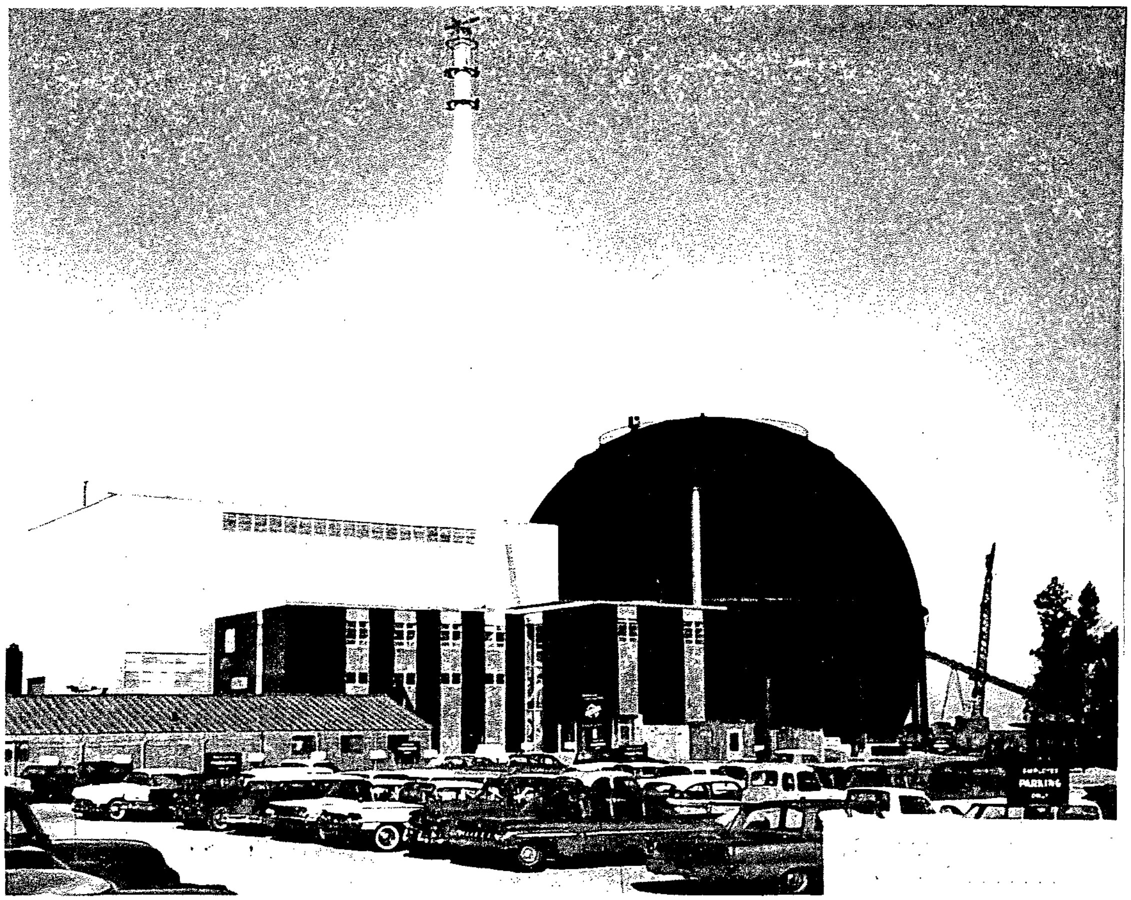
JOB 7060. . .BIG ROCK PT. NUCLEAR P
SOLID RADWASTE VAULTS & GANTRY CRAN
looking NORTH-EAS
SEPT. 3, 1962.

Photograph 9



JOB 7060. . .BIG ROCK PT. NUCLEAR PLANT
WAREHOUSE AND INST. TEST FACILITY
BLDGS. LOOKING SOUTH-WEST
JULY 27, 1962. . . . . NC. 352

Photograph 10



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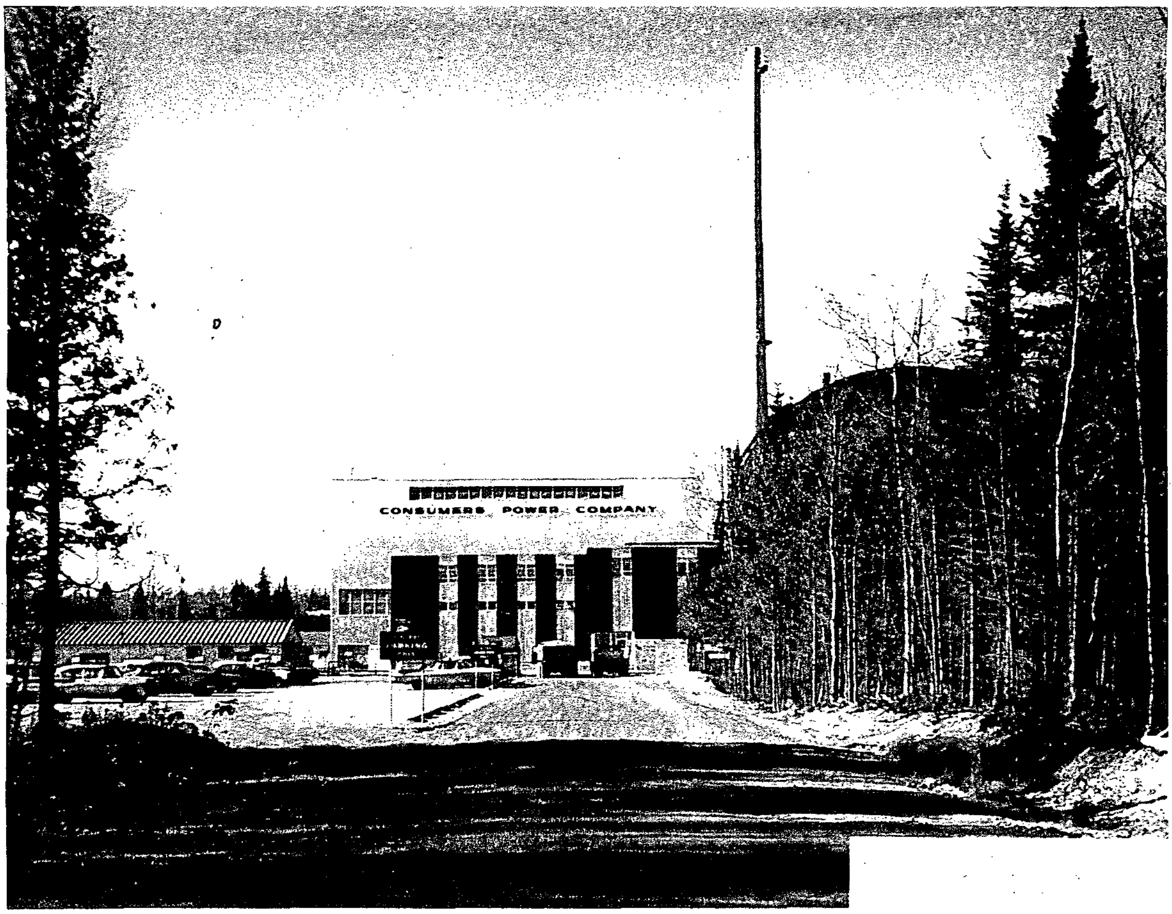

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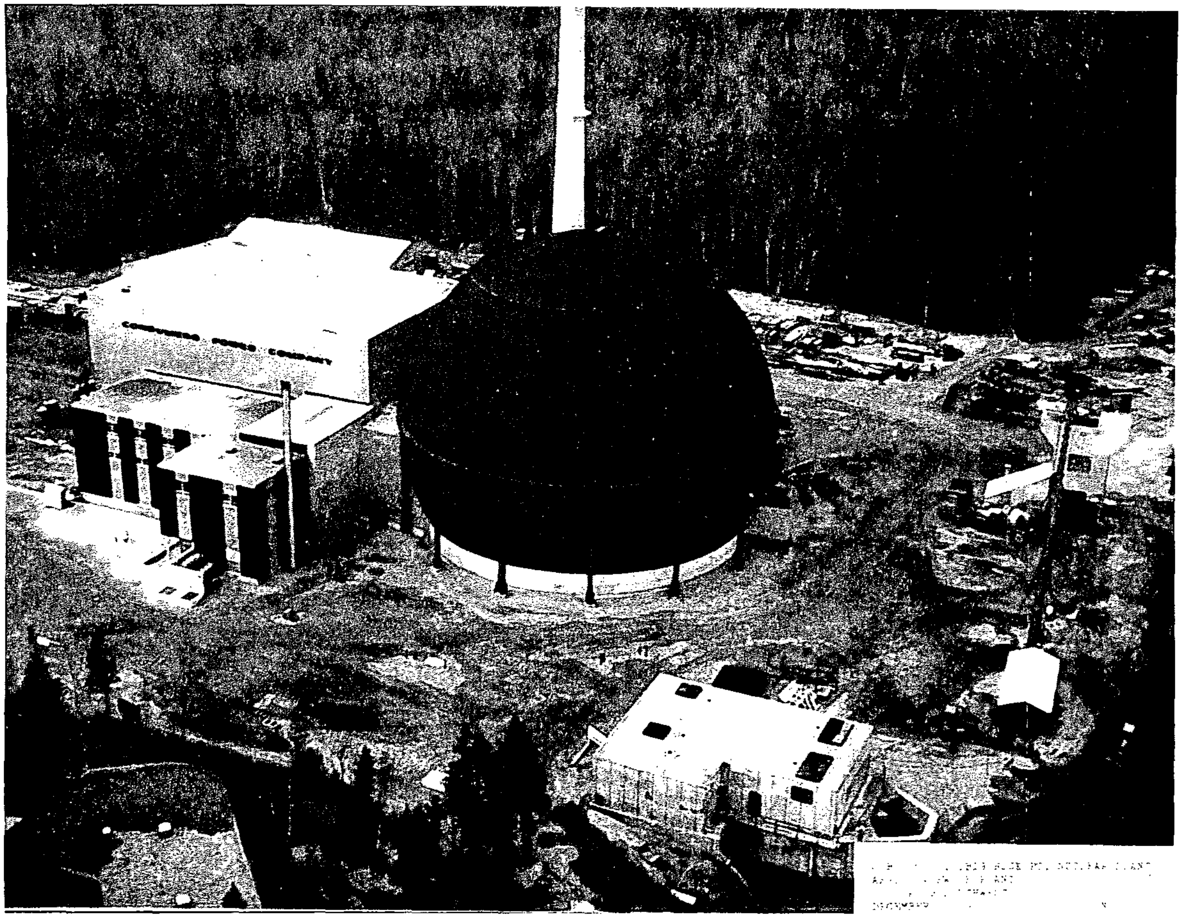

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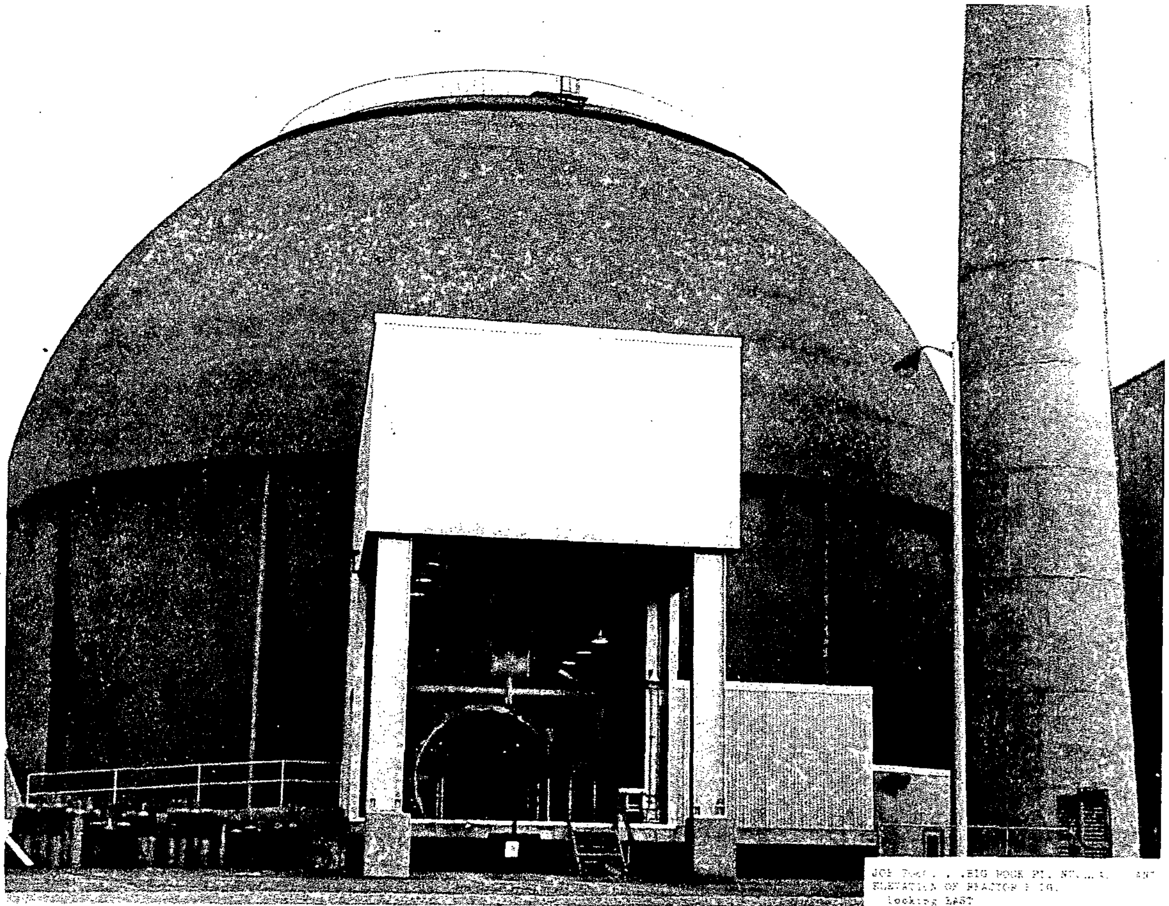

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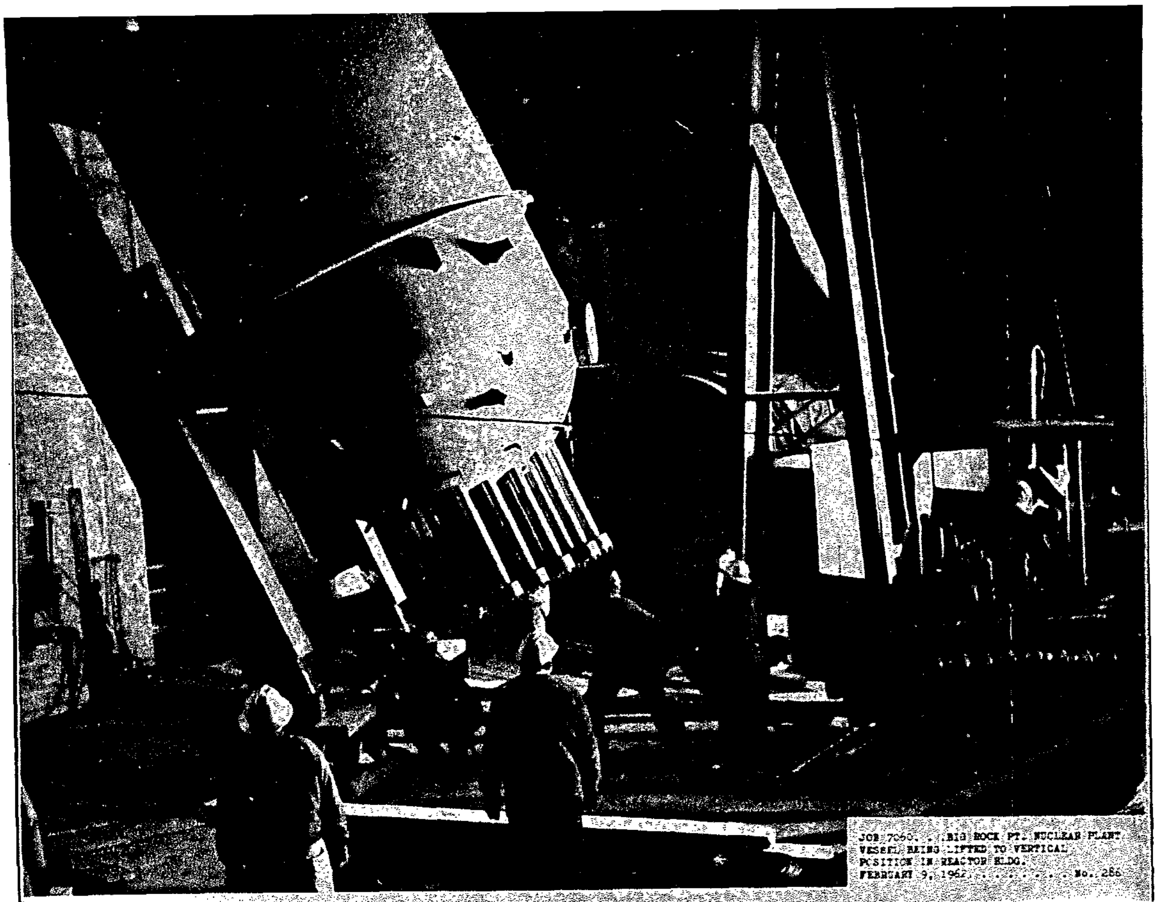
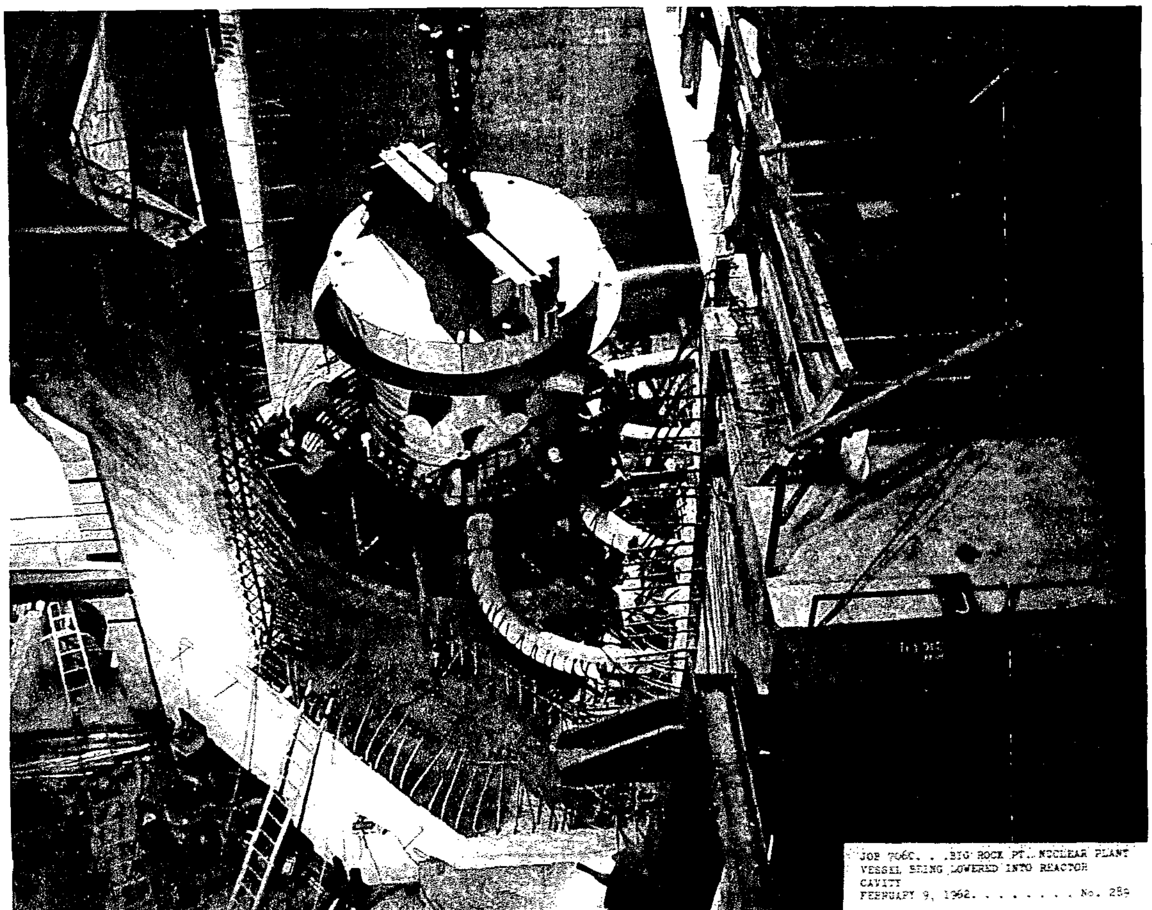


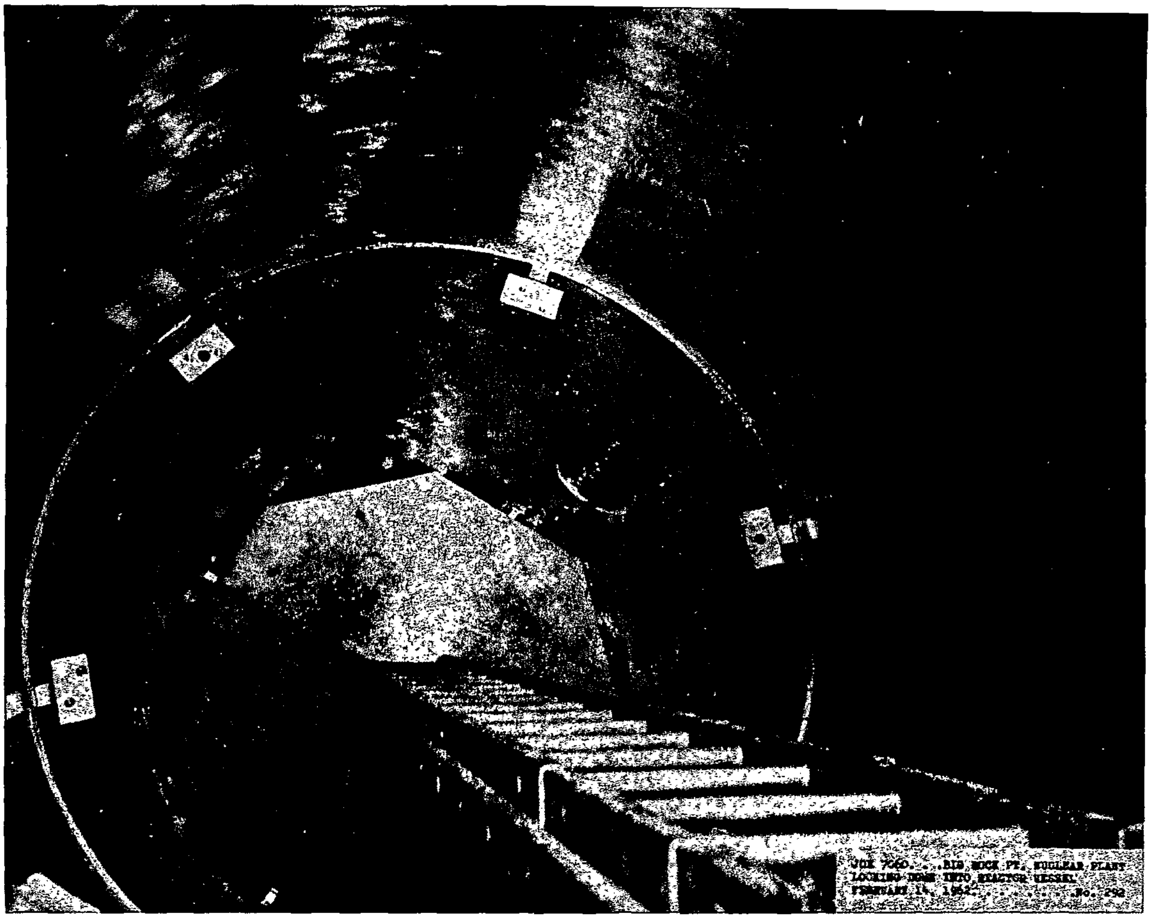
JOB 7060. . .BIG ROCK PT. NUCLEAR PLANT
VESSEL BEING LIFTED TO VERTICAL
POSITION IN REACTOR BLDG.
FEBRUARY 9, 1962. . . . . No. 286

Photograph 15

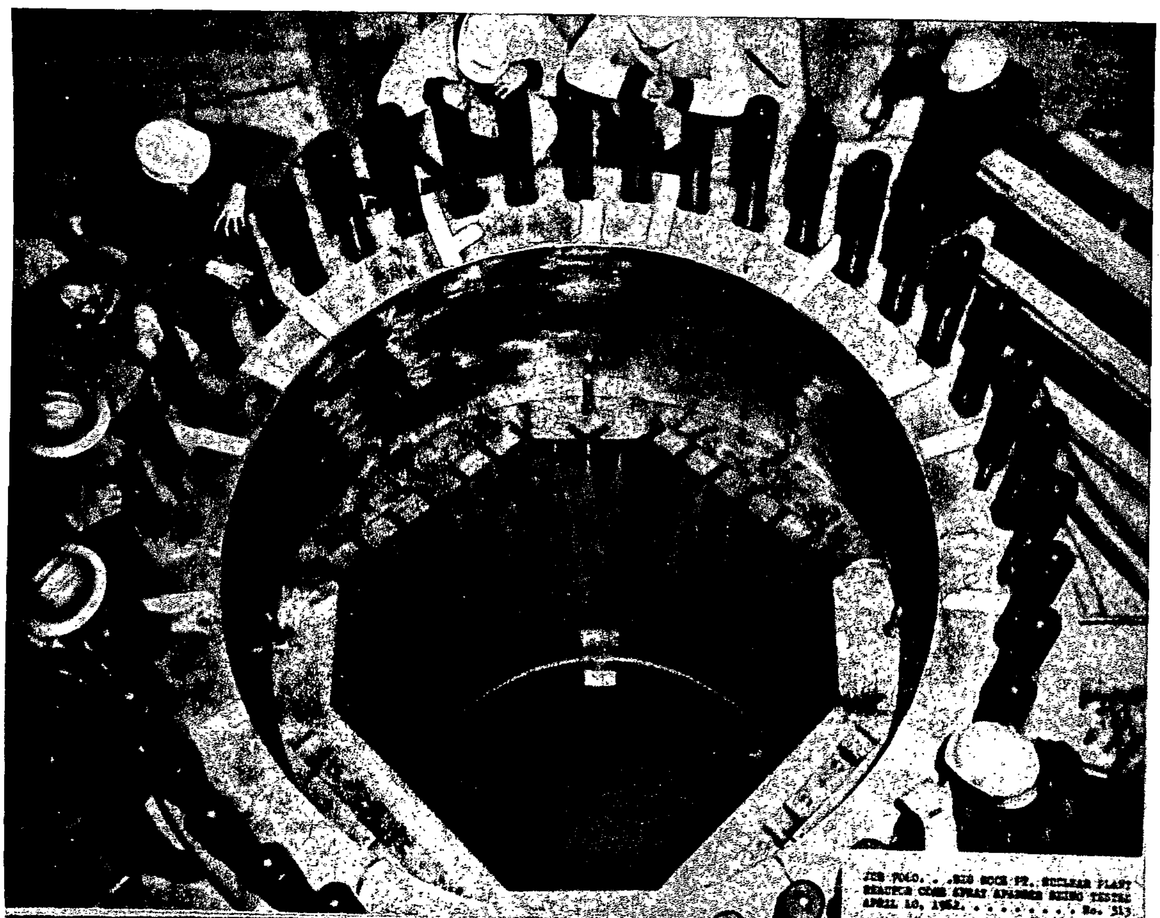


JOB 7060. . .BIG ROCK PT. NUCLEAR PLANT
VESSEL BEING LOWERED INTO REACTOR
CAVITY
FEBRUARY 9, 1962. . . . . No. 289

Photograph 16

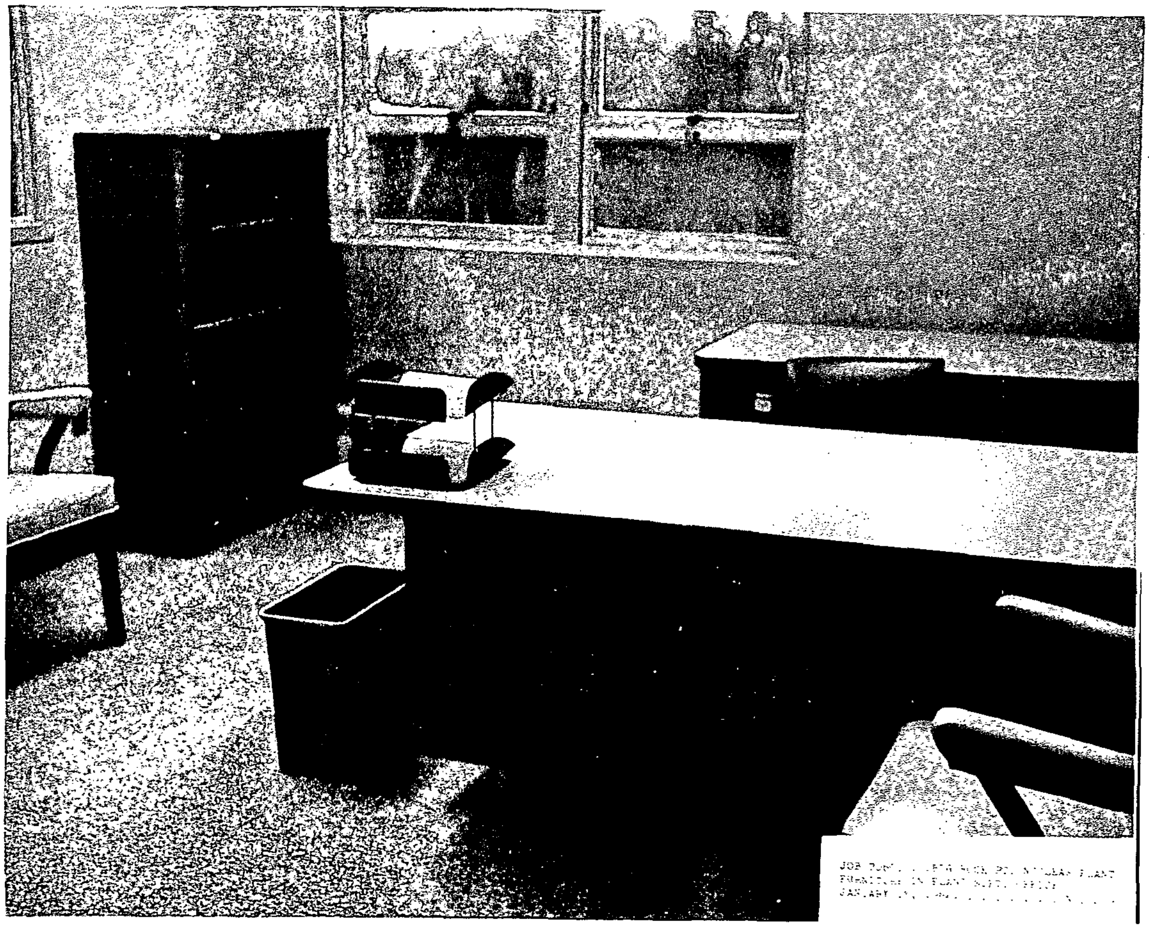


Photograph 17



Photograph 18

Photograph 19



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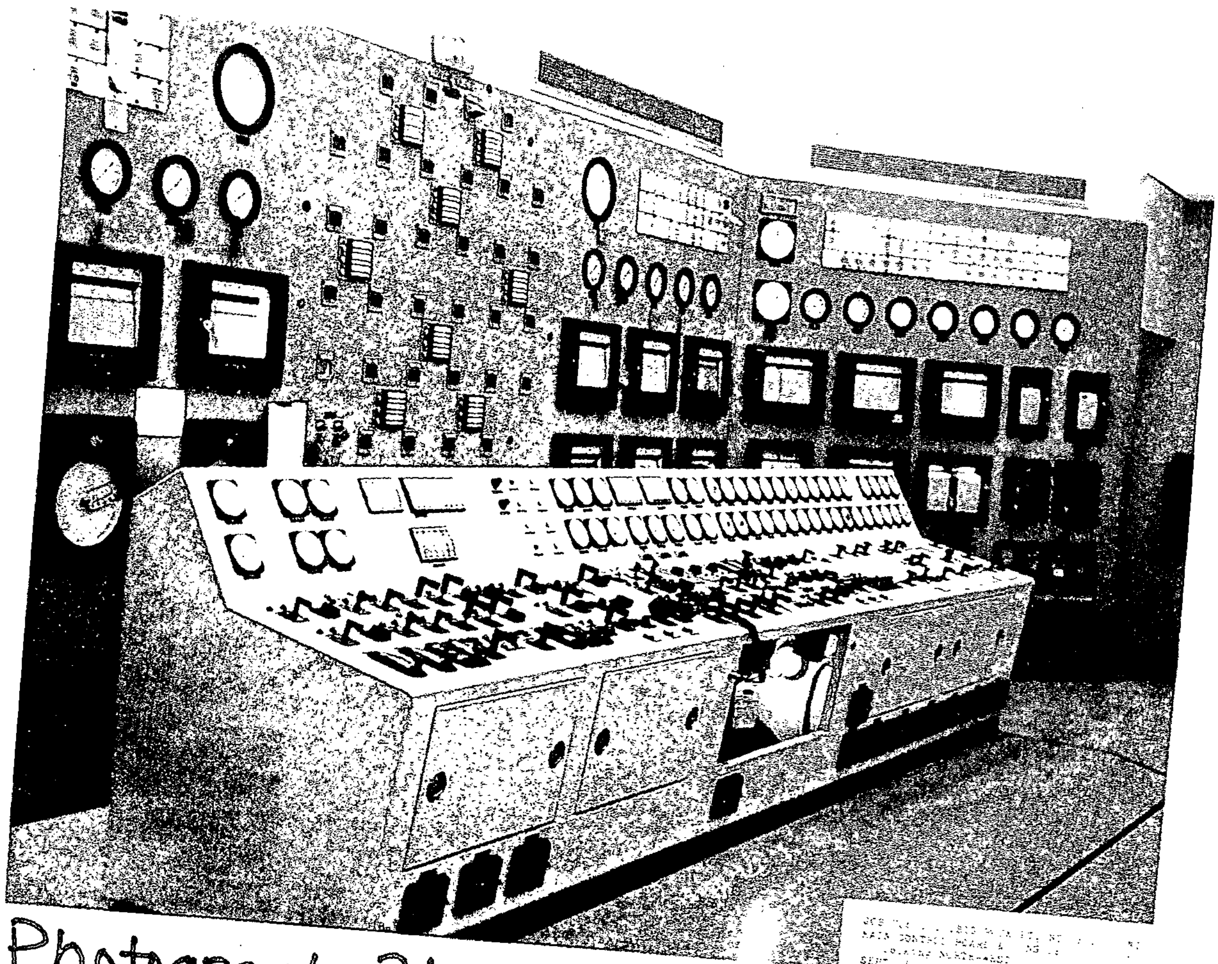

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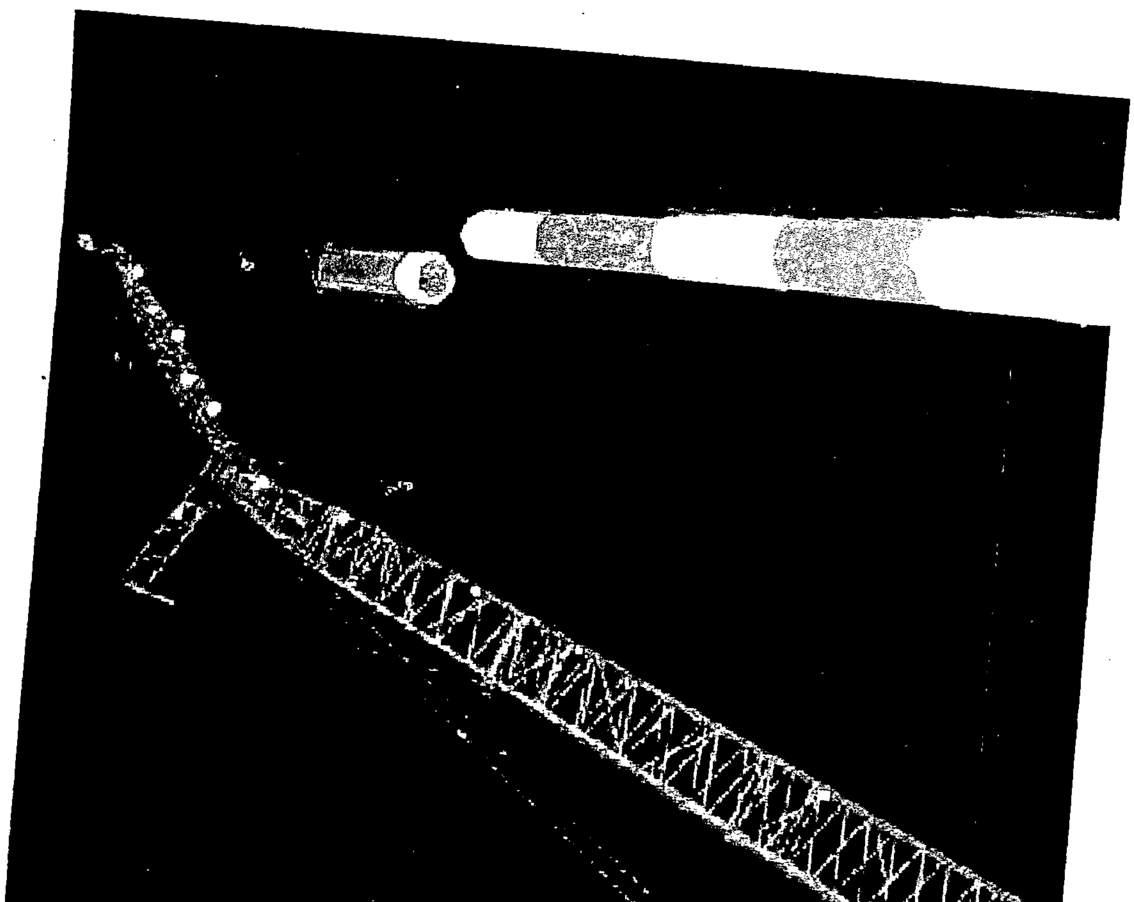

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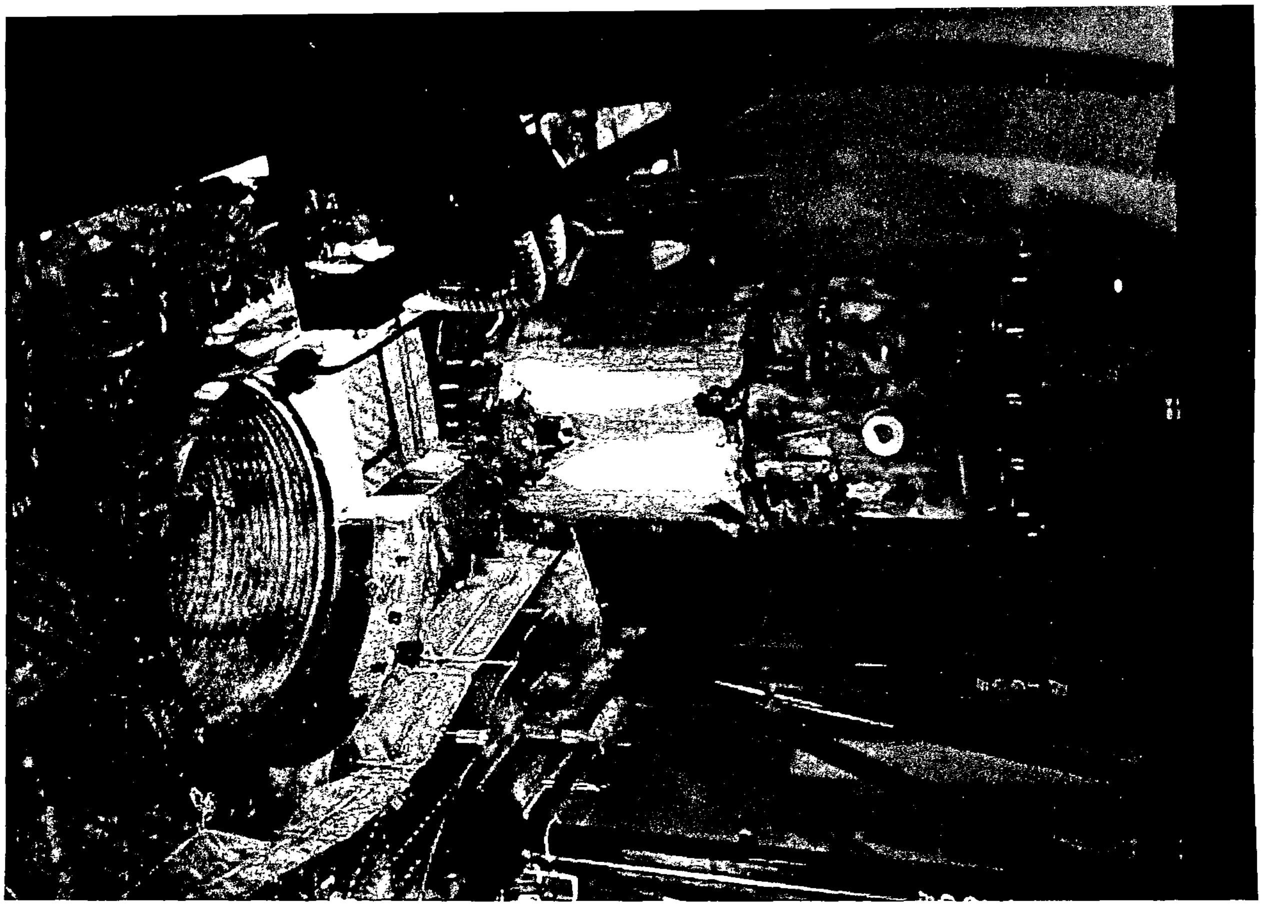

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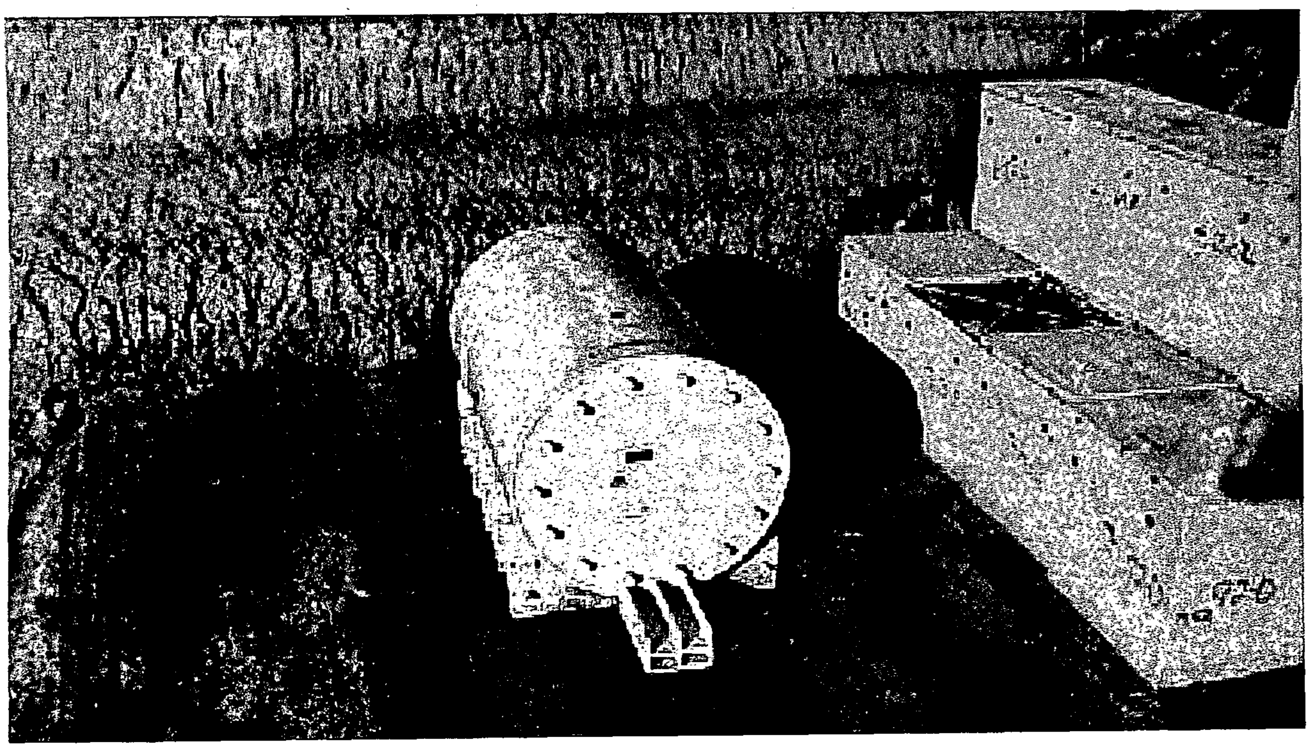

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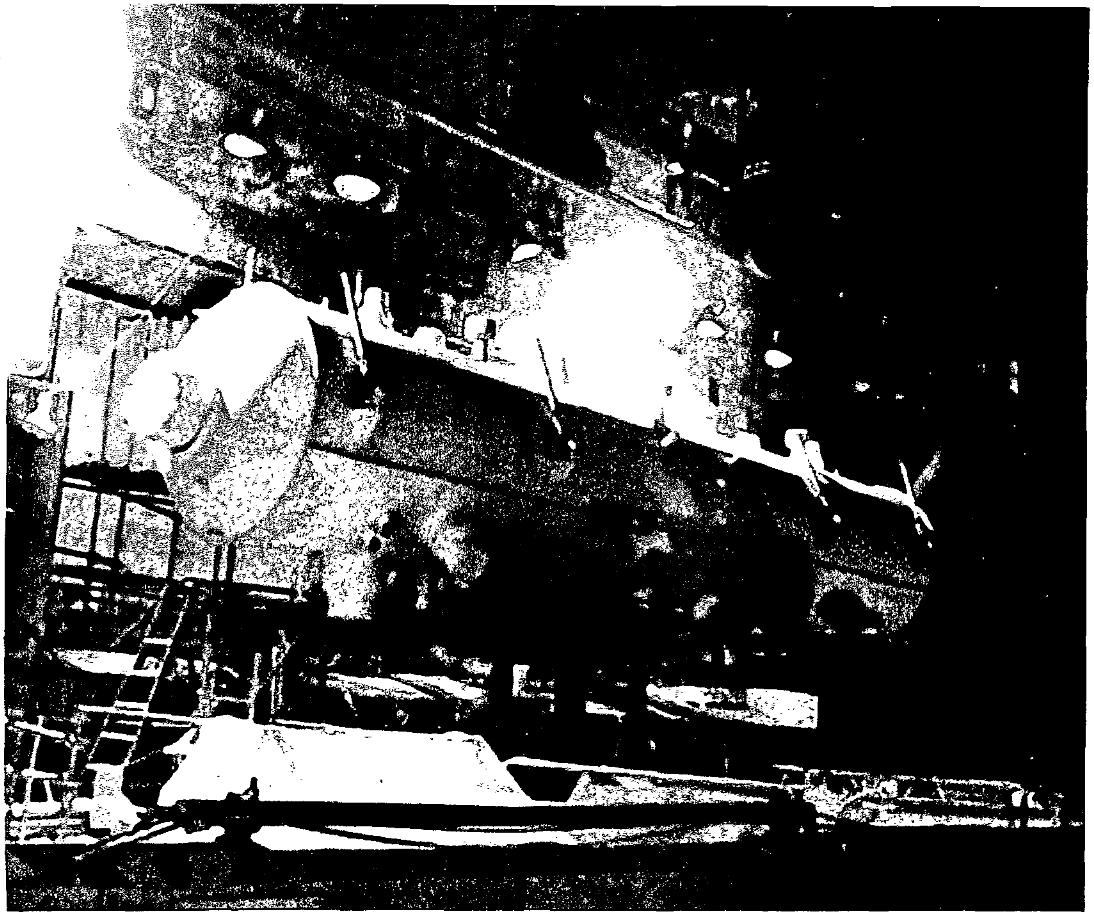

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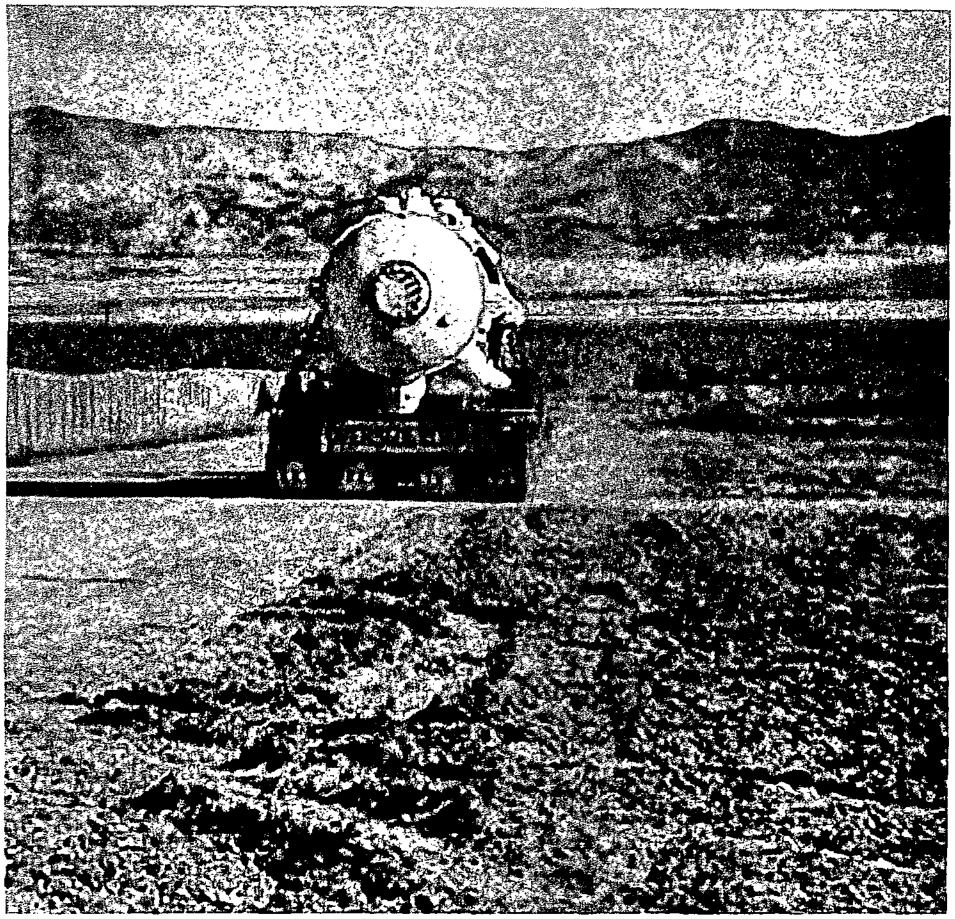
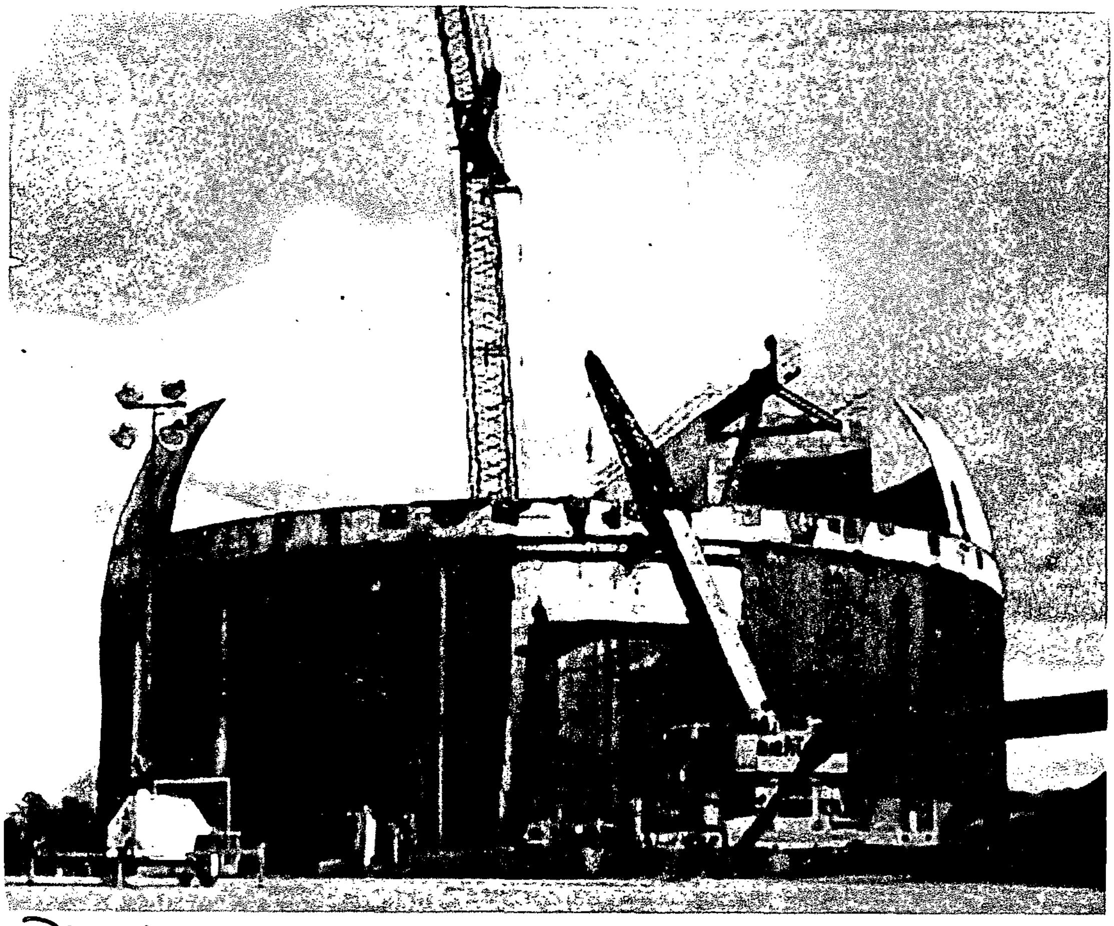


Photograph 26

Photograph 27



Photograph 28