Form No. 10-300 REV. (9/77)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY -- NOMINATION FORM

FOR NPS USE ONLY
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DATE ENTERED

SEE INSTRUCTIONS IN *HOW TO COMPLETE NATIONAL REGISTER FORMS*
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC

AND/OR COMMON
Antioch Potash Plants

2 LOCATION

STREET & NUMBER

__NOT FOR PUBLICATION

CITY, TOWN
Antioch
X VICINITY OF

CONGRESSIONAL DISTRICT
Third

STATE	CODE	COUNTY	CODE
Nebraska	031	Sheridan	161

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	__PUBLIC	__OCCUPIED	X AGRICULTURE	__MUSEUM
__BUILDING(S)	X PRIVATE	X UNOCCUPIED	__COMMERCIAL	__PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
X SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	X YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
	__BEING CONSIDERED	__YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
		__NO	__MILITARY	__OTHER:

4 OWNER OF PROPERTY

NAME
Mrs. C. E. Todd

STREET & NUMBER
1321 Emerson

CITY, TOWN
Alliance
__ VICINITY OF

STATE
Nebraska

5 LOCATION OF LEGAL DESCRIPTION

COURTHOUSE, REGISTRY OF DEEDS, ETC.
County Clerk

STREET & NUMBER
Sheridan County Courthouse

CITY, TOWN
Rushville

STATE
Nebraska

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Historic Preservation in Nebraska

DATE
1971
__FEDERAL X STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS
Nebraska State Historical Society

CITY, TOWN
1500 R Str., Lincoln

STATE
Nebraska

7 DESCRIPTION

CONDITION		CHECK ONE	CHECK ONE
__EXCELLENT	__DETERIORATED	__UNALTERED	X ORIGINAL SITE
__GOOD	X RUINS	X ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

Between 1916 and 1918 five companies, Alliance, American, National, Nebraska and Western, were organized for the purpose of extracting potash from so-called alkali lakes in the Sandhill region of southern Sheridan and northern Garden counties, Nebraska. Each company built huge processing plants adjacent to one another along the Chicago, Burlington and Quincy railroad fourteen miles east of Alliance at the village of Antioch. By late summer of 1918 all of the plants were operational.

Potash consists of a variety of potassium compounds with a wide variety of uses as diverse as the production of glass to making soap. Nebraska potash, however, was used almost exclusively as a fertilizer additive for the United States cotton belt where natural reserves of potassium in the soil were seriously depleted.

Potash could be obtained from alkali lakes simply by boiling the water until it was completely evaporated, leaving behind the salts it had contained. Essentially this is what was done at the Antioch plants, but to be profitable millions of gallons of water had to be evaporated. To handle this kind of volume sophisticated and efficient methods of evaporation had to be devised. A less difficult problem to solve, but one of equal importance, was a way of handling the 60 to 80 tons of potash produced each day and the 100 or more tons of coal needed to boil the water.

Each company leased or occasionally purchased one or more lakes with as high a percentage of dissolved salts as was possible to find. At first the lake water was used but it was soon discovered that the sands under the lakes contained water with an even greater proportion of dissolved potash. To tap this richer source, literally hundreds of sand-point wells were installed and connected to one or more large pumps driven by gasoline or electric motors. From the wells the water was piped to what was called a solar tower. This was a wooden structure 20 to 40 feet square consisting of up to 20 floors or pans each about two inches deep stacked one on top of the other at intervals of about two feet. Water was pumped to the top pan which overflowed into the next lower pan and so on through the tower. This system utilized sun and wind to evaporate a small portion of water.

After leaving the tower the water was pumped to the plants, a distance of as much as 30 miles. The exact location of the potash producing lakes has not been determined. For these longer distances booster pumping stations had to be installed. The pipes were made of beveled wooden slats fitted together, wrapped with wire and coated with tar. Wood may have been used because of the corrosive action of the water on metal or simply as an economy measure.

At the plant the water went through a second solar tower and then to an open concrete reservoir to await processing. The largest of these could hold more than one million gallons. Most plants used a spray pond as the first step in the final reduction. This was either a section of the reservoir or a separate concrete tank. Above the pond was a system of nozzles not unlike lawn sprinklers. Heated water was sprayed through these into the air, again making use of the normally dry winds of this region to evaporate additional water.

From the spray pond the now weak brine was either returned to the reservoir or sent directly to the plant for final reduction. This was accomplished in Swenson evaporators which were air tight steel cylinders approximately nine feet in diameter and fourteen feet tall. They contained metal tubing through which live steam was pumped to heat the brine. In the first evaporator the brine was boiled under pressure raising the boiling point to 250 degrees. The steam from the brine was used to heat a second and a third evaporator in which the liquid was boiled in a partial vacuum thereby lowering the boiling point. The brine which emerged from the third Swenson contained about 60 percent solids and was the consistency of molasses. The final evaporation was carried out in a rotating cylindrical dryer approximately 40 feet long and 5 feet in diameter. The cylinder was inclined slightly and the "molasses" was poured into the upper end. At the lower end was a nozzle through which compressed air and crude oil was sprayed. When ignited, the open flame drove off the last of the moisture and the potash, described as looking like ashes and clinkers, tumbled out of the lower end of the dryer. It was then crushed to a fine powder and sacked for shipment to the eastern fertilizer companies.

It required from one to one and three-quarters tons of coal to produce a ton of potash. Apparently automatic conveyors fed the coal into the fireboxes. The ashes were used to "pave" sidewalks and roads in the vicinity.

There appear to be basic similarities in the floor plans of the plants. The National Company's facility which consisted of a single building was the most simplistic. This long rectangular structure contained four rooms. At one end was a room for the boilers and steam engines which powered the machinery, and a generator for electric lighting. Adjacent to it was the evaporating room, next to this was the drying room and at the far end of the structure was the grinding and sacking room. A small addition housed a blacksmith shop.

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At the other extreme is the Western plant which consisted of three buildings. What function each served is not yet apparent. Part of this problem may have resulted from the Western company's plan to incorporate a potash refinery into the plant.

Near each plant were homes for the workers. These ranged from one or two room shanties to large attractive dwellings equipped with steam heat, electric lights and indoor plumbing provided by the company.

In the 1920's the dwellings were dismantled or moved. At the same time the plants were torn down to salvage the structural steel, brick and other reusable parts. The machinery was sold for scrap. Today the foundations of the plants and of several of the larger houses are all that remain. Since the buildings were removed the only change that has occurred is the partial covering of the foundations and other features by wind deposited sand.

The Antioch potash plant ruins are located near the western edge of the Nebraska Sandhills region in the Snake Creek valley. At the site the valley widens forming a flat basin approximately one square mile in extent surrounded by grass-covered sandhills 100 to 120 feet in height. Except during the period when the plants were extant the site was rangeland and the surrounding area has always served as pasturage.

The southern boundary of the nominated area is the north edge of the Chicago, Burlington and Quincy Railroad Company's track right-of-way beginning at a point 1,100 feet east of the west boundary of Sec. 7 T24N R45W and extending eastward for 6,700 feet, then due north for 1,000 feet, then west for 6,700 feet, and then south for 1,000 feet to the point of origin. This rectangle encloses all the known plant foundations, and the associated reservoirs and dwelling remains. Only the north boundary may be somewhat arbitrary since known features associated with some of the plants extend northward for different distances and, at others, as yet unrecognized features may exist.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW				
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION	
__1400-1499	X ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE	
__1500-1599	__AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE	
__1600-1699	__ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN	
__1700-1799	__ART	__ENGINEERING	__MUSIC	__THEATER	
__1800-1899	X COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION	
X 1900-	__COMMUNICATIONS	X INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)	
		__INVENTION			

SPECIFIC DATES CONSTRUCTION FROM MID 1916 to mid 1918 BUILDER/ARCHITECT

STATEMENT OF SIGNIFICANCE

The potash industry in the United States developed as a result of a wartime shortage. Before World War I this country had been importing approximately 900,000 tons of potash each year, nearly all of it from Germany. Most of it was used in fertilizer sold in the cotton belt states. The German product came from natural dry deposits that could be mined and shipped to the United States for about $10 a ton. When the war began this source was closed and the resulting shortage drove the price up to as much as $150 a ton.

Many companies were hastily organized and began producing potash from a variety of sources. In the United States there were fifteen companies that extracted potash from alkali lakes and they accounted for about seventy-five percent of the war time production. Ten of these were in Nebraska but excepting the Antioch plants the physical evidence of the industry has been largely destroyed. Since so little is known about the operations of the plants, except on an abstract level, the ruins should be preserved for further study.

Before the war there had been a few experiments in evaporating lake water for potash, including one in Sheridan County in 1912, but because of the high cost of production the projects were discontinued. These experiments undoubtedly helped, but for the most part an industry geared for large scale production was developed during the war without a prototype. It could not have developed as rapidly as it did if it had not been for some unknown "inventor" who realized that certain aspects of refining sugar beets could be adapted to potash production. The Swenson evaporators which were the heart of the potash production process, were borrowed from the beet refineries. The solar towers were used in the 1912 experiment but the spray ponds, rotary dryers and certainly other refinements as well, were developed as large scale production began.

The Antioch companies were closed corporations consisting of five to ten investors who undoubtedly had worked out the details of operation well before filing for incorporation. A minimum of $400,000 was needed to build a plant, acquire easements, lay pipe and buy the other equipment necessary for operation. Despite the high cost and the short life of the industry, profits were made. Although the evidence is incomplete, it seems that investors in the American and the Nebraska companies made a substantial amount of money. The Alliance Company was probably at the break-even point. The National Company's plant was destroyed by fire and then rebuilt but

this was too much of a strain on the financial resources of the investors and the company went bankrupt before the war was over. The Western Company is an enigma. The plant was completed well before the boom ended, yet railroad records show that it received only enough coal to operate for about one month and that it never shipped any potash.

The American Company's plant began production in the spring of 1917, the first in Antioch to be operational. The last to be completed was the Western plant in the summer of 1918. Production continued until January of 1919, when the fertilizer companies cancelled their orders, believing that the cheaper German product would soon be on the market. The owners of the Antioch plants realized that they could not compete with the Germans and began an intensive lobbying campaign to persuade the U.S. Congress to enact a protective tariff. If such a law was passed it would keep fertilizer prices at or near their inflated wartime level. For a time it seemed that the potash interests would prevail but opposition from the cotton producing states proved to be too strong and the attempt failed.

After the war Germany had more pressing problems than reopening their potash mines and the fertilizer manufacturers were forced to turn to Antioch. By September, 1919 the plants were again in full operation. The boom ended just five months later when Germany offered potash for sale at about $15 a ton, or one half of what it cost to produce at Antioch. By the end of 1920 all of the plants were closed for the last time.

Within a year or two the company officials realized that there was no possibility of reopening the plants. Some of the machinery could be sold intact but much of it no longer had any use and went to scrap dealers. The plants were dismantled for brick and structural steel. The Western plant's huge chimney was taken down, the brick was cleaned and reused to build a commercial garage at Hyannis, Nebraska which is still in use. The dwellings, which were frame, were moved to other locations and some may still be in use.

Although the plans at Antioch operated for only three years their impact was much larger than their short history might imply. Since the industry had no real predecessor its development represents no small degree of inventive genius. It received extensive newspaper coverage throughout the state not only because of the large amounts of money being invested but also because it was so unique. The struggle by the owners in 1919 to obtain a protective tariff brought the industry to the attention of the nation.

Most of what is presently known about the operation of the plants comes from contemporary newspaper accounts but these are invariably presented in a generalized way. Clues to the layout of the plants and their operation are contained in the plant ruins. A cursory examination of the foundations and other structural remains indicates that much data could be derived from a careful study of the ruins.

9 MAJOR BIBLIOGRAPHICAL REFERENCES

See continuation sheet

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY 154

QUADRANGLE NAME Antioch, Nebraska QUADRANGLE SCALE 1:62500

UTM REFERENCES

	ZONE	EASTING	NORTHING
A	6	9,8 2,1,4	4,6 6,0 0,9,5
B	6	9,8 2,1,4	4,6 6,0 0,3,0
C	6	9,8 0,1,3	4,6 6,0 0,1,5
D	6	9,8 0,1,3	4,6 6,0 0,7,5
E			
F			
G			
H			

VERBAL BOUNDARY DESCRIPTION

See continuation sheet

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES

STATE	CODE	COUNTY	CODE
STATE	CODE	COUNTY	CODE

11 FORM PREPARED BY

NAME / TITLE

Richard E. Jensen

ORGANIZATION — DATE

Nebraska State Historical Society — December, 1978

STREET & NUMBER — TELEPHONE

1500 R Street — 432-2793

CITY OR TOWN — STATE

Lincoln — Nebraska 68508

12 STATE HISTORIC PRESERVATION OFFICER CERTIFICATION

THE EVALUATED SIGNIFICANCE OF THIS PROPERTY WITHIN THE STATE IS:

NATIONAL X STATE ____ LOCAL ____

As the designated State Historic Preservation Officer for the National Historic Preservation Act of 1966 (Public Law 89-665), I hereby nominate this property for inclusion in the National Register and certify that it has been evaluated according to the criteria and procedures set forth by the National Park Service.

STATE HISTORIC PRESERVATION OFFICER SIGNATURE Marvin F. Kivett — DATE 3/19/79

TITLE Director, Nebraska State Historical Society

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I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

KEEPER OF THE NATIONAL REGISTER

ATTEST: DATE

CHIEF OF REGISTRATION

GPO 921-803

Condra, George E. The Potash Industry of Nebraska. Nebraska Bureau of Publicity. 1917.

Anon. Antioch News. Numerous newspaper articles, 1916-1921.

Anon. Alliance Semi-Weekly Times. Numerous newspaper articles, 1916-1921.

Form No. 10-300a
(Rev. 10-74)

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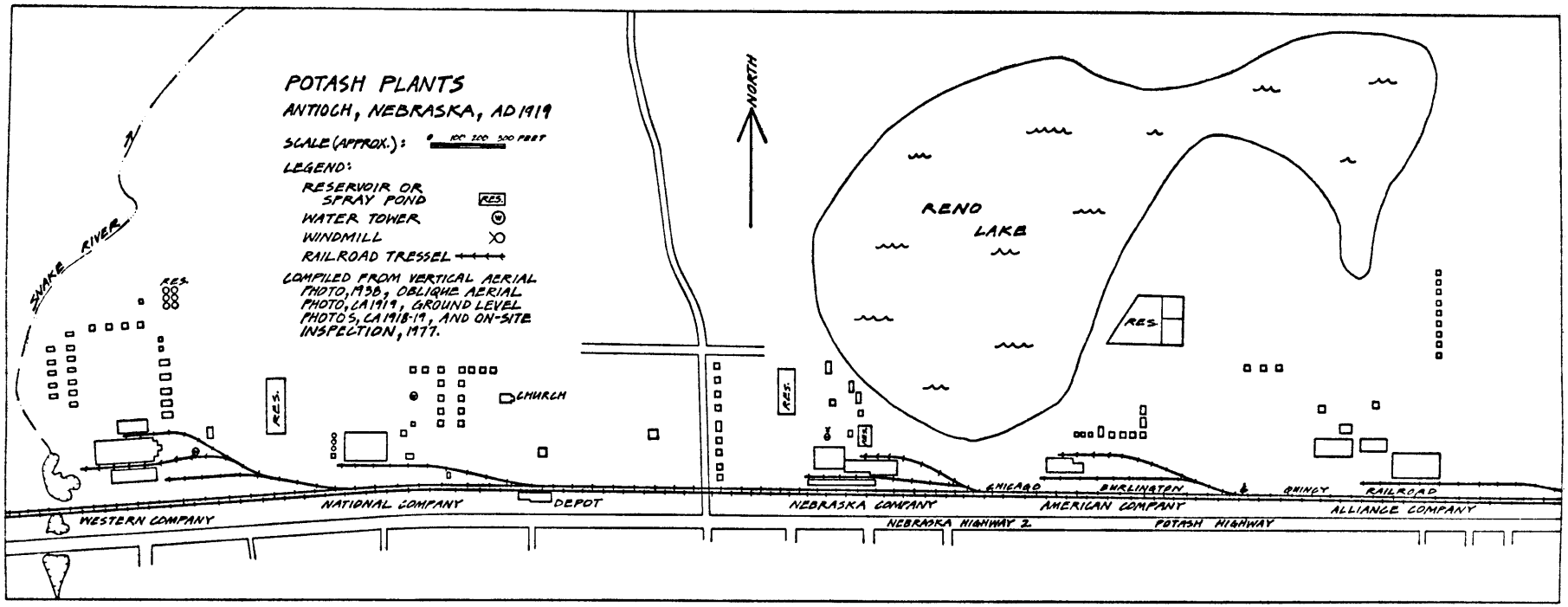
Along the north side of the Chicago Burlington and Quincy tracks beginning at a point 1100 feet east of the west section line of Section 7 T24N R45W and extending east for 6700 feet, then north 1000 feet, then west 6700 feet, then south 1000 feet to point of origin.


POTASH PLANTS
ANTIOCH, NEBRASKA, AD 1919
SCALE (APPROX.): 0 100 200 300 FEET
LEGEND:
RESERVOIR OR SPRAY POND
WATER TOWER
WINDMILL
RAILROAD TRESSEL
COMPILED FROM VERTICAL AERIAL PHOTO, 1938; OBLIQUE AERIAL PHOTO, CA 1919; GROUND LEVEL PHOTOS, CA 1918-19; AND ON-SITE INSPECTION, 1977.
NORTH
SNAKE RIVER
RENO LAKE
RES.
CHURCH
DEPOT
CHICAGO BURLINGTON QUINCY RAILROAD
WESTERN COMPANY
NATIONAL COMPANY
NEBRASKA COMPANY
AMERICAN COMPANY
ALLIANCE COMPANY
NEBRASKA HIGHWAY 2
POTASH HIGHWAY

Looking SW. Photo by R.E. Jensen, 1977, NSHS (7706/50:20)

Foundation of N building, looking NW. Photo by R.E. Jensen, 1977, NSHS (7706/50:16)

Main building ruins, looking W. Photo by R.E. Jensen, 1977, NSHS (7706/50:17)

Structure at E end of main building, looking S. Photo by R.E. Jensen, 1977, NSHS (7706/50:10)

Aspect: NW. Photo by D. Murphy, 1975, NSHS (7507/17:16)

Foundation of engine bldg, looking W. Photo by R.E. Jensen, 1977, NSHS (7706/50:15)

Plant ruins in distance. Concrete foundation of reservoir at lower left, looking W. Photo by R.E. Jensen, 1977, NSHS (7706/50:19)

Aspect: NW. Photo by D. Murphy, 1975, NSHS (7507/17:22)

Aspect: NW. Photo by D. Murphy, 1975, NSHS (7507/17:18)

Engine room, basement, looking E. Photo by R.E. Jensen, 1977, NSHS (7706/50:11)

Engine room, looking NE. Photo by R.E. Jensen, 1977, NSHS (7706/50:12)

Railroad ramp on S side of main bldg, W end of RR ramp. Photo by R.E. Jensen, 1977, NSHS (7706/50:9)

E end of RR ramp bet engine bldg at L & main bldg at R, looking WSW. Photo by R.E. Jensen, 1977, NSHS (7706/50:8)

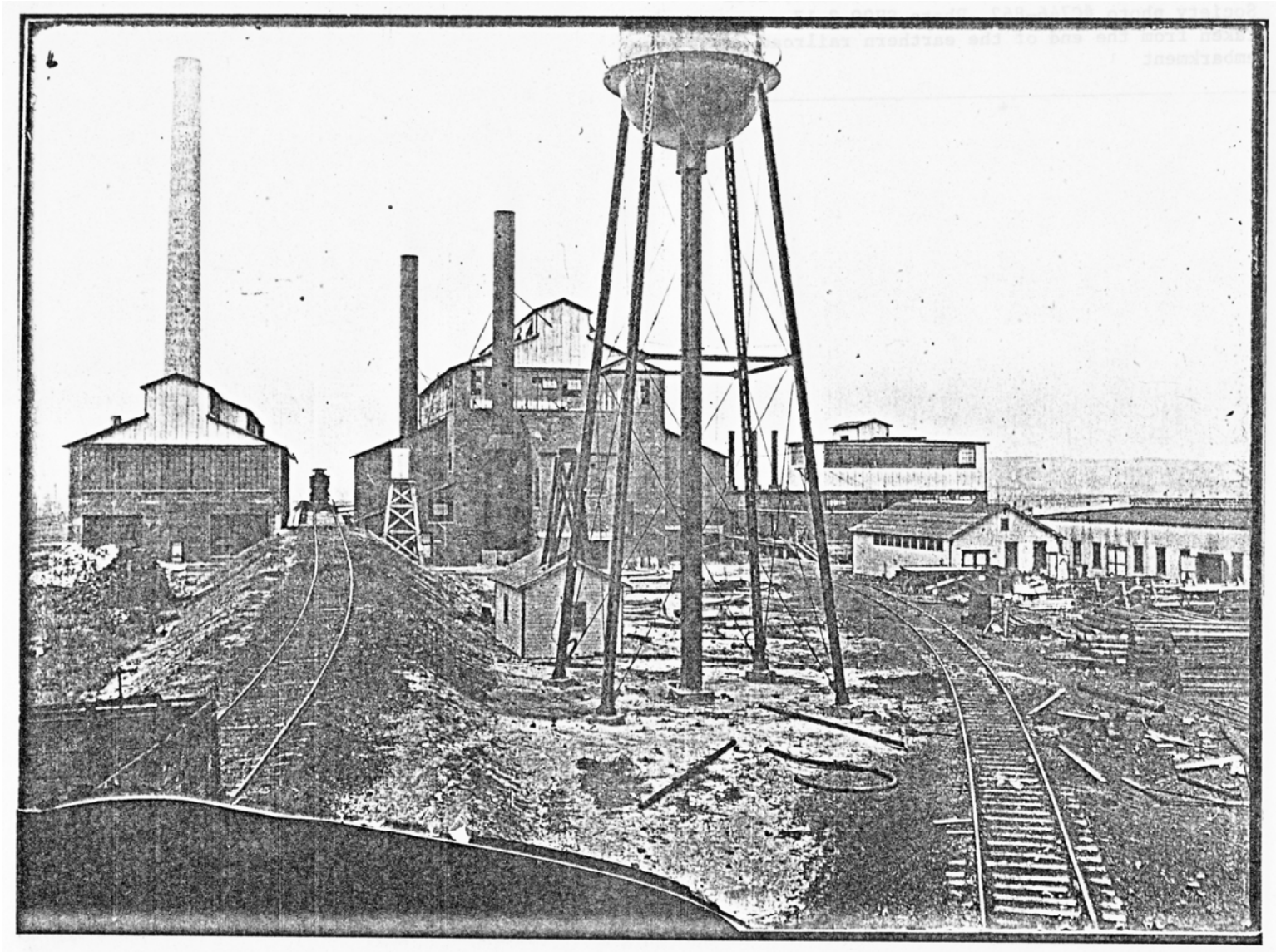
Main bldg wall remains, looking W. Photo by R.E. Jensen, 1977, NSHS (7706/50:7)

Basement of engine room, looking WSW. Photo by R.E. Jensen, 1977, NSHS (7706/50:13)

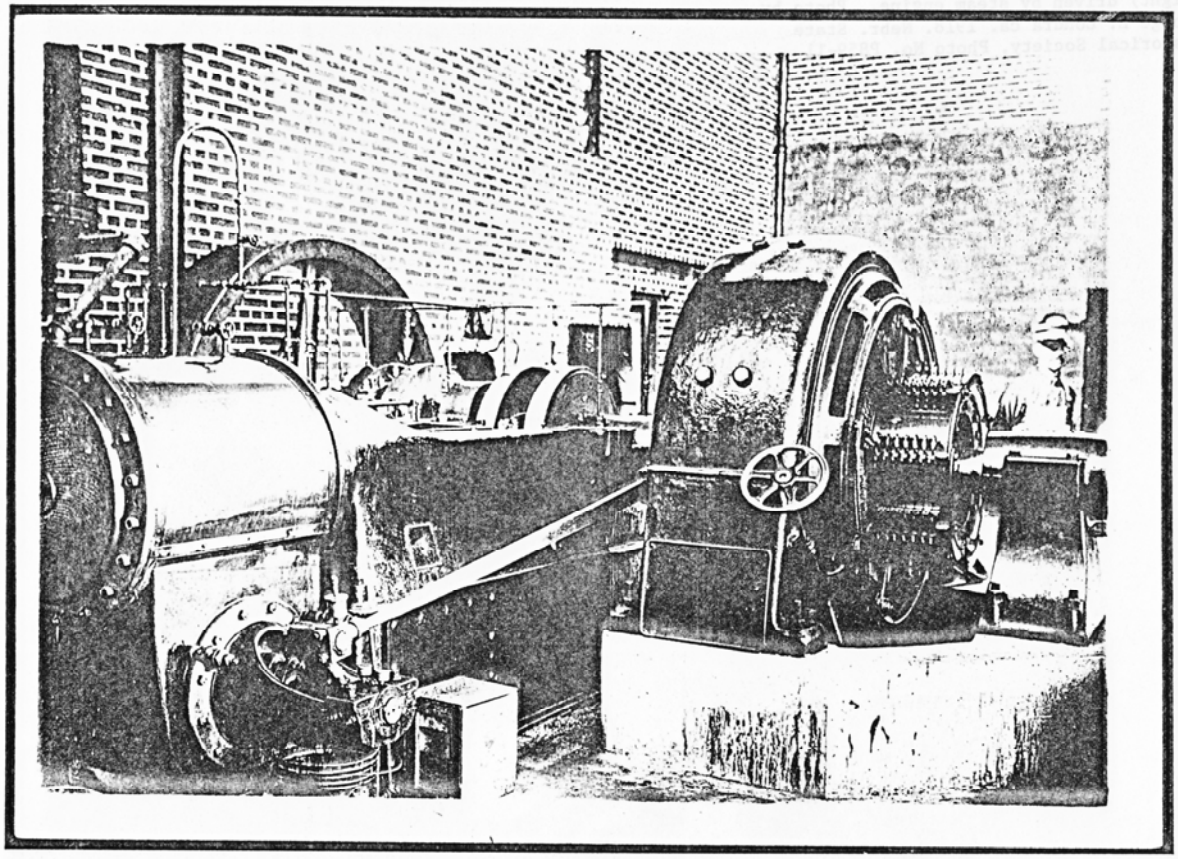
Detail inside of N bldg looking W. Photo by R.E. Jensen, 1977, NSHS (7706/50:23)

Inside N bldg, looking NW. Photo by R.E. Jensen, 1977, NSHS (7706/50:22)

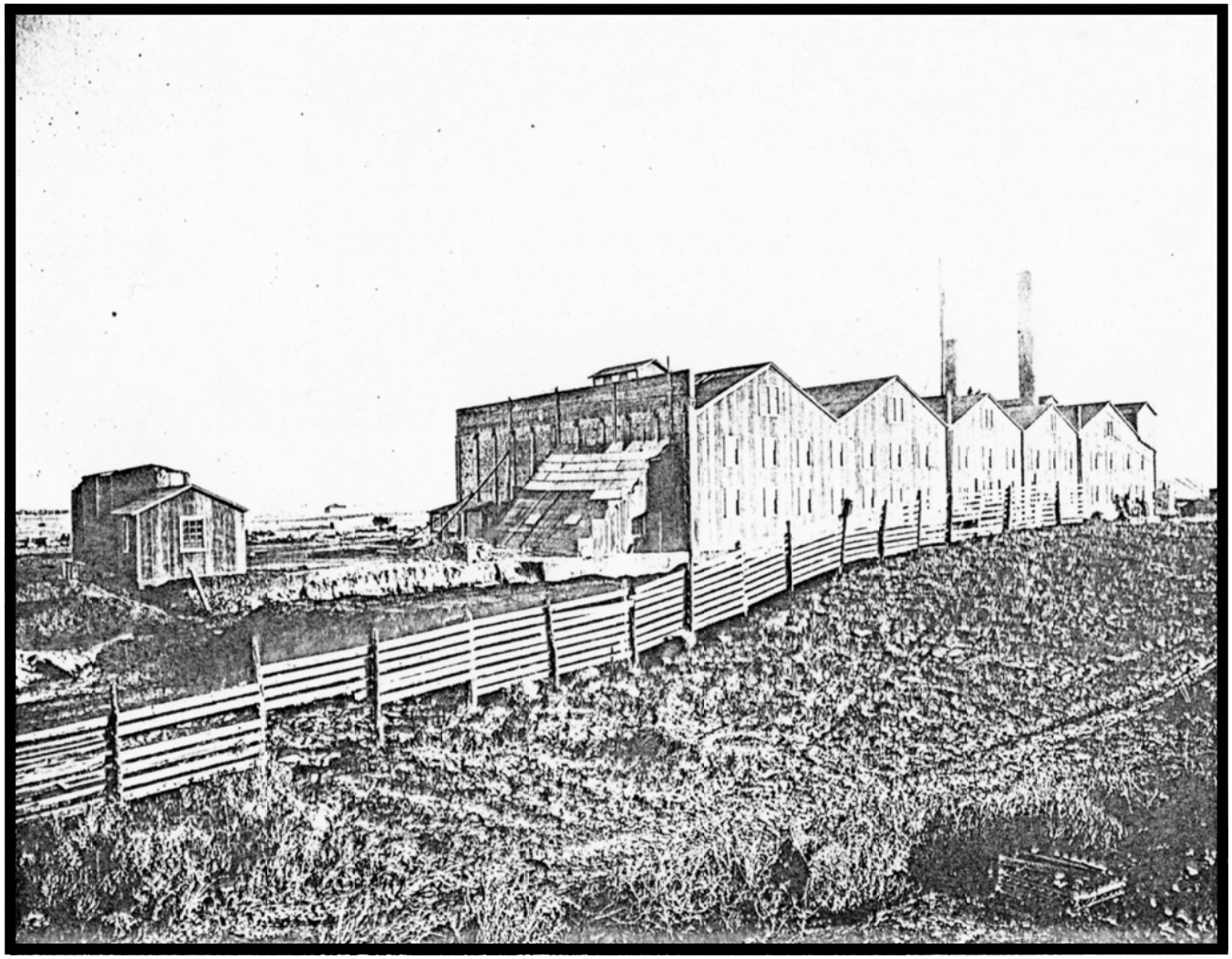
Inside N bldg looking NE. Photo by R.E. Jensen, 1977, NSHS (7706/50:21)



Looking west in c1918 photo by George E. Condra. Nebraska State Historical Society photo #C746-862.
Photo SH00-2-17 was taken from the end of the earthen railroad embarkment.



Electric generator (right) driven by steam engine. Photo by George E. Condra, c1918, Nebraska State Historical Society photo #P859-11.



Looking northeast. Photo probably from a promotional brochure. Nebraska State Historical Society photo #P859-90.