

# THE MACHINE SHOP AT KENNECOTT

## A COLLECTION PLAN



Mary Ann Sweeney  
Wrangell-St. Elias National Park and Preserve

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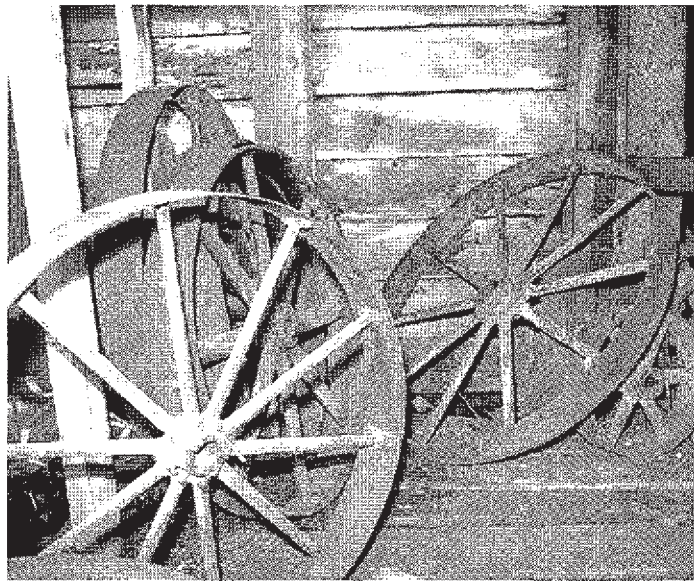
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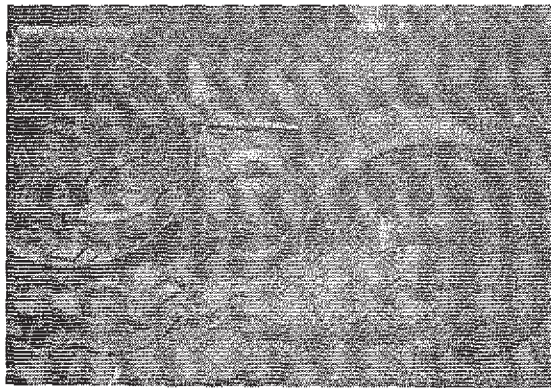


## Abstract

This report is a collection plan for a historic industrial assemblage at Kennecott National Historic Landmark, Alaska. Kennecott, a copper mine, operated from 1907 to 1938 and is located in interior Alaska. A collection plan is proposed for one material assemblage located at the Machine Shop at Kennecott. The collection plan takes into account the historical significance of the site, the role of unauthorized collecting at Kennecott and the industrial nature of the material culture. The assemblage is composed of 2901 artifacts related to the mining, milling and support systems of the mill town. The collection plan recommends assigning an accession number to the entire assemblage and cataloging 61 individual artifacts. This report provides a detailed description and inventory of the entire assemblage, in addition to the collection plan recommendations.





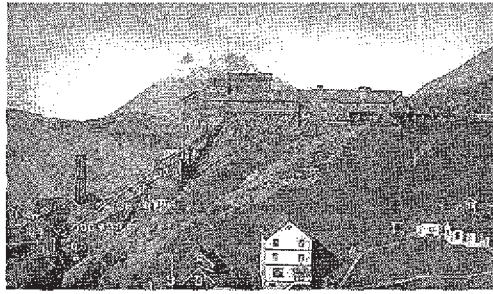


## Introduction

Kennecott National Historic Landmark (XMC-001) is located in Wrangell-St. Elias National Park and Preserve and consists of a large industrial mining complex; the mill site, the mines, and the tramway that links the two sections. The Kennecott mill site is located on the south side of the Wrangell Mountains, on the western slope of Bonanza Ridge, about five miles north of McCarthy, Alaska. Bonanza Ridge rises 4,000 feet in elevation and is bounded on the west by the Kennicott glacier and on the east by McCarthy Creek. The mill townsite is located near the confluence of the Root and Kennicott glaciers, and is situated on the valley wall above the glacier's lateral moraine. The mines themselves are located on Bonanza Ridge above the mill town. Kennecott National Historic Landmark encompasses 5,226.4 acres consisting of the mines and mining camps at Bonanza, Glacier, Jumbo and Erie mines located on Bonanza ridge, the mill town and its 45 major structures located along the valley wall just above the glacial moraine, and the tramway which connected the mines to the mill (Dept of Interior, NPS 1996).

Due to the fact that the National Park Service acquired Kennecott in 1998 the cultural resource management plan for the landmark is in the initial stages of inventory, identification, and significance assignment. The Machine Shop, located in the center of the industrial complex of the mill town, contains a large storage area consisting of thousands of industrial hardware items and mining equipment (Figure 1). The storage area is located in the foundation area of the Machine Shop. The foundation area is not a secure location and is open to visitors. Unauthorized collecting is prevalent at Kennecott and is the primary reason for the development of a collection plan for this assemblage. The purpose of the 1999 fieldwork was to inventory, identify, and assess the material remains in the storage area of the Machine Shop and develop a collection plan.

In order to develop a collection plan for the assemblage it is necessary to first document and record the assemblage. The report is organized into the following sections. A brief history of Kennecott is presented, and followed by the project description. Field methods, database organization and artifact typology are then explained. Next a discussion of the material culture assemblage includes research questions that identify the temporal organization of the assemblage. Finally, collection plan recommendations are outlined. Two appendices present the data: Appendix I artifact description and Appendix II artifact database.



## Copper Mining at Kennecott: A Brief Historical Overview

The mining activity at Kennecott (1907-1938) is historically significant in the national context of industrial history and development of big business during the progressive era. Kennecott is a prime example of the copper mining industry and the industry's technological development during the first half of the 20<sup>th</sup> century. The copper ore at Kennecott was the last of the high-grade deposits discovered in the American west. During the 1910s and 1920s when the United States produced more than half of the world's copper the Kennecott mine in Alaska was among the nation's largest producers. The Kennecott mines produced 591,535 tons of copper and nine million ounces of silver. The value of the mines approximated \$200 million with net profits of about \$100 million (Spude 1984:5; White 1998:33).

In addition to the industrial aspects of Kennecott, the competition over the ownership of the mining claims and subsequent development of Kennecott affected not only Alaskan territorial politics but national politics as well. Entrepreneur Stephen Birch, backed by New York capitalists, formed the Alaska Copper and Coal Company and acquired the mining claims at Kennecott. The Alaska Copper and Coal Company was sued by the Chitina Exploration Company over ownership rights to the mining claims. The litigation carried through the court system up to the U.S. Supreme Court where it was denied a hearing. The Alaska Copper and Coal Company reorganized as the Kennecott Mines Company in 1905. Together the Kennecott Mines Company organized with the business interests of the Guggenheim family and J.P. Morgan forming the "Alaska Syndicate." The Alaska Syndicate provided the capital to fund the development of the mines, mill, and railroad. The Alaska Syndicates' claims on extensive coal fields in Alaska brought to the boiling point the Ballinger-Pinchot affair, which focused on President Taft's administration's stand on conservation issues. Finally, the profits earned from the Kennecott



Alaska mines allowed the Kennecott Copper Company (formed in 1915) to expand and invest in low grade long term mines in North and South America, some of which are in operation today (Spude 1984:5).

From 1938 to 1999 Kennecott has a varied history. Although the mines officially closed on December 23, 1938, the strategy of abandonment by the Kennecott Copper Corporation ensured the ability for the mill settlement to reopen in the event of future ore discoveries. The company closed the mining activities, but retained the mining claims. During the 1950s the Kennecott Copper Corporation awarded Ray Trotochau the contract to demolish all of the surface properties at Kennecott. Trotochau demolished the staff house, manager's residence, and guesthouse in the central part of the mill complex. He also removed the roof of the upper Mill Building and part of the roof of the Company Store. Trotochau acquired the surface rights to Kennecott in 1957. Consolidated Wrangell Mining Company (CWMC) purchased the surface rights to 3,000 acres of Kennecott from Trotochau and began working on the copper deposits below Bonanza mine. In 1967 CWMC moved their base of operations downhill to the mill town and the tailings of the operations are visible today. In 1976, the Greater Kennecott Land Company (GKLC) acquired CWMC's rights in the mill town. Due to increased visitation and tourism GKLC subdivided the property into lots and sold portions to private individuals (White 1998:34-36).

In 1998 the National Park Service acquired Kennecott after several years of negotiation and planning. Federal interest in the area first occurred in 1938, when the Department of the Interior supported the creation of the Kennecott National Monument, but President Roosevelt rejected the proposal due to wartime concerns. Wrangell-St. Elias National Park was created in 1980 (Lappen 1984:38). The formation of the National Park and the designation of Kennecott as a National Historic Landmark in 1986 increased tourism to McCarthy and Kennecott even though the site remained privately owned (White 1998:37). The National Park Service maintained interest in Kennecott and worked together with the Friends of Kennicott to preserve the standing mill town structures. Finally, in 1998 the National Park Service purchased the Kennecott NHL property including the industrial complex, the mines and the available boardinghouse structures. Several lots of the Kennecott mill town remain in private ownership.



## Machine Shop Project Description

### THE KENNECOTT TOWNSITE

The project area for the 1999 cultural resource management fieldwork is the Machine Shop. The Machine Shop is located in the industrial complex of the mill town at Kennecott (Figure 1). This section of the report describes the function of the buildings in the industrial complex of the mill town and specifically describes the role of the Machine Shop at Kennecott.

The mill town is the largest concentration of buildings, people and activities at Kennecott. The fourteen-story concentrator or "Mill" stair-steps down Bonanza Ridge, dominating the landscape of the settlement. Surrounding the Mill building are other industrial buildings: the Power Plant, the Leaching and Flotation Plant, and the Machine Shop. Warehouses and shops are just south of the industrial complex. The administration buildings and staff housing cluster around National Creek to the south of the industrial buildings. The railroad and road ran through the center of the settlement. Boardwalks that connected structures facilitated pedestrian traffic. Indoor plumbing and steam heat was available to most buildings, and electricity generated in the Power Plant was wired to all structures, both industrial and domestic. Sewage and domestic refuse was dumped onto the moraine (NPS 1996; 27). Although a remote mine and community in interior Alaska, Kennecott had the luxuries of electricity, steam heat, and direct railroad access that provided a link to the transportation networks of the rest of the United States.

The industrial complex at the mill town concentrated and processed ore and prepared it for shipment. The concentrator mill, the large 14 story building, was constructed between 1908 and 1911 with additions added throughout the operation of the mill. The purpose of the mill was to take lower grade ore and concentrate the copper out of the rock, which was then bagged, and sent to

Tacoma, Washington for smelting. When the mines initially opened on Bonanza Ridge the ore deposits were exceptionally rich and the waste rock could be sorted out by hand. But as lower grade ore was mined it became necessary to further process the ore in the Mill building. The ore was generally concentrated by gravity techniques. The ore arrived from the mines via the tramway at the upper Mill. As the ore proceeded down the conveyors and chutes of the Mill via gravity the ore was crushed, sized, and mechanically separated from the waste rock (NPS 1996: 27). The copper ore was bagged at the bottom of the Mill, conveniently located close to the railroad, and shipped out.

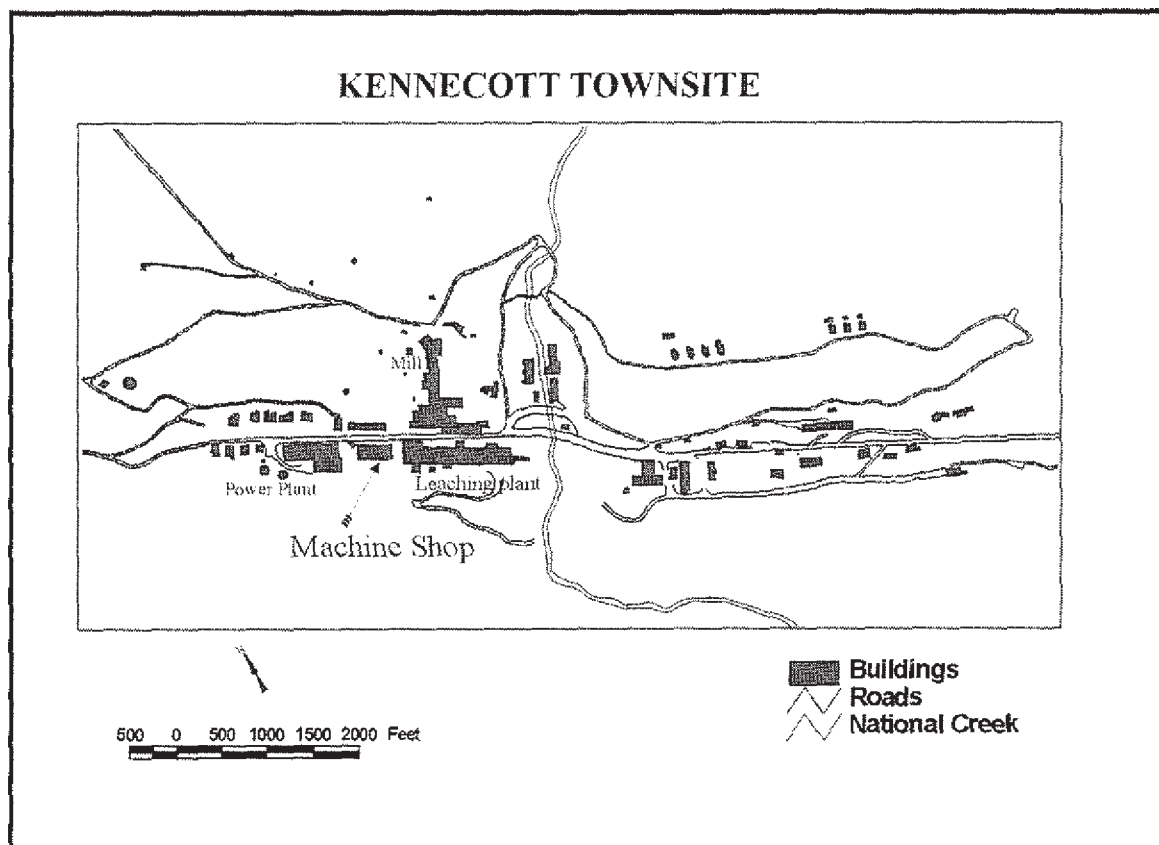


Figure 1. Map of Kennecott Townsite

Leaching is a process where copper is recovered from light carbonate ores. The Leaching Plant, located directly across the tracks from the Mill building, was constructed in 1916. A new method to recover copper from light carbonate ores was developed and implemented in 1917. Traditional methods of recovering copper from light carbonate ores via acid leaching did not work well on the ores at Kennecott (NPS 1996:27).

The flotation mill in the Leaching Plant, and the Power Plant are also components of the industrial complex. As a result of the crushing process in the Mill building, very fine-grained particles (less than 2mm) called slimes were produced. Slimes created a problem in the milling process because they did not sort out during gravity separation. In order to get the copper out of the slime a small flotation mill located in the Leaching Plant was installed in 1923 (NPS 1996: 27). The Power Plant produced necessary electricity for the Mill building and the entire mill town. Construction of the Power Plant began in 1911. The structure was expanded in 1917 for a turbine room and in 1922 an addition was added for diesel installation (NPS 1992:71). The Power Plant burned down in 1924 and was rebuilt in 1925.

At Kennecott three ore treatment processes existed for treating the ore: gravity concentrator, leaching, and flotation. Most of the ore was treated by gravity milling alone, whereas carbonate ore was treated by ammonia leaching. After 1923, a small percentage of the ore required flotation treatment. In the final years of operation the ammonia Leaching Plant was closed and flotation treated less than 20% of the tonnage milled (NPS 1996: 28).



*Figure 2. Machine Shop at Kennecott, Alaska. Mill building in background.*

The Machine Shop, located just north of the Mill building and across the street, was constructed in 1916 (Figure 2). The building includes a blacksmith forge, a welding room and general workspace (Fire Insurance Map, Kennecott 1938). The Machine Shop maintained not only the industrial equipment found in the Mill, Leaching Plant, and Power Plant, but maintained equipment for the entire settlement. For example, at the mill town water was available for domestic and industrial use and steam for heating purposes. The water and steam pipes were carried in insulated, wooden, above ground 'utilidors' across the settlement,



remnants of which can still be seen today. The workers at the Machine Shop were responsible for maintenance of these and all of the facilities at the mill town, and probably worked on equipment from the mines as well.

## THE MACHINE SHOP

The Machine Shop foundation storage area is the focus of the 1999 field research. The building is located in the industrial complex of the mill town, across the railroad right-of-way from the Mill building, and is sandwiched in between the Leaching and Power Plants (Figure 1). The first floor of the Machine Shop is level with the railroad grade and has a retaining wall on the east side of the building foundation (NPS 96:146). On the west side of the building the grade sharply falls away to the west and the floor of the foundation is level at grade (NPS 96:146).

The Machine Shop structure is a wood frame building measuring 50' x 111' with a rectangular floor plan (Figure 2 and Figure 3). The structure is one-and-one-half stories tall with six tall front window bays. The entrance to the building is centered on the front elevation, facing the main right-of-way of the industrial complex. The north and south ends of the structures have doorways that open onto wood platforms. The roof extends at an unbroken pitch over the side and rear platforms, which are partially enclosed. At the south end of the building an overhead hoistway enters above the door-head (NPS 1992; 144).

The interior of the building is divided into three main work areas (Fire Insurance Map, Kennecott 1938). On the north end of the building is the blacksmith area and includes a forge, hood and workbench. The wood flooring of the blacksmith area was removed and replaced with a wood cribbed shaft filled with tailings and covered with dirt, thus providing a noncombustible surface for the blacksmith area (see Figure 5; NPS 1992: 145). The main area in the Machine Shop was the large work area. On the west side of the Machine Shop, opposite the main entrance is a smaller brick-floored room. The brick-floored area was utilized as a welding shop (Kennecott Copper Corporation 1938; ms). Small storage areas exist on the west side of the Machine Shop.

The structural supports of the building are open on the west side of the structure (Figure 3 and Figure 5). The grade falls away to the west, providing an open area underneath the Machine Shop floor. In this foundation area are the structural supports of the Machine Shop consisting of approximately 60 posts, some rough sawn and others un-milled logs. The structural posts divide the

area into square sections referred to as 'bays' (Figure 5). The foundation area extends underneath the entire building, except for the blacksmith area, which is filled in by the wood cribbing and tailing fill. Outside of the foundation area, on the western boundary a utilidor runs north-south connecting the Power Plant and the Leaching Plant.



*Figure 3. West side of Machine Shop, Kennecott. Note foundation area underneath floor of structure.*

The foundation area of the Machine Shop is the project area for the 1999 fieldwork. The bays of the foundation area below the Machine Shop floor were used for the storage of machine parts and industrial detritus. Equipment in this storage area covers a wide range of material, including hundreds of gears and fittings, large wood water pipes, couplings, metal pipes, gears and wheels, boilers, cooking stoves, and milling equipment such as concentrating tables. The equipment, machinery and industrial debris located in this storage area provides information concerning the functioning of the copper mine and mill and the abandonment of the mining complex in 1938.

#### PREVIOUS ARCHAEOLOGICAL RESEARCH AT THE MACHINE SHOP

Previous archaeological research at Kennecott focused on site documentation, recording, and asbestos abatement monitoring. No subsurface archaeological testing has been conducted at Kennecott. The Kennecott mill town and mine were listed in the Alaska Heritage Resource Survey (AHRS) files in 1972, and were determined to be eligible for inclusion to the National Register of Historic

Places in 1978. In 1986 Kennecott was designated a National Historic Landmark.

The structures of the mill complex have been fully documented. A Historic American Engineering Record (HAER) project of the mill complex buildings was conducted by historian Robert Spude in 1985 and 1986. In 1992, a Historic Structures Report (HRS) was prepared to recommend appropriate emergency stabilization treatments for ten structures at Kennecott. The recommendations were compiled under NPS guidelines for stabilization of historic structures.

A waste audit and asbestos survey in 1990-1991 identified asbestos containing materials at Kennecott. As a result, Kennecott Corporation initiated a two-year asbestos abatement project in 1993. Northern Land Use Research, Inc. (NLUR) of Fairbanks was subcontracted for the archaeological monitoring of the asbestos removal (Ludwig and Ream 1993:1). Abatement work and archaeological monitoring occurred in the "...Bunkhouse, National Creek Bunkhouse, Hospital, Assay Office, General Manager's Office, Tailing Hoist House, Oil House, Mill Buildings, Company Store, Refrigeration Plant, West Bunkhouse, Recreation Hall, Railroad Freight Depot, Private Residence and Leaching Plant" (Ludwig and Reams 1995: 2). Abatement also occurred in the interior of the Machine Shop.

NLUR archaeologists monitored the asbestos abatement of the interior of the Machine Shop. Archaeological monitoring also occurred in the foundation storage area of the Machine Shop during the re-enforcing of the eastern foundation wall. No subsurface archaeological testing has been done at the Machine Shop.

## Field Method

The field documentation and recording of the foundation area of the Machine Shop was performed between June 7 and August 25, 1999. The 1999 National Park Service Cultural Resources field season at Kennecott focused primarily on the Machine Shop at five locations: the foundation area, the two decks on the west side of the structure, an area to the north of the structure, and an area to the south of the structure. The purpose of the field work was to document the assemblage and generate a complete inventory of the material culture.

### MACHINE SHOP PROJECT AREAS

The 1999 fieldwork recorded five areas of the Machine Shop: Area A, Area B, Area C (Figure 4), Area D and Area E. These areas were selected for inventory and documentation due to the collection plan and also future stabilization work on the Machine Shop east foundation wall scheduled for the summer of 2000. The Machine Shop foundation is designated as Area A and was used for the storage of machine parts and industrial detritus. Two decks on the western side of the building, are arbitrarily designated as the north deck, Area B, and the south deck, Area C. Wood bins and the floors of the decks have equipment. A pipe rack is present on the south deck (Area C). Area D is located to the north of the foundation area and Area E is to the south of the foundation area. Areas D and Area E are outside the Machine Shop structure at ground level and contain a surface scatter of artifacts. This report presents only the data on Area A of the Machine Shop. The data from the other areas of the Machine Shop will be presented in future reports. The Machine Shop functioned as the maintenance area for the entire mill town and possibly for the mines on Bonanza Ridge. The equipment, machinery and industrial debris located in these storage areas provide information concerning the functioning of the copper mine and mill, and the abandonment of the mining complex in 1938.





Figure 4. Areas A, B, and C of the Machine Shop, Kennecott.

All work at the Machine Shop was recorded in the following manner. The five areas of documentation were given an arbitrary area designation (Area A, B, C, etc.; see above). For each area of the Machine Shop, units were delineated. Artifacts were mapped and identified *in situ*. Every artifact was assigned a field specimen number (FS#) which was recorded on the unit map and the artifact field recording form. The FS# series are sequential for each area of the Machine Shop (not sequential by unit). For example, Area A had FS# 1-1750. The other four areas have their own FS# sequence.

Every artifact was described on an artifact field recording form. The following attributes were recorded: FS#, function, material type, refuse type, dimensions, and comments. An artifact typology was developed in the field during recording to standardize the description terms. For unidentified items a running list describing the item was also recorded in the typology (unidentified 1, unidentified 2, etc.). Due to the use of the typology the artifact descriptions are standardized even though several people worked on the project. Black and white photographs were taken for every unit and of specific artifact types. Color slides recorded general views of Area A and of specific artifact types. The field work was preformed by Mary Ann Sweeney, Dan Thompson , and Paul White. Field forms, photos and notes are available at Wrangell-St. Elias National Park and Preserve, Copper Center, Alaska.

## DATABASE

A database developed on Microsoft Access records the artifacts from all areas of the Machine Shop. The database structure includes three linked forms: artifact catalog, dimension form and embossing form. The artifact catalog describes the provenience and general functional description of each item. The dimension form describes the various measurements recorded, and all of the embossed, stamped, or painted lettering and numbering found on an artifact is recorded on the embossing form. Together these three forms record all pertinent information recorded for an artifact and facilitate queries and generation of database reports. The complete database for Area A is presented in Appendix II.

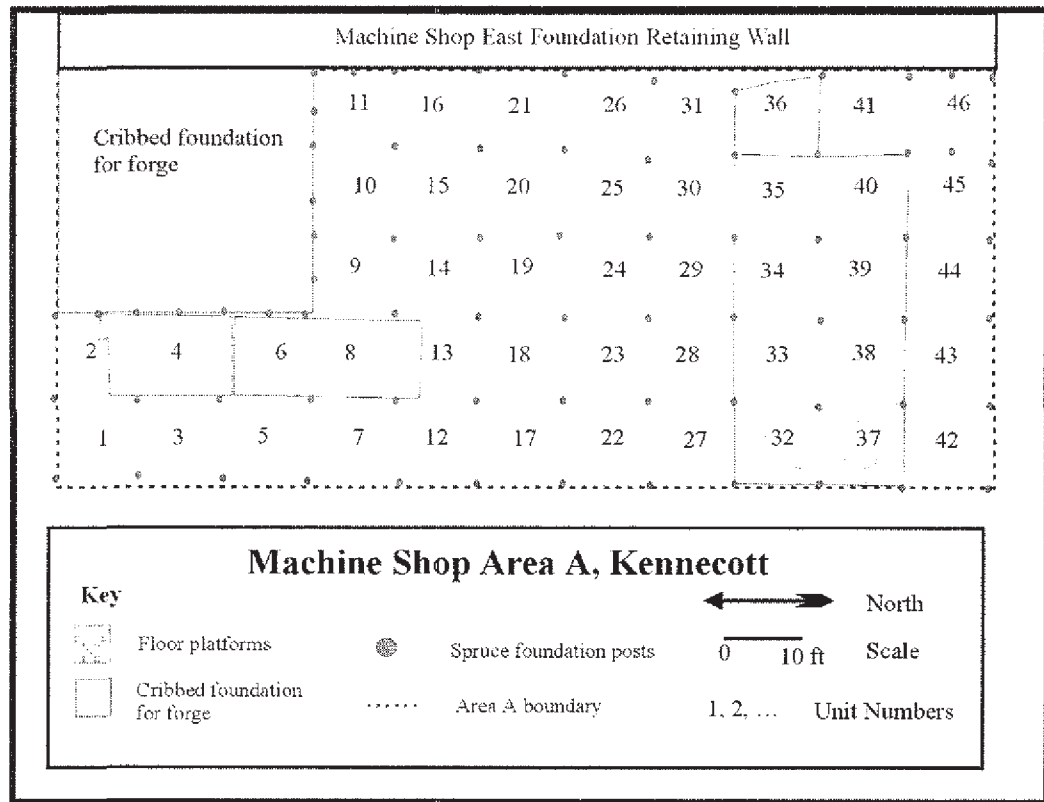


Figure 5. Machine Shop foundation area map with units.

## MACHINE SHOP AREA A DESCRIPTION

Area A is located underneath the Machine Shop in the foundation area (100' x 50') of the structure (Figure 4 and Figure 5). Spruce posts support the first floor of the building. The posts are fairly evenly spaced and conveniently divide the foundation area into rectangular sections the project called units. There are 46

units in Area A of the Machine Shop and the units typically measure about 10' x 10'. The northeast corner of the foundation area contains a cribbed square filled with tailings and dirt. The cribbed section is the foundation to the forge area of the Machine Shop and the dirt and tailing fill is a safety measure against fires.

Two wood platforms or floors are present in the foundation area. One platform covers units 2, 4, 6, 8, and 13, is 9 to 14" above ground level and has overall dimensions of 36' long x 9' wide (see Figure 5). The second wood platform is larger with overall dimension of 47' long x 20' wide covering units 32 - 40, and is 29" above ground level. The two wood platform constructions consist of flat milled floorboards nailed to joists. Runners that rest on flat wood footers support the joists. All of the floorboards run north-south. The rest of the foundation area has an unprepared dirt floor with cobble inclusions.



## Artifact Typology

The artifacts recorded in Area A of the Machine Shop are described in a functional classification system first defined by Sprague in 1981 for cataloging of early 20<sup>th</sup> century Euro-american artifacts. (Sprague 1981). The basic outline and major artifact classes of Sprague's classification system was modified for use in the downtown Fairbanks "Barnette Street " archaeological project (Bowers and Gannon 1997) and customized by Mills for research at the historic gold mining settlements of Coldfoot and Tofty, Alaska (Mills 1998). The classification system is further adapted to accommodate the industrial nature of the assemblage at Kennecott.

With a functional classification system an artifact may possibly fit into a number of categories as a result of multiple functions of the artifact. The function of an artifact can also change during its life-use due to recycling, reuse, and innovation. Artifacts are classified within the functional categories based on the manufacturers intended use of the object. If an artifact has an unknown function or multiple functions the object is classified under the unknown/unclassified section.

The classification system is divided into 8 broad categories: personal, domestic, architecture, transportation, commerce and industry, group services, group ritual, and unknown/unclassified. Table 1 outlines the classification system utilized in Machine Shop research. The personal item category is subdivided into 14 categories such as clothing, recreation, pocket accessories and personal indulgences. The domestic item category is subdivided into three main categories that cover artifacts relating to household items: housewares and appliances, furnishings, and household maintenance. Architecture is divided

into nine categories: structures, construction, plumbing, fixed illumination and power, energy transmission, telephone, fixed heating and cooling, wiring fixtures and private communication. The transportation category has three main categories to accommodate all transportation-related artifacts. Commerce and Industry is divided into 10 categories, including mining, manufacturing and construction artifacts. Group Services has two major divisions: banking/monetary systems and public administration. The seventh category is group ritual and includes artifacts involved with organized religion and other group events. Finally, the unknown/unclassified category includes all diagnostic and undiagnostic artifacts that are not identified to function, or have multiple functions.

The detailed material culture description is provided in Appendix I. The artifact descriptions in this Appendix are organized following the classification system presented in Table 1. The descriptions include a definition of each artifact class. Each artifact is referred to by its FS# in the artifact description, and the dimensions of each artifact is presented as is any trademarks or lettering, if applicable.

The complete database for Area A is presented in Appendix II. The database includes complete artifact descriptions and comments, provenience, dimensions and embossing. Lastly, a field map of each unit was drawn including all of the artifacts in the unit with their respective FS#'s listed. Copies of the original field maps are provided in Appendix IV.

**Table 1**

Functional classification system used in this study (adapted from Sprague 1981, Bowers and Gannon 1997, Mills 1998).

## 1. PERSONAL ITEMS

### A. CLOTHING

1. hardware
2. textile/cloth/leather
3. belt
4. glove
5. mitten
6. labels

### B. FOOTWEAR

1. shoes
2. boots



3. metal footwear hardware

#### C. ADORNMENT

1. rings
2. pins
3. chains
4. beads
5. pendants

#### D. BODY RITUAL AND GROOMING

1. dental care
2. haircare
3. perfume, toilet waters
4. mirror
5. makeup

#### E. MEDICAL AND HEALTH

1. patent & pharmacy medicines
2. syringe
3. thermometer
4. eyeglasses
5. hotwater bottle & accessories
6. protective eyewear

#### F. BIRTH CONTROL

#### G. INDULGENCES

1. candy/gum
2. smoking
3. snuff & chewing tobacco
4. alcohol

#### H. PASTIMES & RECREATION

1. writing utensils
2. musical instrument
3. toys
4. audio playback
5. games

#### I. RITUAL

1. religious medallions
2. whetstone
3. pocketknife
4. watch

#### J. POCKET TOOLS & ACCESSORIES

#### K. INFANT CARE

L. LUGGAGE

M. STORAGE

N. MONEY

## 2. DOMESTIC ITEMS

### A. FURNISHINGS

1. carpet
2. linoleum
3. wallpaper
4. tile
5. furniture & parts
6. time keeping devices (not pocket or wrist)
7. curtain related
8. table cloth
9. venetian blind
10. shelf
11. space empty
12. wall/bureau mirrors
13. furnishing tacks

### B. HOUSEWARES & APPLIANCES

1. culinary (food preparation)
  - a. food waste
  - b. storage
  - c. kitchen appliances
  - d. food, condiment & beverage containers (non-alcoholic)
    1. beverage
    2. condiments
    3. food
  - e. cooking pots & pans
  - f. cooking utensils
  - g. bottle & can openers
  - h. closures
2. gustatory (food eating)
  - a. food
  - b. beverage
3. portable illumination
4. portable waste disposal
5. portable heating/cooking
6. domestic ritual
7. household pastimes (e.g. flower pot)
8. home education, information, business
9. non-kitchen appliances

### C. CLEANING AND MAINTENANCE

1. cleaning
2. household maintenance
3. laundry
4. sewing
5. pest control

### 3. ARCHITECTURE

#### A. STRUCTURES

#### B. CONSTRUCTION

1. materials
  - a. window
  - b. interior
  - c. exterior roofing & walls
  - d. miscellaneous
  - e. foundation
2. hardware
  - a. fasteners
  - b. hinges
  - c. nailers for wooden boxes
  - d. brackets/braces
  - e. metal stock
  - f. door fixtures
  - g. cabinet fixtures

#### C. PLUMBING

1. pipes
2. drain
3. spigot
4. valves
5. fittings/couplings
6. pipe hangers

#### D. FIXED ILLUMINATION & POWER

1. wire
2. fuses
3. reastats
4. light bulbs
5. insulators
6. energy transmission
  - a. gears
  - b. pulley systems
  - c. shaft equipment

#### E. TELEPHONE

#### F. FIXED HEATING, COOLING. ATMOSPHERIC CONDITIONING

## G. WIRING FIXTURES

## H. PRIVATE COMMUNICATION

## 4. PERSONAL AND DOMESTIC TRANSPORTATION

## A. VEHICLES

1. horse/dog accoutrements
2. vehicle accessories

## B. MAINTENANCE

## C. RITUAL

## 5. COMMERCE AND INDUSTRY

## A. AGRICULTURE

## B. HUNTING

1. guns
2. ammunition

## C. FISHING

## D. GATHERING

## E. TRAPPING

## F. LOGGING

## G. MINING

1. mining equipment
2. milling equipment

## H. CONSTRUCTION

1. tools

## I. MANUFACTURING

1. handicraft
2. industrial

## J. COMMERICAL SERVICES

1. adverstising signs
2. storage
3. entertainment
4. beverages

- 5. record keeping

## K. BLACKSMITHING

## 6. GROUP SERVICES

### A. BANKING/MONETARY SYSTEMS

### B. PUBLIC ADMINISTRATION

## 7. GROUP RITUAL

## 8. UNKNOWN/UNCLASSIFIED

### A. GLASS FRAGMENTS, UNIDENTIFIABLE TO FUNCTION

### B. SHEET METAL FRAGMENTS

### C. MISCELLANEOUS METAL

- 1. wire, functionally unknown
- 2. cans, unidentifiable to function
- 3. hardware(functionally unknown; multiple functions common)
- 4. metal beams
- 5. unidentified miscellaneous metal

### D. MACHINE/ENGINE PARTS (IN A SETTING WHERE FUNCTION IS UNKNOWN)

### E. PLASTIC, FUNCTIONALLY UNKNOWN

### F. PAPER, FUNCTIONALLY UNKNOWN

### G. WOOD & CHARCOAL FRAGMENTS

### H. COAL

### I. FAUNAL REMAINS, NOT KNOWN TO BE FOOD REMAINS

### J. OTHER, COMPLETELY UNIDENTIFIED MATERIAL

### K. CERAMIC, FUNCTIONALLY UNKNOWN

### L. TEXTILES, FUNCTIONALLY UNKNOWN

### M. UNIDENTIFIED SYNTHETIC VISCOUS LIQUID



N. LEATHER, FUNCTIONALLY UNKNOWN

O. CORDAGE

P. FOIL, FUNCTIONALLY UNKNOWN

Q. CORK, FUNCTIONALLY UNKNOWN

R. RUBBER, FUNCTIONALLY UNKNOWN

S. LITHIC, FUNCTIONALLY UNKNOWN

T. IVORY, FUNCTIONALLY UNKNOWN

## Artifact Assemblage Discussion

A total of 2901 artifacts were classified and described in Area A of the Machine Shop. Six major artifact classes are identified: personal, domestic, architecture, transportation, commerce & industry, and unknown/unclassified. The majority of artifacts (84.14%) fall into one of two categories, architecture (43.54%) or commerce and industry (40.6%) (Figure 6). The remaining artifacts are classified in the artifact categories of unknown/unclassified 13.79%, transportation 1.4%, personal 0.586% and finally domestic with a count of 1 artifact.

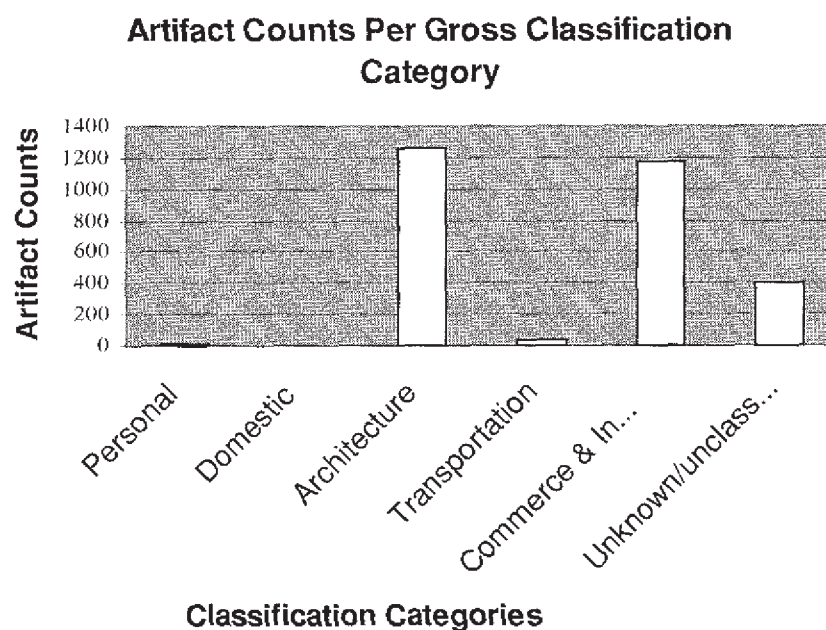


Figure 6. Histogram of gross classification categories for Area A of the Machine Shop

The artifact class with the largest count of artifacts is Architecture ( $n=1264$ ). Architecture has five subdivisions that contain artifacts: structures ( $n=2$ ), construction ( $n=299$ ), plumbing ( $n=584$ ), fixed illumination and power ( $n=352$ ) and finally fixed heating, cooling and atmospheric conditioning ( $n=26$ ) (Figure 7). Plumbing and construction contain the most artifacts, and includes pipes, pipe fittings, pipe hangers, valves and drains. The construction category includes materials and hardware such as fasteners, hinges, braces and metal stock.

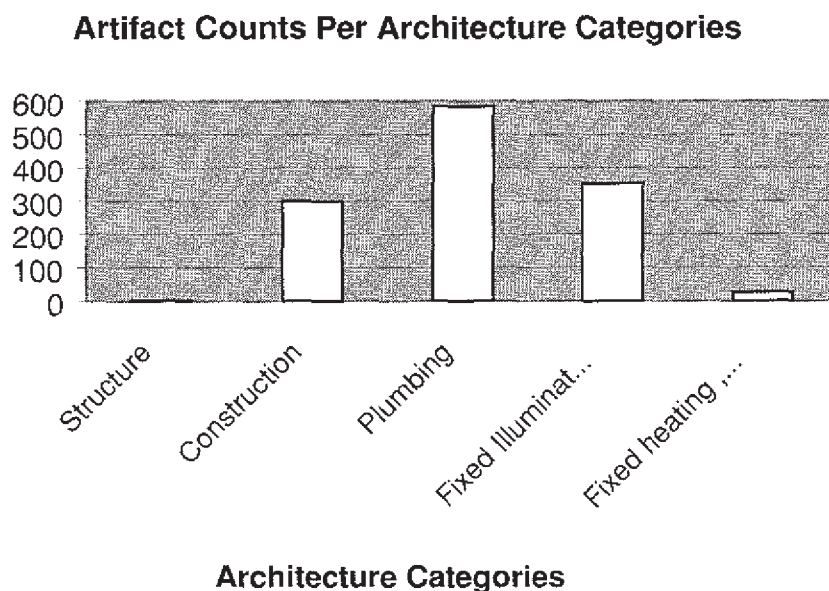


Figure 7. Histogram of artifact counts per architecture category for Area A of the Machine Shop

The second largest artifact class is Commerce and Industry (Figure 8). Commerce and Industry has six categories that contain artifacts: hunting, mining, construction, manufacturing, commercial services and blacksmithing. The largest class is manufacturing ( $n=892$ ) but it is important to note that the manufacturing industrial artifacts include two lots (FS 699, FS 927) of metal shear trimmings that contain 300 items for each lot. In addition a lot of punched blanks (FS 568) consisting of 250 items is also included in the manufacturing category. As a result three FS's account for 850 of the 892 artifacts in the manufacturing category. These three lots are secondary refuse piles. The manufacturing class has a high concentration of artifacts but only a few artifact classes ( $n=3$  artifact classes). Compared to all other artifact categories, the manufacturing category artifact counts per category have a different pattern because there are few artifact classes yet those classes have a high artifact count.

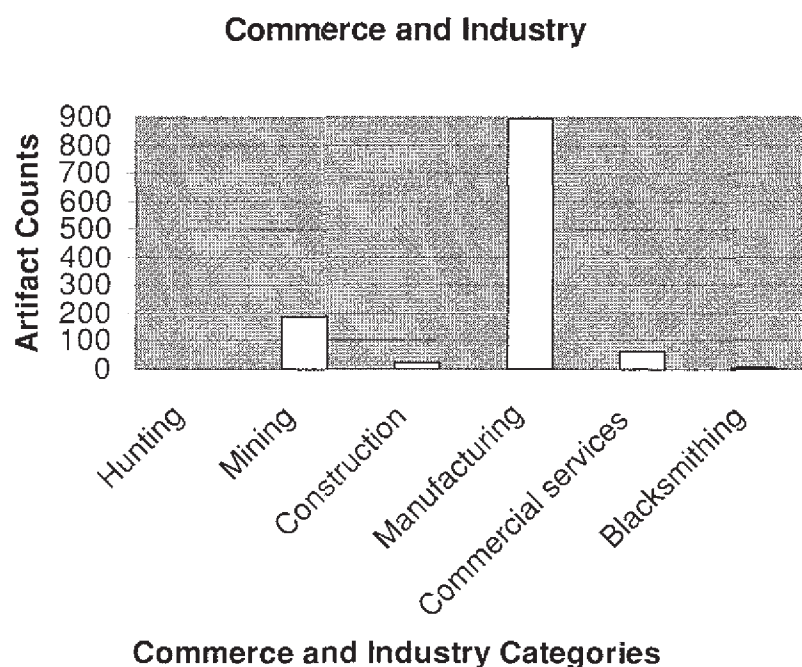


Figure 8. *Artifact counts per commerce and industry categories at Area A of the Machine Shop*

The mining category ( $n=188$ ) within Commerce and Industry consists of two subdivisions, mining equipment and milling equipment. Only 24 artifact relating to the extraction of copper ore are classified under mining equipment and includes mostly rock drills and rock drill shafts. The milling equipment category consists of 164 artifacts that are involved with the crushing or concentrating of ore. Artifacts in this category include a callow cone, concentrating tables, conveyor system parts, James Simplex vibrators, and ore bags.

Following architectural and commerce and industry the next largest artifact category in the assemblage is the unknown/unclassified category consisting of 400 artifacts. The Unknown/Unclassified category is used for artifacts with unknown function or artifacts with multiple functions. The Unknown/Unclassified artifact categories present in the Machine Shop assemblage are glass fragments, miscellaneous metal, machine and engine parts, paper, wood, textiles, cordage and rubber (Figure 9). Within unknown/unclassified the two largest categories are miscellaneous metal ( $n=226$ ) and machine parts ( $n=148$ ). Miscellaneous metal includes hardware, wire, metal beams, cans and generic unidentified metal (not sheet metal). The machine/engine category is comprised of machine and engine parts that have multiple functions or unidentifiable functions.

In sum, the artifact assemblage in Area A of the Machine Shop consists of 2901 artifacts, the majority of them falling into the architectural and commerce and industry classes, with relatively few other classes identified. All of the artifacts

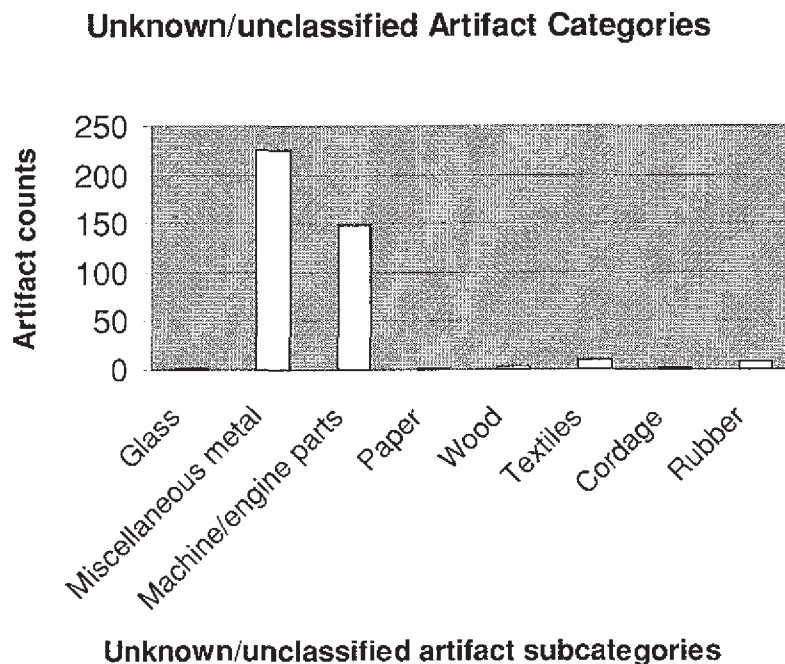


Figure 9. Histogram of artifact counts per Unknown/Unclassified categories for Area A at the Machine Shop.

are described in Appendix I and a brief general description is provided above. The next section discusses two research questions that focus on the functional and temporal organization of the assemblage.

## RESEARCH QUESTIONS

Two research questions attempt to delineate the functional and temporal organization of the assemblage. The first research question addresses the storage function of Area A of the Machine Shop. Is the area a storage facility for just the Machine Shop, the Mill building or the entire mill townsite? The second research question addresses when the artifacts were stored. Were the artifacts stored over the entire time span of the mines operation, or was the assemblage deposited at the time of site abandonment in 1938? This section of the report evaluates the proposed research statements. For each research statement the archaeological expectations and method are reviewed and the results discussed.



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RESEARCH STATEMENT 1

The artifacts in the storage area of the Machine Shop represent maintenance activities from all areas of the mill town and mines.

Archaeological Expectation: If the Machine Shop maintained all of the equipment from the mill town and mines then the storage facility assemblage in Area A is expected to contain equipment and equipment parts for a diverse set of machinery. Various parts and maintenance equipment that functioned in the industrial complex, (e.g. the Mill, Leaching Plant and Power Plant), and in the administrative, support services and utilidors shall be present.

Archaeological Method: The archaeological expectations of Research Statement 1 can be falsified by determining if the assemblage does not include parts utilized in the maintenance of the industrial, domestic and administrative areas of the settlement. If the artifacts consist of items only used in the Machine Shop, or limited to only one activity (i.e., only milling or mining or heating, etc.) the research statement is falsified. It is critical to consider the function of an artifact in the context of this research question.

Archaeological Evaluation: The material culture assemblage in Area A of the Machine Shop includes artifacts that functioned in a wide variety of activities at Kennecott. Figure 6 presents the classification categories of artifacts found in Area A. Simply by examining the gross classification categories of the assemblage the wide diversity of the artifacts are apparent. Figure 7 and Figure 8 present the subcategories within the Architecture and Commerce & Industry categories. Artifacts involved in mining, milling, blacksmithing, fixed illumination and power, plumbing, heating & cooling, are just examples of the wide variety of artifact classes present in the assemblage.

Several groups of artifacts are involved with the maintenance and operation of site wide systems such as water heat, and power. The assemblage includes plumbing artifacts including pipes, wood water pipes, valves and pipe fittings. The plumbing artifacts could be used in many locations and functions throughout Kennecott. For example, pipes are present in all buildings. Water and steam pipes are present in the utilidors, which carried water, heat and waste. The wood water pipes present were used to pipe in water from National Creek. Fixed illumination and power includes electricity-related artifacts and power transmission systems found between and within all of the buildings.

Other artifacts, however, relate to a specific activity found at only one location. The blacksmithing activities occurred in the Machine Shop. Several of the engines present in the assemblage are seen *in situ* in the Power Plant. Transportation related artifacts such as railroad and tramway artifacts are present. Finally the mining and milling equipment are used in specific areas of the mill or mines.

Artifacts used in a wide variety of systems at the site support the research statement that Area A of the Machine Shop is a storage facility for many of Kennecott's operation systems. There is no evidence that the foundation area stored equipment for only the Machine Shop or any other specific activity.

#### RESEARCH STATEMENT 2

The assemblage represents maintenance activities and storage for the entire time span of the Machine Shop, 1916-1938.

Archaeological Expectations: If the assemblage represents maintenance activities from 1916-1938, the artifacts present in the assemblage will consist of items used at Kennecott through out the time span of operation. The technology utilized at the industrial complex changed throughout the history of the facility. Therefore, the various technologies utilized by Kennecott during the years 1916-1938, when the Machine Shop was in operation, should be represented in the assemblage. Such technologies include changes in concentrating equipment or leaching technology.

Archaeological Method: This archaeological expectation can be falsified in several ways. The function of the artifacts will be identified and the time when used at Kennecott will be determined. If the date of the artifacts and the technology of the artifacts cluster to one end of the time frame of mill operation, then Research Statement #2 is rejected. The assemblage has two data sets to determine the date of the assemblage: artifacts with known dates of use, and artifacts with patent information.

Archaeological Evaluation: Two artifact types, the concentrating tables (FS 1410) and the James Simplex Vibrators (FS 1027) have known dates of operation. Concentrating tables in Kennecott's 1924 mill flowchart shows the presence of the same concentrating tables found in Area A of the Machine Shop. The chart indicates that the concentrating tables probably functioned in

the mill in 1924. The tables were not in use at the time of Kennecott's closure in 1938. Perhaps the tables were stored in the Machine Shop foundation area when they were taken out of operation.

The James Simplex Vibrator is a machine that shakes a concentrating table. The James Simplex vibrators were in operation in the Mill building in 1938 and are present today *in situ* in the Mill building. The James Simplex Vibrators illustrate that the assemblage contains artifacts utilized during the last days of Kennecott's operation.

Ten artifacts contained patent information (Table 3). The patent data are either actual patent dates such as "April 24, 1906-September 11, 1906", or patent numbers such as "4876801". Table 3 provides the estimated dates for the artifacts containing patent numbers, listed in brackets. The patent dates range from 1888 to 1909. Five of the artifacts' patents were acquired in the first decade of the 20<sup>th</sup> century.

**Table 3. Patent and Manufacturing Data of Artifacts in Area A of the Machine Shop**

FS	Embossing
1426	TRUMP MEASURING MACHINE/ PATENTED APRIL 24 1906 - SEPTEMBER 11 1906/ SOLE MANUFACTURERS/ THE CONVEYING WEIGHER CO./ 90 WESTSTREET NEW YORK/ SIZE 36 INCH ORDER 306
1372	TATE JONES & CO. INC/ PAT. APR 17'06/ PITTSBURGH, PA
1361	SIMPLEX CONDENSATION METER/ PATENTED JUNE 21 1905 - DEC 1, 1906/ AMERICAN DISTRICT STEAM CO./ NORTH TONAWANDA, N. Y. / SIZE 2/ SERIAL NO. 13062
992	PAT. IN U.S./ SEPT. 22, 91 NOV. 18 19[...]
543	ILLINOIS/MARSH & COMPANY/CHICAGO, USA/ PAT'D OCT-02-88
516	[...]05-08"
437	BRYANT 125 PYROTITE/SOA/TRADEMARK/PAT 4-27-09
314	MALL MAY-10-04/OCT-07-07

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- 197 PAT NO 5 508682, 647502, 622218/ ROLLER BEARINGS/  
HARRISON, NJ [estimated patent date is 1895-1900 (Sagstetter and  
Sagstetter 1998:254)]
- 101 PAT NO 116\4876801\B866 [estimated patent date is 1890-1895  
(Sagstetter and Sagstetter 1998:254)]

There are two points to remember when using the patent dates to determine the age of the assemblage at the Machine Shop. First, patent information provides a *terminus post quem* for the artifact, not an actual date of when the artifact was purchased or used at Kennecott. The *terminus post quem* is the date after which an artifact must date, and by extension that portion of the assemblage containing that artifact. As a result, patent dates provide a very general time period and do not provide specific information in determining the age of the Machine Shop assemblage. The second point is that only a small sample of the artifacts in the assemblage, 0.3%, has patent or dating information. To make broad conclusions from such a small sample is tenuous.

Nevertheless, the patent information at Kennecott does not refute the possibility that the assemblage consists of artifacts dating from 1916-1938. All of the patents were filed prior to 1938 and could have been purchased, used and stored during the period of mining operation at Kennecott. Altogether, the artifacts do not falsify Research Question #2. The patent dates spanning the late 19<sup>th</sup> and early 20<sup>th</sup> century, the concentrating tables used in 1924, and the James Simplex vibrators, which were used in 1938, all support the hypothesis that the assemblage contains artifacts spanning the life-span of the Machine Shop (1916-1938). There is no evidence to support the notion that the assemblage is the result of one deposition that occurred at the time of closure of the facility.

The two research questions, discussed above, have determined that Area A of the Machine Shop was used as a storage facility for material culture used throughout the Kennecott system and accumulated throughout the time span of the Machine Shop (1914-1938). Now that the artifact assemblage is identified, described and the research questions answered, we can now turn to recommendations for a collection plan for the assemblage.

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## Collection Plan Recommendations

This section makes recommendations for a collection plan for the assemblage of material culture at Area A of the Machine Shop at Kennecott.

Recommendations focus on a collection plan for *historically significant* (defined below) items. The plan also suggests collecting non-significant portable items for use in an on-site interpretation program. Two underlying attributes of the assemblage influence the collection plan. The first is the prevalence of unauthorized scavenging at Kennecott, and the second is the exhibit-like quality and atmosphere of the assemblage located in the foundation area underneath the Machine Shop.

Unauthorized scavenging is notorious at Kennecott. For this very reason, a collection plan is necessary for the assemblage located in Area A of the Machine Shop. Not only is this assemblage one of the only remaining extant assemblages left at Kennecott, it is also in an area easily accessible to visitors. In addition to the scavenging problem, the foundation of the Machine Shop is scheduled for stabilization by the NPS. The necessary construction work may have a negative impact on the assemblage. This section of the report makes specific recommendations in the context of a collection plan for the assemblage.

Unauthorized collection of artifacts is an important consideration at Kennecott as it is at every National Park. Artifact collection is very tempting to the Kennecott visitor because of the high visibility of surface historic material culture, and the common assumption that historic items are trash, not artifacts. In fact, during the project fieldwork a visitor removed a crate, located behind the machine shop, over the Fourth of July weekend. There is also a long history of scavenging at Kennecott following the mine closure in 1938. Tourists and local residents were not deterred by the absentee owners from collecting usable items at the abandoned mill site. Historically and today the foundation area is open to the general public and accessible at all times.

The foundation area of the Machine Shop has an exhibit-like atmosphere. The assemblage is a storage facility for a concentration of large industrial machinery and equipment. Excluding the interior of the buildings, there are no other large extant assemblages at Kennecott. The context of the assemblage is of primary importance. Situated underneath a building, facing the glacial moraine, the area is poorly lit and separate from the main tourist routes in the mill site. As a result, when the visitor finds and walks through the foundation area it is like walking through a graveyard of industrial detritus. The visitor has an experience that is different from any other location at Kennecott. The exhibit-like quality



of the assemblage is part of the integrity of the building as well as the site and should not be disturbed if possible.

The recommendation posited here is to give the entire assemblage one accession number and to catalog 61 specific artifacts of the assemblage Table 4. Not all of the specified 61 cataloged artifacts need be collected. Two variables influence the decision to collect and/or accession artifacts in the assemblage: 1) the historical significance of each of the artifacts in the context of Kennecott, and 2) the significance of the artifact in the context of early-20<sup>th</sup> century material culture.

#### **Historical significance of the assemblage in the context of Kennecott.**

The key factor in determining the historical significance of an artifact is the industrial history context of Kennecott. Kennecott is a National Historic Landmark in part due to the fact it is the best national example of early 20<sup>th</sup> century copper mining. Therefore, artifacts that were directly utilized in the ore extraction and milling process at Kennecott are historically significant, as are industrial engines and machines that made copper extraction at Kennecott possible.

One could argue that every nut and bolt present at the site was imperative to Kennecott's operation; however, some artifacts were more critical than others to the mining and milling operations. It is easy to link the artifacts that functioned directly in the extraction of ore, or the crushing and concentrating of ore, to the industrial mining history of the site. Nevertheless, artifacts that functioned in other systems, like electricity and power transmission are also important. Also, commonly used and abundant artifacts at Kennecott are significant in the context of overall mill operations. For example, several pulleys are present in the assemblage and are seen in the industrial buildings. Without the pulleys at Kennecott the machines would not have been powered to crush and separate the ore. Therefore the pulleys are significant, but due to the abundance of pulleys (n=78) in the assemblage, the entire lot need not be accessioned. Instead, one example from this lot should be accessioned as a representative of them all.

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**The significance of the artifact in the context of early 20<sup>th</sup> century material culture.**

An artifact may not directly reflect the mining and milling history of Kennecott, yet still be significant and included in the collection plan. If an artifact is rare, in excellent condition, or a typical example of early 20<sup>th</sup> century technology, it may be considered to be significant. For example, a wood water pipe is a common item utilized in early 20<sup>th</sup> century settlements in Alaska and the western United States. However, these pipes are usually found buried beneath city streets, and are rarely seen in good physical condition. The wood water pipes at Kennecott are examples of early 20<sup>th</sup> century material culture and technology that was common at the time but are atypical in the sense that the artifact is not commonly found today owing to preservation factors.

Once significant artifacts are determined, the next step is to decide if the artifact should remain *in situ* underneath the Machine Shop or if it should be removed and stored elsewhere. Due to the exhibit-like quality of the assemblage, a recommendation that an artifact ought to be removed from the area will occur only when there is an undo threat of the artifact being scavenged, or if there will be a negative impact to the artifact either due to weathering or during the stabilization work planned for the Machine Shop. The primary factor in this decision concerns the unauthorized collection of artifacts at Kennecott, and the open accessibility of the assemblage to the public. If a significant artifact is readily portable, then the artifact ought to be removed to a secure location.

Portability of an artifact is the key variable when determining if an artifact should be stored in a more secure area. As a result of the industrial activities at Kennecott and the fact that the foundation area functioned as a storage facility, many of the artifacts in the assemblage are large and heavy. A historically significant artifact could be eight feet long and cumbersome. Large artifacts are difficult to be carried off by a visitor or moved unless using a hoist. On the other hand, a small artifact is more likely to be picked up and pocketed by an individual.

Table 4 presents the collection plan recommendations for Area A of the Machine Shop. Table 4 lists 61 significant artifacts, and includes for each artifact its location, criteria for accessioning the artifact (1 or 2), and if it should be collected or left *in situ* underneath the Machine Shop.

**Table 4. Machine Shop Area A Artifacts Recommended for Accessioning**

Key to table:

the historical significance of the artifact in the context of Kennecott, and 2) the significance of the artifact in the context of early 20<sup>th</sup> century material culture .

C = collect, N = not collect

FS	Code	Identification	Comments	Unit	Crit eria	Coll ect?
210	3b1	Brick	Laglede King St. Louis	6	2	C
222	3b1	Brick	Evens & Howard Extra	7	2	C
384	3c1	Water pipe		20	2	N
889	3c1	Water pipe		29	2	N
1258	3c1	Water pipe		35	2	N
1698	3c5	Water pipe coupling		26	2	N
1094	3c5	Water pipe plug		34	2	N
796	3d6	Gear	Meese & Gottfried	25	2	N
1051	3d6	Gear	Link-belt Company Silent	34	2	N
191	3d6	Pulley		6	2	N
1613	3d6	Pressure tank		36	2	N
563	5g2	Roller crusher part		13	1	N
624	5g2	Callow cone		18	1	N
1410	5g2	Concentrating tables		43	1	N
1045	5g2	James Simplex Vibrator		34	1	N
1027	5g2	James Simplex Vibrator n=9		37	1	N
1026	5g2	James Simplex Vibrator		37	1	N
1044	5g2	James Simplex Vibrator		34	1	N
1035	5g2	James Simplex Vibrator door piece		37	1	C
75	5g2	Ore chute handle		2	1	N
513	5g2	Tram hanger		16	1	N
1644	5g2	Tram bucket		31	1	N
1426	5g2	Trump weighing machine		43	1	N
472	5k	Swage		11	1	C
816	5k	Swage		25	1	C
979	5k	Swage		33	1	C

FS	Code	Identification	Comments	Unit	Crit eria	Coll ect?
1667	5k	Swage		26	1	C
806	5k	Fire iron		25	1	C
1324	8c3	Sheave	Rankin Tool Wks Seat.	40	1	N
1332	8c3	Sheave	Vulcan TA[...] Block	40	1	N
1692	8d	Brake		26	2	N
966	8d	Byron chassis and Pelton pump	Byron	33	2	N
974	8d	KC1182 chassis	Morris Machine Works Baldwinsville N.Y.	33	2	N
1649	8d	Capstan n=1 (pick 1)		31	2	N
32	8d	Chain guard		2	2	N
1199	8d	Drum		39	2	N
70	8d	Elevator bucket		2	2	N
1732	8d	Engine 1		30	2	N
678	8d	Engine 2		18	2	N
1734	8d	Engine 3 n=2 (pick one)	American Hoist and Derrick Co St. Paul Minn	30	2	N
1620	8d	Fairbanks Morse engine casing		36	2	N
1093	8d	Goulds pump	Goulds, Seneca Falls, NY Made in USA 0752	34	2	N
144	8d	Piston rod		4	2	N
1361	8d	Simplex condensation meter	Simplex Condensation Meter, Patented June 21 1905 - Dec 1 1906, American District Steam Company	45	2	N
1577	8d	Sprocket wheel	Link-belt Company, 18, 1, 2	41	2	N
1011	8d	Tubular boiler		37	2	N
962	8d	Unidentified 29		33	2	N
1113	8d	Unidentified 35		38	2	N
119	8d	Unidentified 37		38	2	N
1128	8d	Unidentified 38		38	2	N
1395	8d	Unidentified 60		42	2	N
63	8d	Machine stand		2	2	N
1105	8d	Unidentified 146		38	2	N

Table 4 presents a total of 61 artifacts recommended for cataloging. Eight of these are small and portable and should be removed from the foundation area of the Machine Shop and stored at a secure location. The remaining 53 artifacts

can remain *in situ* beneath the Machine Shop with little risk of being stolen because of the size and weight of the artifacts. As a result, significant artifacts can still be monitored in addition to maintaining the integrity of the assemblage.

The final collection recommendations pertain to the collecting of non-significant portable artifacts for use as props in visitor interpretation. Common non-significant artifacts may be able to be used to illustrate the history of Kennecott in the planned NPS visitor interpretation center. For example, rock drills, a common artifact found at any hard rock mining site, can help provide a context for explaining how ore was extracted in the mines. At the same time, rock drills are portable items and removing an interpretative portable item from Area A at the Machine Shop is a positive action due to the high frequency of unauthorized collecting which is likely to continue at the site.

**Table 5. Non-historically significant artifacts recommended for visitor interpretation, owing to their portability and likelihood for unauthorized collection.**

FS	Function	Identification	Description	Unit	Collect
1708	1h5d	Baseball		30	C
480	3d4	Light shade		11	C
167	5g1	Rock drill bit		4	C
170	5g1	Rock drill bit		4	C
413	5g1	Rock drill bit		12	C
587	5g1	Rock drill bit		14	C
710	5g1	Rock drill bit		19	C
1691	5g1	Rock drill shaft		26	C
1103	5g1	Rock drill shaft		38	C
700	5h1	Cant hook		19	C
39	5h1	Box wrench		2	C
452	5h1	Crow's foot wrench		11	C
613	5h1	Open end wrench		17	C
892	5h1	Wheelbarrow		29	C
1452	5j2	Burlap bag		44	C
1299	5j2	Crate fragment	Crouse-Hinds Condulets	35	C
1315	5j2	Crate fragment	Kennecott Copper Corporation	40	C
1438	5j2	Crate fragment	Kennecott, Alaska	43	C

Eighteen non-significant portable artifacts are useful for interpretation programs at Kennecott. The probability of these artifacts being collected by visitors is high. The recommendation is to remove the 18 non-significant artifacts from

the assemblage and donated them to the interpretation program where they will remain in the Kennecott context.

Although unauthorized collecting is a primary concern at Kennecott, the importance of the exhibit-like quality of the material culture assemblage in Area A of the Machine Shop can not be overemphasized. The entire assemblage is historically significant in the context of the history of the Machine Shop, Kennecott and mining in Alaska. The entire assemblage should be assigned an accession number. Selecting one artifact over another for cataloging is extremely difficult since the assemblage, as a whole is part of the integrity of the National Historic Landmark. Only 61 artifacts are recommended for cataloging. That does not mean that the remaining 2840 artifacts are not important. The remaining artifacts are part of a historically significant context and should not be removed or negatively impacted. If future monitoring suggests that looting or another detrimental processes will negatively impact the assemblage, then the collection plan should be re-evaluated.



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## Summary

Kennecott Copper Corporation mined and milled copper at Kennecott from 1907 through 1938. The Machine Shop was built in 1916 and functioned to build and mend equipment for the mill town and the mines. The shop had a blacksmith forge, a welding room and a general workspace for metal cutting and shaping tools. Area A of the Machine Shop is located in the foundation area underneath the building.

Area A functioned as a storage facility for industrial equipment used throughout the time of operation of the mine. The equipment included mining and milling equipment, in addition to machines and tools used to maintain the power, electrical, water, and heating systems for the mill town. The assemblage is characterized by large cast iron industrial equipment in a setting unlike any other in Kennecott, and is one of the only remaining extant material culture assemblages at the site.

The entire assemblage of material culture in Area A of the Machine Shop is inventoried and described in this report. A collection plan is presented that assigns one accession number for the entire assemblage, and recommends that the National Park Service catalog 61 historically significant artifacts. "Historical significance" is determined in part by the context of the artifact's role in the industrial history of Kennecott, and also by the technological historic significance of the artifact. Maintaining the exhibit-like quality of the assemblage is of primary importance to retain the cultural integrity of the Machine Shop.

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## **APPENDICES**

### Appendix I: Area A Artifact Descriptions

PERSONAL ITEMS

DOMESTIC ITEMS

ARCHITECTURE

TRANSPORTATION

COMMERCE AND INDUSTRY

UNKNOWN/UNCLASSIFIED

### Appendix II: Artifacts Per Unit



## Appendix I: Machine Shop Area A Artifact Description



The artifact classification system is divided into eight broad categories: Personal, Domestic, Architecture, Transportation, Commerce & Industry, Group Services, Group Ritual, and Unknown/Unclassified. Table 1 (see text) outlines the classification system utilized in the Machine Shop research, and the artifact descriptions presented below follow the organization of Table 1.

A detailed material culture description is presented below and includes only those items found in Area A of the Machine Shop. The descriptions include a definition for each artifact class, the dimensions of each artifact, and any trademarks or lettering if applicable. Each artifact is referred to by its FS# (field specimen number) in the artifact description. All dimensions are measured in inches.

Abbreviations are used in the dimension tables and the embossing/stamp tables. The following table is a key to abbreviations:

Abbreviation	Term	Abbreviation	Term
FS	Field specimen #	D	Diameter
N	Count	ED	External Diameter
L	Length	ID	Internal Diameter
W	Width	[...]	Illegible lettering
P	Depth	...	Word is not complete
H	Height		



## Artifact Descriptions

### 1. PERSONAL ITEMS

Personal items are subdivided into several categories including clothing, indulgences, pastimes & recreation, and pocket tools & accessories. A total of 17 personal artifacts were recorded in Area A of the Machine Shop.

#### A. CLOTHING

Clothing related artifacts from the study area include a buckle, a textile fragment, and gloves totaling 14 artifacts.

##### 1. HARDWARE

###### BUCKLE

A rectangular iron open-faced buckle with a simple tongue. The buckle is either a belt buckle or a suspender buckle. The buckle measurements are L 2.0", W 3.0", and P 0.38". The diameter of the buckle tongue is 0.25".

##### 2. TEXTILE/CLOTH/LEATHER

A dark blue denim pant or overall fragment (FS 690) was found in Area A of the Machine Shop. The fragment dimensions are L 18" and W 9".

##### 4. GLOVE

The gloves found in the foundation area of the Machine Shop are either cotton or leather work gloves.

A total of 12 gloves or glove fragments were identified in the project area. Eleven of the artifacts are complete, yellow or brown cotton gloves. One leather glove (FS 1672) consists of the finger portion of the glove

Glove dimensions (in inches)

FS	N	Material	L	W	H	P	D	ED	ID
492	1	textile	8	4		0.25			
501	1	textile	8	4		0.25			
917	1	textile	26			4		18	12
991	1	cotton	4					1.75	1.5
1052	1	cotton	5.5					2.25	1.75
1211	1	cotton	10.0		10.0			10.0	4.0
1240	1	cotton	37.0	24.0		0.13			
1251	1	cotton	42.0				1.0		
1276	1	cotton	21.5	2.0		0.25			
1297	1	cotton	4.5	3.25	4.25				
1311	1	cotton	53.0	29.5	13.0				
1672	1	leather	20.0		7.0		5.0		

## G. INDULGENCES

Indulgences is a category that includes a wide variety of artifacts such as alcohol, candy and tobacco. In the project area only one indulgence artifact was identified: cigarette box.

### 2. SMOKING

#### CIGARETTES

A single 'Chesterfield' cigarette box wrapper (FS 1298) was found in the project area. The printing on the document was illegible. The wrapper measurements are L 3.25", W 2.0" and H 0.13". The cigarette box wrapper has the following label "CHESTERFIELD CIGARETTES/LIGGETT and MYERS TOBACCO CO".

## H. PASTIMES & RECREATION

Pastimes & recreation includes music, toys and games. One artifact is classified in the pastime & recreation category.

### 5. GAMES

#### BASEBALL

One baseball cover (FS 1708) was found with a diameter of 3.5".

## J. POCKET TOOLS AND ACCESSORIES

Pocket tools and accessories class is comprised of one example.

#### MATCHBOX

One cardboard rectangular matchbox (FS 1301) was found. The dimensions of the box are L 6.0" and W 5.0". The box is labeled "WESTPOCKET SAFETY MATCHES/ MATCHES MADE IN SWEDEN".

## 2. DOMESTIC ITEMS

Domestic is a category of the classification system subdivided into various groups including houseware & appliances. Domestic items are items typically found in a domestic structure but do not include structural artifacts of the domicile. Only 1 domestic item is recorded: a fuel can.

### B. HOUSEWARES & APPLIANCES

#### 5. PORTABLE HEATING/COOKING

##### FUEL CANS

A typical fuel can is a tall rectangular can with distinctive circular ridges on the bottom end and a valve and spout on the top. One fuel can fragment (FS 1664) was identified in Area A of the Machine Shop. The dimensions of the fuel can fragment are L 9.0", W 7.0" and Depth of 0.3".

### 3. ARCHITECTURE

Architectural items are any artifacts that comprise part of the structural makeup of a building. Architecture is subdivided into the following groups: structures, construction, plumbing, fixed illumination & power, energy transmission, and fixed heating and cooling. A total of 1264 architectural items were recorded.

#### A. STRUCTURES

Two architectural structural artifacts were identified in Area A of the Machine Shop both of them A-frames.

##### A-FRAME

A-frame is a term to describe part of a structure associated with the utilidors at Kennecott. An A-frame is a short wood framed roof structure covered with corrugated sheet metal. A-frames are used as a covering for the utilidors, which run parallel, and behind the Machine Shop as well as throughout the townsite. At the machine shop the utilidors are right in the drip line of the Machine Shop roof, and may require a special roof of their own.

Two A-frames were found in the Area A of the Machine Shop.

A-frame dimensions (in inches)

FS	N	Length	Width	Height
432	1	72	44	32
608	1	72	45	26



*Two A-frames in unit 17. One is covered with corrugated sheet metal.*

#### B. CONSTRUCTION

Architectural construction artifacts include two artifact categories: materials and hardware.

## 1. MATERIALS

A total of 57 construction items are recorded in the project area.

### c. Exterior roofing and walls

#### CORRUGATED SHEET METAL

Corrugated sheet metal is galvanized or un-galvanized sheet metal with a pattern of parallel and alternating ridges and grooves. Sheet metal is a term to describe metal rolled into a relatively thin flat sheet. Corrugated sheet metal can be used for roofing and siding on structures.

Fourteen pieces of corrugated sheet metal were found in the project area. The lengths of the pieces vary from 100.00" to 24.00" inches.

Corrugated sheet metal dimensions (in inches).

FS	N	Length	Width	Depth
433	5	100.0	7.5	0.13
479	6	90.0	25.00	0.13
330	2	24.0	14.0	0.13
611	1	72.0	10.0	0.13

#### WOOD SIDING

Tongue and groove wood siding found on structures at Kennecott.

Only one fragment of wood siding (FS 1085) was found in the project area. Its dimensions are L 20.0", W1.0", and H 6.0".

#### BRICK

Buff colored earthenware bricks are present *in situ* at Kennecott in the Power Plant. In Area A of the Machine Shop 40 bricks were found. Ten of the bricks are complete and 30 are fragments. Thirty-seven of the bricks are standard rectangular shaped, and three are wedged shaped. The dimensions of the complete and incomplete bricks are listed in the table below. Eighteen of the bricks are stamped with a brand name and/or place of origin and the data is presented in the brick brand name table.

Brick dimension and completeness table. Dimensions are in inches.

FS		Length	Width	HT	Complete?
189	1	9	4.25		Yes
210	1	9	5		Yes
211	1	9	4.5		Yes
222	1	8.5	4.5	3	Yes
261	1		4.25	2.5	No
383	1		4	2.25	No
393	1	9	4		No
397	2	5	3	2.75	No
405	1	9	4.5	2.5	No
468	9	9	4		No

FS		Length	Width	HT	Complete?
481	1	6	4.5	2.25	No
482	1	6	4.5	2.5	No
512	1	9	4.5	2.5	No
575	1	9	4.5	2	Yes
364	1	11.5		2	No
374	1		4	2	No
376	1	11.5	1	2	No
723	1		2.25	2.5	No
749	1	3	4		No
844	1	5	4	2.5	No
947	1	22	8.5		Yes
1366	1	25.25	12.0	8.0	Yes
1669	9	9.0	6.5		No
1747	7	9.0	4.0	2.5	Yes

## Brick brand names

FS	N	Stamp
468	9	COWEN
393	1	CO[...]
405	1	COWEN
210	1	LAGLEDE/KING 2/ ST. LOUIS
222	1	EVENS & HOWARD/EXTRA
189	1	EVENS & HOWARD EXTRA
481	1	COWE[N]
482	1	[C]OWEN
512	1	COWEN
947	1	LAGLEDE, KING, ST LOUIS

## d. Miscellaneous

## INSULATION

Canvas insulation is a standard insulation for pipe, electrical tubing and hose at Kennecott. One fragment of canvas insulation was found and measures 7.0" long with a 1.0" diameter.

## ANTI-SLIP TREAD

Anti-slip tread are rectangular pieces of metal flooring which have a raised tread design and function to provide traction. The anti-slip tread is found *in situ* on the floor of the Power Plant.

One piece of anti-slip tread was found in the project area. The dimensions of the item are L 20.0", W 11.75", and D 0.25".

## 2. HARDWARE

Hardware is the second category within architectural construction. Hardware artifacts include fasteners, hinges, nailers, braces, and metal stock. A total of 242 hardware artifacts are recorded.



**a. Fasteners**

A total of 195 fasteners are identified in Area A.

**NAILS****Wire nail**

Wire nails are regular wood nails with a typical size range of 1" to 6". Wire nails have round shanks and flat heads.

A total of 16 wire nails were found, 15 of which are complete.

Wire nail dimensions (in inches)

FS	N	Length	Diameter
311	1	8	0.25
312	1	6	0.25
315	2	4	0.25
316	1	5	0.13
341	4	4	0.13
441	1	3.5	0.25
412	1	4	0.13
421	1	4	0.75
431	1	4	0.13
581	1	3.75	0.25
582	1	3.75	0.25
1665	1	6.0	0.75

**SPIKE**

A spike is a common nail with the length ranging from 6" to 18".

Seven complete spikes were identified in Area A of the Machine Shop.

Spike dimensions (in inches)

FS	Length	Diameter
398	6	0.25
929	10	0.5
464	6	0.25
696	6	0.5
400	7.25	0.25
804	10	0.5
401	4.25	0.38

**SCREW**

One screw fragment (FS 954) was identified, with the dimensions L 0.25" and D 0.25". The screw is stamped with the mark "5228".

**COTTER PIN**

A cotter pin is a strip of metal curved back upon itself with an open loop at the bend. Cotter pins are usually 2" or less in length and are used for holding metal shafts or rods. The cotter pin is inserted through a tight hole and its tips are bent back to prevent the cotter pin from sliding back out. To remove the cotter pin the ends are pulled

straight and the pin pulled free with pliers or a hook (Ettlenger 1998:201).

Four complete cotter pins were found, 1 of them was inserted through an end of a shaft.

Cotter pin dimensions (in inches)

FS	Length	Diameter
208	5.5	1.0
207	3.75	1.5
435	6.0	1.25
765	4.5	0.5

RIVET

One rivet (FS 354) was found in the project area. The rivet dimensions are 2.25" in length with a shank diameter of 0.56".

BOLTS AND NUTS

Bolts are generally used for fastening metal to metal, although the carriage bolt is used to fasten wood to wood. Bolts have a shaft with a blunt end and a head. Bolts are tightened by using a wrench (except for stove bolts, machine screws and cap screws). The threads on a bolt are called machine threads and the threads cannot grip and hold in any type of substance (unlike wood-screw threads). The only thing a machine thread can hold is a nut (Ettlenger 1998: 189).

MACHINE BOLT

The machine bolt is the standard classic bolt. It has a square or hex shaped head with a partially threaded shaft. In this study machine bolt heads are assumed to be hex shaped unless otherwise noted.

A total of 109 machine bolts were found in the project area. Seven are found with a nut, seven with a washer and one with a gasket. Three of the machine bolts are fragments the rest are complete.

Machine bolt length and diameter (in inches)

FN	N	Length	Diameter
8	1	5	0.75
128	1	8	0.5
274	2	2.5	0.5
275	1	3.5	0.5
288	1	6	0.25
303	1	112.75	0.5
306	1	2.25	0.5
308	1	2.75	0.75
319	1	9.06	0.75
320	1	2	0.5
324	1	3	0.5
327	1	3	0.5
328	1	2.75	0.5
331	2	3	0.5

FN	N	Length	Diameter
344	1	3	0.5
345	1	4.5	1
348	1	2.25	0.5
359	15	4	
360	1	2.75	0.5
363	1	3.25	0.5
377	1	4.5	0.75
389	1	4	
406	1	1.5	0.25
440	1	9	0.5
446	1	11	0.75
448	1	3	0.5
449	1	4.5	0.5
450	1	7	0.5
454	1	5	0.5
456	1	3.5	2
457	1	10	0.75
461	1	4	0.75
462	1	7.5	0.75
467	1	2.5	0.5
476	1	8.25	1.0
483	1	2.75	0.75
486	1	14.5	0.5
488	1	2.75	0.38
535	1	3	0.75
556	1	25	
436	1	17	0.5
597	1	4.75	0.5
615	1	3	0.5
689	1	10	0.5
724	1	4.5	
725	1	2	0.25
794	1	5	1
815	1	3.5	0.75
847	1	3.5	0.5
873	13	3.5	0.5
902	1	15	0.75
1042	1	11.75	0.75
1152	1	4.0	0.75
1269	1	4.5	0.75
1286	1	2.5	0.25
1382	1	6.5	0.75
1384	1	4.0	0.75
1440	2	3.0	0.5
1451	1	3.0	0.5
1459	2	2.0	0.5
1642	1	4.0	1.0
1651	1	17.0	1.0
1694	1	6.0	0.5
1705	1	1.25	

## CAP SCREW

A cap screw bolt is a machine bolt that is completely threaded.

A cap screw also has a round head (or cap) and is tightened with an Allen wrench (Ettlenger 1998:190).

One complete cap screw bolt was found in Area A of the Machine Shop. The bolt measured L 6" and D 0.5".

## ALL THREAD

An all thread is a metal rod threaded all along the length of the rod. All threads are used for hanging, bracing, supporting, fastening, and mounting. Typically, all threads are used in conjunction with nuts and washers. All threads are useful for situations where bolts do not have an adequate length of thread for the job.

Four complete all threads were found. Three were found individually and one (FS 145) was in association with a split ring pipe hanger.

All thread dimensions (in inches)

FS	N	Length	Diameter
145	1	180	2.0
334	1	7.0	1.25
367	1	6.88	0.75
587	1	19.5	1.0

## U-BOLT

A U-bolt is a threaded steel rod bent into a U shape. Typically U-bolts have a slotted bar across the ends that clamps down as the nuts are tightened (Ettlenger 1998:193). U-bolts are used on suspension jobs such as hanging hose, pipe, joists and securing scaffolding (McMaster-Carr 1999: 932).

A total of nine U-bolts were found in the project area. Eight are complete and one is incomplete.

U-bolt dimensions (in inches)

FS	N	Length	Width
91	1	26.5	7.5
336	3	7.5	4.5
497	1	7.25	2.25
1043	1	23	12
1261	1	7.5	6.25
1630	1		3.0
1673	1		5.0

## EYEBOLT

An eye bolt has a partially threaded shaft at one end, while the opposite end is bent into a circle. Two eyebolts were found in Area A of the Machine Shop. One eyebolt (FS 808) is L 14" and D 0.5". The

second eyebolt has a piece link chain attached to the eye. The second eyebolt (FS 160) dimensions are L 6" and D 0.75".

#### HOOK BOLT

A hook bolt is a bolt shaft where one end is threaded and the other end is curved into a hook. One hook bolt (FS 74) was identified measuring L 16.0" and D 1.0".

#### NUT

Nuts are screwed onto bolt shafts to tighten the bolt against whatever is being fastened. Nuts come in various shapes and sizes. A plain nut is fairly flat with four sides.

Ten complete plain nuts were found in the project area.

Nut dimensions (in inches)

FS	N	Width	Internal diameter
218	1	1.0	0.75
356	1	1.0	0.5
733	1	1.25	0.5
772	1	1.25	0.75
972	1	1.0	0.5
984	1	1.5	1.25
1095	1	1.25	0.75
1260	1	2.5	2.0
1365	1	1.0	0.5
1593	1	2.63	1.5

#### HEX NUT

A hex nut is a five-sided nut, which is a bit taller than a plain nut.

Fifteen complete hex nuts were identified in Area A of the Machine Shop. One of the hex nuts (FS 569) is stamped with the word "NAVY".

Hex nut dimensions (in inches)

FS	N	Width	Internal diameter
301	1	2.25	1.75
569	1	5.5	4.25
876	13	0.75	0.5

#### SQUARE NUT

A square nut is a four sided nut the same height as a hex nut (Ettlinger 1998: 196). Two complete square nuts were found in the project area. Both square nuts (FS 276, FS 283) have the same dimensions W 1.5 and internal diameter of 0.5".

## WASHER

Washers are small donut-shaped pieces that match the diameter of the bolt being fastened through them. The term washer in this report indicates a flat washer. A flat washer is a plain, flat, circular washer and is used for two purposes. Flat washers provide a smooth surface for a nut of a bolt to be tightened against and large flat washers are used with carriage bolts to prevent the nut from piercing the wood (Ettlinger 1998: 197).

Thirteen washers were found in the project area. Eleven iron washers were identified. One leather and one rubber washer were found. Twelve of the washers found were complete. Eleven of the washers are typical round flat washers, two of the washers, the leather one and one iron washer are not perfectly symmetrical.

Washer dimensions (in inches)

FS	N	Material	Complete	External Diameter	Internal Diameter	Width	Length
292	1	iron	Yes	3.0	0.5		
453	1	iron	Yes	3.75	1.0		
798	1	iron	Yes	4.0	1.25		
1190	4	iron	Yes	2.5	1.5		
1223	1	iron	Yes	4.5	3.0		
1355	1	leather	Yes		0.75	2.25	2.50
1617	2	iron	Yes		0.75	8.0	2.75
1658	1	iron	Yes	3.75	0.75		
1670	1	iron	No	6.0	1.0		

## WASHER 1

Washer 1 is a very large washer with raised spines and is typically embossed "Patent May 10 04[...] 22 29". Washer 1 is manufactured in varying sizes and is seen *in situ* in mill town structures. The function of these washers is to be used underneath the heads of hex bolts to protect the wood from the bolt head.

Two Washer 1s were found. One of the washer dimensions (FS 314) are ED 3.0", ID 0.75" and P 0.13". The washer is stamped "MALL MAY-10-04/OCT-07-07". The second washer is located on a metal plate (see below for definition of metal plate) (FS 1104) and has the dimensions ED 3.5" and ID 0.5".

## NUT LOCK WASHER

Two nut lock washers were found both at the same location (FS 305) and have the same dimensions D 3.0" and H 1.0".

## TURNBUCKLE

Turnbuckles are mechanical screw devices consisting of a threaded body and two threaded end fittings. The body of a turnbuckle is rectangular with an open center and a screw hole at each end. Various



ends can be used in a turnbuckle including round eye end, oval eye end, hook eye end, and jaw end. As a result, various combinations could exist of ends on a turnbuckle.

Turnbuckle assemblies are fitted to cable assemblies so that minor adjustments to cable length and tension can be maintained. One end fitting has left-hand threads, and the other has right-hand threads. The turnbuckle body has matching left-hand and right-hand internal threads. Turning the turnbuckle body adjusts the end fittings an equal amount on each side (McMaster-Carr 1999:1016).

One turnbuckle component, the threaded body, was. No threaded end fittings were associated with the turnbuckle body. The dimensions of the turnbuckle are L 6.5", W 2.75" and HT 2.0".

#### EYE PIN

An eye pin is a rod with an eye at one end and a point at the other. The pin is not threaded and therefore cannot be called an eyebolt.

Eye Pin dimensions (in inches)

FS	N	Complete?	Length	Diameter
1176	1	Yes	21.0	0.25
1406	1	No	23.0	0.5

#### SINGLE TANK LUGS

Single tank lugs secure the metal rope used around wood tanks (Patterson 1919: 355). Two single tank lugs are present in the assemblage

Single tank lug dimensions (in inches)

FS	N	Length	Width	Height
1118	1	6.25	2.5	2.5
1171	1	6.5	3.5	2.25

### b. Hinges

In the architectural construction category, the class hinges is the second subdivision within hardware. A total of four hinges are identified.

#### STRAP HINGES

Strap hinges have a center pin from which two narrow leaves extend. Strap hinge leaves can be plain or decorated. Four strap hinges were found. Two of the hinges are complete and two are hinge fragments.

Strap hinge dimensions (in inches)

FS	N	Complete?	Length	Width
116	2	Yes	23	2.5
572	1	No	14.0	2.0
1281	1	No	21.5	2.0

### c. Metal strapping or nailers for wooden boxes

Nailers for wooden boxes are the third subdivision within the hardware category of architectural construction hardware. Two nailers were identified.

#### NAILERS

Nailers are thin strips of flat metal found around wooden boxes and crates. Small nails are hammered through the nailer and into the wood of the container. Nailers help secure the box.

Two metal strapping fragments were identified. One of the pieces measures L 21.0", W 1.25" and P 0.13". The second fragment of metal strapping dimensions are L 4.5", W 0.75", and P 0.13".

### d. Brackets and braces

Brackets and braces are the fourth category of artifacts within hardware. A total of 30 brackets and braces were found.

#### BRACKETS

A bracket is a fixture with two arms, one of which is fixed to a vertical surface, while the other arm projects horizontally to support weight. Brackets are usually L or U shaped. A common everyday example of a bracket is an L bracket that supports a shelf (Webster 1988: 196).

#### ARM BRACKET

An arm bracket is a J shaped bracket. An arm bracket can be seen *in situ* holding tram rail at Kennecott's Bonanza mine.

One arm bracket was found with the dimensions L 12.0", W 2.5", and ID 0.5".

#### WALL BRACKET

A wall bracket is a typical L shaped bracket where the two arms are at 90-degree angles. One example is a Medart wall bracket (brand name) capable of supporting shafts, bearing mounts and even a line of pipe (C.T. Patterson 1918: 434).

One wall bracket was found in the project area. The wall bracket dimensions are L 10.75", W 5.0", H 8.25".

#### U BRACKET

A U bracket is simply a U shaped bracket. Four complete U brackets were found. Two of the U brackets were found together (FS 337) and measure L 5.5", W 1.0", and P 0.13". One (FS 584) U bracket dimensions are L 7.0", W 1.0", and P 0.13". The fourth U bracket (FS 603) measures L 4.5", W 3.0" and P 0.13".

## BRACKET UNIDENTIFIED

Two unidentified brackets were found in Area A of the Machine Shop. One (FS 204) is an industrial size piece of cast iron tentatively classified as a bracket fragment with the dimensions of L 34.0", W 5.0", and P 0.75". The second unidentified bracket (FS 531) was made by soldering two piece of iron stock onto a base. The bracket was probably made at Kennecott. The dimensions of the second bracket unidentified are L 17.0", W 4.5", P 2.0". The bracket (FS 531) is stamped with the name "LAB PRESS".

## BRACES

There are two common tools, both of which are called braces. The most common one is a flat metal plate that holds or fastens two or more parts together, or in place. Braces are flat, although they can have different shapes such as L shaped. The term brace also describes a supporting beam in a building (Websters 1988: 195).

In the context of this study the term brace refers to the flat metal piece of metal that secures two pieces of wood together. There are several different classes of braces found in Area A.

## MENDING PLATE

A rectangular flat piece of metal with four screw holes. A mending plate functions to join two pieces of wood end-to-end. There are many different uses for mending plates including reinforcing screen doors and furniture (Ettlinger 1998: 205). Mending plates are also commonly known as 'angle braces' or just 'braces' (McMaster-Carr 104 1999: 2472).

A total of eight complete mending plates were identified, two (FS1707, FS1745) of which are partially buried and therefore have incomplete dimensional information.

Mending plate dimensions (in inches)

FS	N	Length	Width	Depth/P
1	1	7.0	3.25	1.5
2	1	7.0	3.25	1.5
599	1	6.25	1.0	0.25
442	1	3.0	1.75	0.5
1407	1	7.75	1.5	0.25
1416	1	16.0	2.0	0.25
1707	1		3.0	
1745	1		5.0	

## L BRACE

An L brace is a typical brace consisting of two mending plates longitudinally connected at right angles

Four L braces were identified, three of the braces are complete and one (FS 6) fragmentary.

L brace dimensions (in inches)

FS	N	Length	Width	Height
6	1	3.5		
409	1	13.25	4	6
1412	1	7.0		
1414	1	6.5	6.5	

## H PLATE

This artifact is a type of brace that is shaped like an 'h' and is constructed from thin metal sheet stock.

One complete h plate (FS 193) was identified having the dimensions of L 28.0", W 2.0", and P 0.28".

## U PLATE

A type of brace that is constructed from flat metal and is U shaped. A bore hole at each end facilitates fastening of the plate to an object.

One U plate (FS 874) was found having the dimensions of L 5.5", W 3.5", and P 0.5".

## ROUND PLATE

A round plate is a large flat metal round brace.

One fragmentary round plate (FS 1102) was found broken in half. Its dimensions are L 34.0", W 20.0" and P 28.0".

## METAL PLATE

Metal plate is a term to describe a flat square piece of metal with one bore hole in each of the four corners. Metal plates are locally manufactured at Kennecott as determined by finding the metal circles that are punched out of each of the four corners of the plate (i.e., the punched blanks).

Six complete metal plates were identified in the project area. Two metal plates were found together (FS 347).

Metal plate dimensions (in inches)

FS	N	Length	Width	P
347	2	14	10	0.25
447	1	5	5	0.13
500	1	14	10	0.25
505	1	17	4	0.25
558	1	9	8	0.25

## BRACE/FRAME

Brace/frame is a term to describe a flat rectangular piece of metal that curves 45-degrees at one end. Two parallel tabs are on one edge of the brace/frame. The exact function of this artifact is not known although it might be a brace or frame piece for a piece of industrial equipment.

One brace/frame (FS 426) was identified in the project area. The artifact is stamped with "368-SHASTA-ECON" and the dimensions are L 22.25", W 1.75", and H 1.0".

## e. Metal stock

Metal stock is the fifth artifact category within hardware. A total of 11 pieces of different types of metal stock are recorded.

## IRON STOCK

Iron stock is a term describing metal bars and/or rods that are the base material for blacksmiths and forgers to work.

Seven pieces of iron stock were identified, three of the pieces are incomplete (FS 297, FS 422, FS 438) and the rest are complete.

Iron stock dimensions (in inches)

FS	N	Length	Width	Height
217	1	21.0	1	
248	1	7.0	1.25	0.75
297	1	35.75	1.0	1.0
349	1	10.13	1.25	0.5
506	1	25.0	1.5	1.5
422	1	7.0	2.5	0.25
438	1	3.25	0.75	

## GROOVED STOCK

Grooved stock is a term used to describe a piece of rectangular iron stock with a longitudinal concave groove in the center of the stock.

One piece of grooved stock (FS 1096) was found in the project area. Its dimensions are L 15.0", W 2.0", and H 1.25".

## SPECIAL STEEL STOCK

This stock is a large rectangular piece of heavy iron stock with two concave grooves. The grooves are parallel, but at opposite ends of the sheet.

One special steel stock (FS 350) was found with the dimensions of L 5.5", W 1.5", and H 1.5". The artifact is stamped "SPECIAL STEEL".

## IRON STOCK CORRUGATED

This term describes a section of iron stock with one side tightly ribbed and the other side having a wider wave like ribbing forming distinct U shaped concave depressions. Possibly function of the iron stock is for the manufacturing of molding cutters or cutter blanks (Patterson 1919: 244).

Two examples (FS 1262) were found at the same location in the project area with the dimensions of L 34.5", W 23.0", and H 3.0".

## C. PLUMBING

In the architectural category, plumbing is the third main class of artifacts. In the project area a total of 584 plumbing artifacts are recorded. The plumbing section is divided into 6 sections: pipe, drain, spigot, valve, fitting and pipe hanger.

## 1. PIPES

Pipes are described and measured following current industrial standards. Pipes are described according to size. The stated size of a pipe 12" or smaller does directly correlate with the inside diameter (ID) or to the external diameter (ED) of the pipe. For example, a 1/4" pipe has an ED of 0.540". However, ED is a constant on all pipes of a stated pipe size, for example, all 1/4" pipes have an ED of 0.540". The following pipe size table describes the actual ED pipe measurement and the correlating pipe size (McMaster-Carr 1999:2). In this project the actual ED of the pipe was recorded, the measurement compared to this pipe size chart, and the pipe size determined.

Pipe size table (from McMaster-Carr 1999:2)

Pipe size (in inches)	ED (in inches)	Pipe size (in inches)	ED(in inches)
1/8	0.405	2 1/2	2.875
1/4	0.540	3	3.5
3/8	0.675	3 1/2	4.0
1/2	0.840	4	4.5
3/4	1.050	5	5.563
1	1.315	6	6.625
1 1/4	1.660	8	8.625
1 1/2	1.9	10	10.750
2	2.375	12	12.750

In the project area 163 sections of pipe were found. The pipes came in various sizes and this data is presented in the following table on pipe sizes and counts. For specific information on pipe dimensions refer to Appendix 3. Three of the pipes were stamped; refer to pipe stamp table, below for details on this stamping.



One pipe found in the project area (FS 1636) is partially buried and obscured by other artifacts. As a result, no dimensions were obtained for this artifact.

#### Pipe sizes and counts

Identification	N	Identification	N
pipe 1/8"	2	pipe 2 1/3"	1
pipe 1/4"	9	pipe 2 1/2"	9
pipe 3/8"	4	pipe 2 3/4"	1
pipe 1/2"	21	pipe 3"	3
pipe 3/4"	22	pipe 3 1/2"	1
pipe 1"	26	pipe 3 3/4"	1
pipe 1 1/4"	27	pipe 4"	8
pipe 1 1/2"	31	pipe 6"	2
pipe 2"	16	pipe 8"	1
pipe 2 1/5"	1	pipe 10"	2
pipe 2 1/4"	3	pipe 11"	4

#### Pipe stamp table

FS	N	Identification	Stamp
693	1	Pipe 3"	LINK-BELT CO/INDIANAPOLIS/PHILADELPHIA/ CHICAGO/241/2 N 187N08{...}
1079	1	Pipe 1/8"	A 14/ 0 14
1465	1	Pipe 1 1/4" and gate valve	CRANE 125

#### H PIPE

An h pipe is a pipe assembly constructed of two pieces of pipe in the shape of an 'h'. One piece of pipe is the backbone of the h and a smaller curved piece of pipe creates the hill part of the h. The exact function of this pipe assembly is not known.

One complete h pipe (FS 1444) was. The dimensions of the pipe assemblage is L 47.0" and W 23.0". The dimensions of the pipe itself are ED 1.63" and ID 1.5".

#### T PIPE

A T pipe consists of two pieces of pipe welded together to form the shape of a T. Both sections of pipe are the same size. The ends of the pipe are not threaded, and therefore a T pipe not a typical pipe fitting. As a result, this artifact type is classified under pipes.

A total of 6 complete T pipes were found, three of which are stamped (refer to T pipe stamp table for data).

#### T pipe dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
961	1	2.75	2.0	1.25
1055	1	5.0	2.5	1.5
1058	1	5.25	3.0	2.25
1100	1	4.25	3.75	2.75

FS	N	Length	External Diameter	Internal Diameter
1183	1	13.25	9.0	4.0
1192	1	10.5	6.25	6.0

## T pipe stamp table

FS	N	Stamp
1055	1	C
1058	1	CRANE
1183	1	CRANE 125

## U PIPES

U pipes are pipes that curve into a U shape. The ends are plain or flanged and unthreaded. Therefore these artifacts are pipes, not pipe fittings.

A total of four complete U pipes were identified.

## U pipe dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
616	1	83.0	6.5	6
1304	1	7.0	3.0	2.25
1357	1	83.0	6.5	5.75
1449	1	68.5	6.5	5.25

## PIPE WITH CAPPED ENDS

This term describes a short section of pipe with a cap at each end. The exact function of this artifact is unknown.

One example of a pipe with capped ends was identified (FS 1733). The dimensions of this artifact are L 4.5", ED 3.0", and ID 0.75".

## PIPE WITH FLANGE

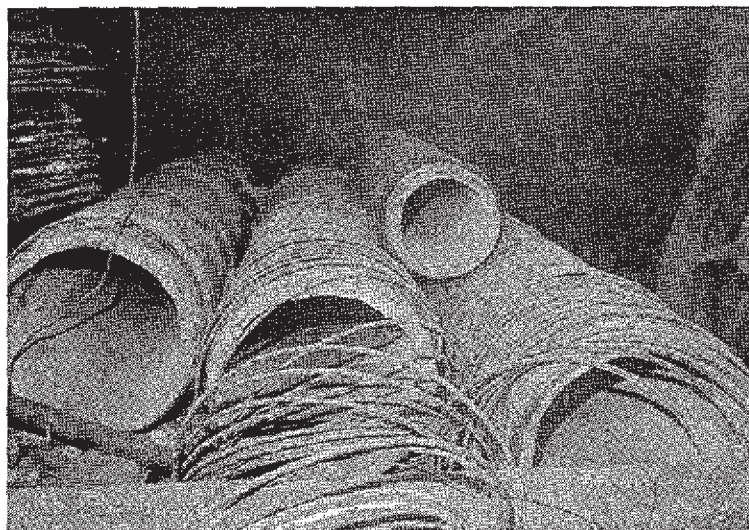
A descriptive term to describe a pipe with a flange soldered on one end.

In Area A of the Machine Shop one (FS 1581) pipe with flange was identified. The dimensions of the pipe are L 102.0" and D 4.20". The pipe is stamped "B- - T".

## PIPE ASSEMBLAGE

Pipe assemblage is a generic term to describe a composite artifact consisting of pipes, fittings and brackets. The exact composition of the artifact is described in detail in the description field of the database in Appendix 3.

One pipe assemblage is identified in the project area. The artifact (FS 1648) consists of two different sizes of pipe in the shape of a T and three U brackets. The artifact is partially buried and one of the pipes is a 3" pipe. The dimensions of the pipe assemblage are L 43.0", ED 3.0", and ID 1.75".



### WATER PIPE

Water pipes are large diameter wood pipes. The pipe is constructed from wooden staves that fit together in a tongue and groove joint. The pipe is wrapped in heavy gauge wire and the wire is covered with tar. Similar pipes have been identified *in situ* at Kennecott in National Creek.

Twenty-five complete segments of water pipes were found.

Water pipe dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
384	1	190.75	16	14
390	1	190.75	16	14
392	1	167.5	16.25	14
712	1	6.0	14.5	12
780	1	192	15.5	13
781	1	192	15.5	13
782	1	192	15.5	13
783	1	192	15.5	13.0
788	1	106	10	8
792	1	15.75	19.25	16.25
801	1	59	16	14
810	1	181	16	14
813	1	8	20	16
814	1	8	20	16
820	1	8	20	16
821	1	8	20	16
882	1	110	12	10
889	1	60.5	6	5.25
890	1	60.5	6	5.25
864	1	131	10	8
870	1	120	11.75	10
1258	1	168.0	16.0	14.0
1562	1	10.0	19.0	15.5
1719	1	32.0	16.0	14.0
1720	1	9.0	19.0	15.0

## WATER PIPE STAVE

Water pipes are constructed of individual rectangular wood pieces called staves that lock together in a tongue and groove joint.

Eleven individual water pipe staves are found in the project area. Ten staves were found together in one location (FS 775).

Water pipe staves dimensions (in inches)

FS	N	Length	Width
775	10	8.0	3.25
793	1	6.0	3.25

## WATER PIPE WIRE

Water pipes are wrapped in heavy gauge wire. Two coils of water pipe wire (FS 738, FS 739) were found in the project area. The width of each coil is 17" across and the diameter of the wire is 0.25".

## FIRE HOSE

Fire hose is a cotton or linen single or double-jacketed hose for carrying water (Patterson 1919:125). At Kennecott there is a fixed fire suppression system, thus fire hose is classified with plumbing in this appendix.

One fire hose section (FS 1356) was identified with the dimensions of L 15.0", W 12.0", and H 4.0".

## 2. DRAIN

## GRATE COVER

A grate cover is a flat round slotted piece of metal that fits over floor drain pipes.

A single grate cover (FS 89) was found in the project area, having dimensions of D 6.5" and W 1.5".

## 4. VALVES

Valves are like faucets in that they control the flow of water or steam, but unlike faucets valves are stronger and have more specialized characteristics. There are a variety of valve types, parts, and brands (Ettlinger 1998: 539).

## GATE VALVE

A gate valve has a plug or wedge called a gate, which acts as the positive shut-off. The handle is turned to lower or raise the valve stem that in turn pulls the gate up or down to block the flow. Gate valves have two appropriate settings either completely open or completely shut. Gate valves are normally used for the regulation of air, water, oil, inert gas, steam and other fluids. Gate valves have 5 components, the *handwheel*, the *stem*, the *bonnet*, the *body* and the *gate*. The handwheel is the round handle that when turned moves the stem so that the valve

opens or shuts. Gate valves can have either rising or non-rising stems. A rising stem gives a visual indication of the position of the valve. Non-rising stem is useful when space is tight. Bonnets provide a leak proof closure for the valve body. Bonnets can be screw-in, a union or bolted. Screw-in is a simple durable pressure tight seal. A union is applicable if frequent inspection or cleaning is necessary. Bolted bonnets are used high pressure applications (McMaster-Carr 1999: 204). The body is the metal casing that holds the gate. The gate is the damper or plug that stops the flow of the gas or liquid.

A wide range of gate valve components and complete gate valves were found in the project area. Ten complete gate valves were recorded along with a variety of gate valve components (see table, below).

Gate Valve Component	N
Gate body	9
Gate body, bonnet and stem	1
Gate bonnet	6
Gate bonnet and gate	3
Gate bonnet and stem	6
Gate	1
Gate handle	1
Gate stem	1

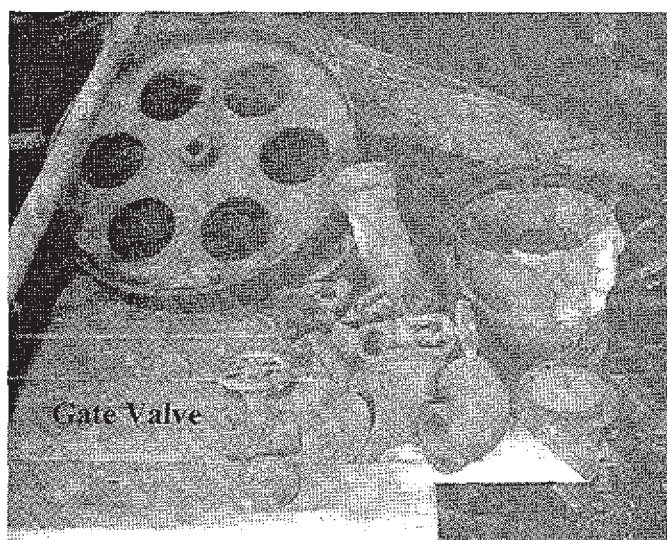
Eleven of the gate valves and/or gate valve components are embossed with product information. The data is presented in the gate valve and component stamp table presented below.

Gate valve and gate valve components dimensions (in inches)

FS	N	Identification	L	W	External diameter	Internal diameter
977	1	gate valve	8.5	5.5	5.5	3.75
527	1	gate valve			6.5	2
763	1	gate valve and pipe	16	11	4.5	2
1431	1	gate valve and pipe	9.0	4.0	2.0	
1220	1	gate valve and pipe	26.0	12.0	12.5	6.0
1418	1	gate valve and pipe 1"	10.0	3.0	1.25	1.0
1468	1	gate valve and pipe 1/4" with female adaptor	6.0	2.5	1.0	0.5
1537	1	gate valve and pipe 3/4"	68.0	1.0	1.0	0.75
648	1	gate valve and pipe 3/4" assemblage	33		1	0.75
673	1	gate valve body	9		9	4
644	1	gate valve body	9		5	3
1348	1	gate valve body	7.0		3.5	2.25
908	1	gate valve body	12	12	12	6
546	1	gate valve body	10		8	3
1328	1	gate valve body	3.75		3.0	2.25
1216	1	gate valve body	10.0		10.0	4.0



FS	N	Identification	L	W	External diameter	Internal diameter
545	1	gate valve body	7.5		8.25	6.5
628	1	gate valve body	9		4.5	2.25
623	1	gate valve body, bonnet and stem	12		6	4.25
686	1	gate valve bonnet	4.5	2.25		1.25
1387	1	gate valve bonnet	20.0	7.5		2.75
834	1	gate valve bonnet	4	1.75	1.5	1
708	1	gate valve bonnet	4.5	2.25		1.25
1131	1	gate valve bonnet	5.0	2.5	1.5	1.0
702	1	gate valve bonnet	16	8.5		
634	1	gate valve bonnet and gate		13.5		
79	2	gate valve bonnet and gate	12	7		
618	1	gate valve bonnet and stem	8	4		
602	1	gate valve bonnet and stem	17	13		
674	1	gate valve bonnet and stem	10.5	8	10.5	5.75
1117	1	gate valve bonnet and stem	15.5	6.5		
1181	1	gate valve bonnet and stem	11.5	8.0		
1012	1	gate valve bonnet and stem	12	8		
850	1	gate valve bonnet and stem	10	7.25		
757	1	gate valve bonnet, stem, and gate	9	8		
1309	1	gate valve gate		3.0	9.5	
881	1	gate valve handle				1.75
706	1	gate valve stem	11.5			



*Gate valves in unit 13.*



Gate valve and component stamp table

FS	N	Description
527	1	CRANE/ 250/C CO
546	1	CRANE, CHICAGO
602	1	C & B
623	1	4/ CRANE/100/4
644	1	B- CRANE-250
763	1	CRANE 250
908	1	13/6- CRANE-175
977	1	3 1/2 59 1/2 / 3 1/2 / 59 1/2
1418	1	CRANE/NAVY
1468	1	CRANE/100
1537	1	CRANE

## CLIP VALVE

Clip valves are a type of gate valve. Clip valve is a brand name manufactured by Lunkeneimer. The valve has a lever handle, and a recessed stem. A U-bolt encircles the body and the body has a hex fitting.

Eight complete clip valves were found, along with one incomplete clip valve missing the body portion. Many of the clip valves are stamped and the data is presented in the table below, clip valve stamps.

Clip valve and clip valve component dimensions (in inches)

FS	N	Identification	L	W	External Diameter	Internal Diameter
1062	1	clip valve	9.0	5.0		
956	1	clip valve	10	5	3.25	2.25
975	1	clip valve		5		
1021	1	clip valve	6.25	2.5	1.75	1.0
1022	1	clip valve	7	3	2	1
550	1	clip valve			5	3.5
1433	1	clip valve		3.5		1.75
1139	1	clip valve and pipe 3/4"	5	2.5	1.0	0.75
1154	1	clip valve bonnet and stem	5.5	3.0	1.75	

Clip valve stamps

FS	N	Stamp
550	1	LUNKENHEIMER /CLIP VALVE/ 2/ 100'
975	1	LUNKENHEIMER /CLIP VALVE
1021	1	LUNKENHEIMER CLIP VALVE/ 3/ 4/ 100
1022	1	LUNKENHEIMER CLIP VALVE/ 1/ 100
1062	1	LUNKENHEIMER CLIP VALVE/ 2/ 100

## BRASS THROTTLE VALVE

A brass throttle valve has a globe-shaped body with a brass stem and handle. The handle is straight not round like those on the gate valves. Brass throttle valves are used for steam (Patterson 1919: 40).

One complete brass throttle valve (FS 701) was found, with the dimensions L 16" and W9.0"

## GLOBE VALVE

A globe valve is similar to a gate valve except the body is more rounded. Globe valves are usually straight valves, but angle valves are available. Angle valves have a right angle bend in the body to change the direction of the flow by 90-degrees. Globe valves control water or steam flow and are especially suitable for high-pressure situations and for frequent use. Globe valves have 's' handle types. Globe valves are also known as compression valves.

One globe valve (FS 525) was found and its dimensions are L 10", ED 5.0", and ID 3.5". One globe valve stem and damper (FS 136) was identified with dimensions of W 3.0", ED 7.2", and ID 4.75".

## LIQUID RELIEF VALVE

The body of a liquid relief valve is hydrant shaped with a stem protruding from the top. The body of a liquid relief valve is taller than the gate or globe valves.

Two artifacts (FS 630, 551) identified as liquid relief valves were found in the project area. Neither one is a complete valve. One liquid relief valve (FS 630) is stamped "2/19/INLET/623".

Liquid relief valve dimensions (in inches)

FS	Identification	N	Length	Width	ED	ID
630	Liquid relief valve	1	11.0	8.0	6.25	2.0
551	Liquid relieve body	1			8.0	4.0

## PIPE VALVE

Pipe valve is a term used to designate an unidentified valve used in pipe assemblies. The term is used when only a portion of the valve is present or when the valve is buried underneath other artifacts and partially obscured.

Seven pipe valves were identified, three of which are complete. Four are components of valves. One pipe valve (FS 543) is stamped "ILLINOIS/MARSH & COMPANY/CHICAGO, USA/PAT'D OCT-02-88". The valve body and stem (FS 1372) is stamped with "TATE JONES & CO. INC/PAT. APR 17'06/PITTSBURGH, PA".

Pipe valve dimensions (in inches)

FS	N	Identification	L	W	ED	ID
304	1	Valve handle			3.0	
543	1	Pipe valve	3.25		1.0	
754	1	Pipe valve	5.5		3.0	1.75
777	1	Handle wheel			8.0	0.25
1069	1	Pipe valve	4.0	1.5		
1203	1	Valve stem and gate	14.5	4.0	1.0	
1372	1	Valve body and stem	11.75	4.25	2.0	

## 5. PIPE FITTING AND FLANGES

Pipe fittings connect pieces of pipe together to increase length and/or change direction of the pipe. Pipe fittings are manufactured from a variety of materials including plastic, galvanized steel, copper, black iron, cast iron, and brass (Ettliger 1998:501). All of the pipe fittings in the project area are of cast iron.

### 45-DEGREE ELBOW

A pipe fitting with the two openings at a 45-degree angle. Both ends have female threads (Ettliger 1998: 512).

Seven 45-degree fittings were found, five are complete and 2 (FS 7) are incomplete. One of the fittings (FS 273) is stamped "C".

45-degree fitting dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
7	2	7	1.25	1.0
524	1	14	6	4.25
548	1	3.5	2.5	1.75
273	1	3	2	1.75
547	1	4.5	3.5	3
528	1	18	8.25	6.5

### 90-DEGREE ELBOW

90-degree elbow pipe fitting are a short section of pipe with the two openings at a 90-degree angle. Both ends have female threads (Ettliger 1998: 512).

Thirty-four complete 90-degree elbow fittings were identified, (FS 685) is stamped "10".

90-degree elbow dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
3	1	36	14	15
206	1	5	3	2.5
523	1	8	5.25	4
529	1	14	8	6.5
541	1	9.5	4.25	4
564	1	6	4.75	4
565	1		10	6
621	1	8	4	
632	1	6.5	3.5	2.75
645	1	8	5.5	4.5
660	1	13	8	6.5
661	1	19	11	6
666	1	12	8	6.75
670	1	8	5.5	4
671	1	8	5.5	4.5
685	1	6.5	5.5	3.5
698	1	7	5.35	4.25
841	1	7.5	4.5	3.25

FS	N	Length	External Diameter	Internal Diameter
877	1	5	3.5	2.75
969	1	4.0	3.75	2.5
987	1	7	4.75	3.5
1020	1	6	4.5	3.75
1059	1	5	3.5	3
1064	1	5.0	3.5	2.75
1155	1	4.5	2.5	1.75
1159	1	4.0	3.0	2.75
1178	1	4.5	3.75	3.0
1188	1	4.25	2.5	1.75
1305	1	7.0	5.75	4.25
1417	1	7.0	4.5	3.25
1423	1	3.0	3.0	2.25
1485	2	7.0	3.5	
1650	1	4.0	3.75	2.75

#### 90-DEGREE MALE ELBOW FITTING

A pipe fitting with the two openings at a 90-degree angle. Both ends are externally threaded (McMaster-Carr 1999:9).

Two 90-degree male elbow fittings were found.

#### 90-degree male elbow fitting dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
428	1	3	0.75	0.5
578	1	8.5	1.5	1.25

#### T FITTING

A tee shaped pipe fitting with three openings. Straight T's have the same size opening and reducing T's have one opening of different size. The purpose of the fitting is to connect three pipes (Ettlinger 1998:515).

Thirty-eight T fittings were identified, one (FS 707) is incomplete and the rest are complete. T fittings are the most prolific pipe fitting found in the project area. Seven of the T fittings are stamped with product information, and the data are presented in the T fitting stamp table, presented below.

#### T fitting dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
38	1	18.5	12	9.5	7.75
552	1	7.5		5.5	4.5
553	1	7.5		5	4.25
629	1	6.75		5	4
631	1	6	5.5	4.5	3.5
639	1			6	4.25
642	1	7.5		6	5

FS	N	Length	Width	External Diameter	Internal Diameter
653	1	6.25	5.5	4.25	3.5
655	1	2.5		6.5	6
657	1	6		4.25	3.25
659	1	6.5		8.25	6.5
662	1	4.5		3.75	2.75
667	1	5.25		4.25	3.25
669	1	6		4	3.25
672	1	6		4	3.5
704	1	5.25		4	3
707	1	3.25		2.5	1.5
709	1	4.5		2.5	1.5
762	1	5		8.5	6.5
764	1	10	5	4	2.5
998	1	6.25	5.5	4.25	3.5
1006	1	5	4	3.5	2.25
1016	1	3.5	3.0	2.0	1.0
1136	1	5.0	5.0	8.5	6.5
1137	1	7.5	7.0	5.5	4.5
1143	1	6.25	5.0		
1179	1	6.5	2.75		
1184	1	16.0		12.5	6.0
1213	1	14.0		9.0	5.5
1236	1	18.0		13.5	8.0
1307	1	11.5		13.5	8.0
1308	1	10.5		10.0	3.75
1330	1	9.5		7.5	3.0
1337	1		7.75	7.5	2.5
1422	1	5.5	5.6	3.75	3.0
1441	1	10.5	7.0	8.0	6.5
1579	1	3.75	3.0	2.38	2.0
1699	1	5.0	4.25	3.0	1.75

## T fitting stamps

FS	N	Description
659	1	G
1016	1	1-CRANE
1184	1	11,6 CRANE 250
1236	1	CRANE
1307	1	8/CRANE 125
1330	1	CC
1441	1	10

## Y FITTING

A pipe fitting with three openings, two in line with each other at opposite end of the pipe and one opening that shoots off the pipe at an angle. A Y fitting connects two pipes coming from similar directions (Ettlinger 1998:517).

Two complete Y fittings were found, one (FS 1077) is stamped "2/CRANE/150", which is a common stamp found on numerous pipe fittings and fixtures at Kennecott.

Y fitting dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
1077	1	11.0	8.0	6.0	3.0
1317	1	11.0	7.0	6.5	1.75

#### CROSS FITTINGS

Cross fittings are shaped like a cross with four female threaded opening set at 90-degree angles. The function of a cross fitting is to connect four pipes. This fitting is also commonly called a 4-way tee or a straight cross (Ettlinger 1998:510).

Four complete cross fittings were found in the project area.

Cross fitting dimensions (in inches)

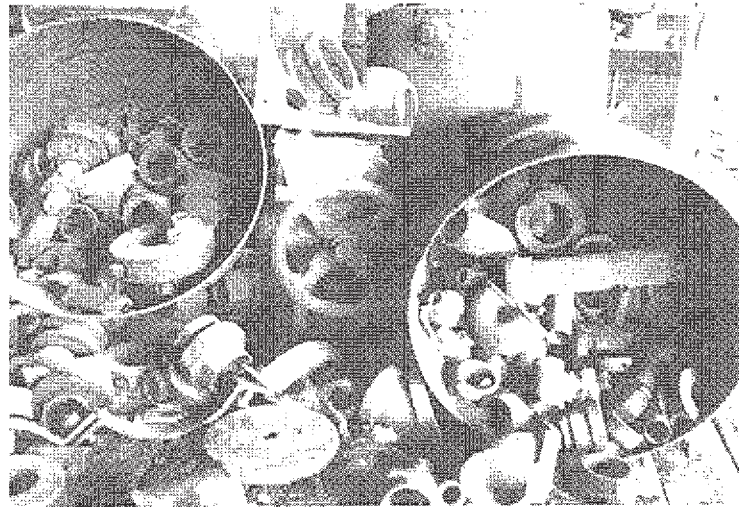
FS	N	Length	Width	External Diameter	Internal Diameter
664	1	5.25	5.25	4.0	2.5
1717	1	4.0	3.5	2.25	1.25
1227	1	4.0	4.0	2.5	1.75
1419	1	6.5	6.5	5.0	3.5

#### 8 FITTING

A pipe fitting that changes direction of flow 180-degrees. The openings are in a figure 8, hence the name. 8 fittings are found *in situ* at Kennecott in the Mill building on steam heating pipes.

Three 8 fittings were identified in the project area. Two 8 fittings were found together (FS 1036) and measure L 6.0", ED 3.0", and ID 2.25". The dimensions of the third (FS 1161) are L 6.5", W 4.0", ED 3.0", and ID 2.5". One of the 8 fittings (FS 1036) is stamped "C".





*Assorted pipe fittings in overturned 55 gallon drums. U fittings, 45-degree elbow fittings, couplings, and hex bushings are present.*

#### U FITTING

A pipe fitting that changes direction of flow 180-degrees. The pipe is U shaped. The U fitting is different than the 8 fitting because the openings of a U fitting have a space in between them whereas the openings of an 8 fitting has no space.

Two complete U fitting of the same size were identified.

U fitting dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
1169	1	7.0	3.0	2.25
1047	1	7.0	3.0	2.25

#### TRIANGULAR FITTING

A triangular pipe fitting is triangular shaped with four openings. Three openings are parallel to each other on one side of the fitting and the fourth is on the opposite end of the fitting. All openings are internally threaded and are of the same diameter.

Only one triangular fitting (FS 1115) was identified, with dimensions L 9.0", ED 4.75", and ID 3.25". The fitting is stamped "CRANE".

#### COUPLING FITTING

A coupling fitting is a cylindrical short length of pipe with female threads. Typically the interior is completely threaded. The function of this fitting is to attach pipe that is not intended to be disconnected (Ettlinger 1998:509).

Twenty-eight complete coupling fittings are found, seven of which were found together in one location (FS 1160).

Coupling dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
114	1			12	11.5
126	1	3		8	4.25
293	1	2.5		1.5	
463	1	1.75		1.5	1.25
318	1	1.25		2.25	1.75
487	1	1.25		1.5	1
741	1	4.5		9.25	8.5
773	1	2.5		3	2.25
943	1			9	3.75
960	1	11.5	2.5		
859	1	4.5		8.5	7.5
1000	1		2	5.0	4.0
1033	1	4		7	6.25
1111	1		3.75	5.25	4.5
1112	1		3.75	5.25	4.5
1144	1		5.0	9.25	8.25
1160	7		4.0	5.0	4.5
1226	1			9.0	8.5
1345	1		0.25	4.5	3.5
1458	1	2.0		1.5	1.25
1421	1	3.0		3.0	2.25
1639	1		1.5	5.25	4.25

## REDUCING COUPLING

A reducing coupling is a tapering coupling with two different-sized openings (Ettlinger 1998:510). Usually, the fitting has two female ends and is sometimes called a reducing coupling female x female.

Seven complete reducing couplings were identified, and one of the fittings (FS 1162) is stamped "C".

Reducing coupling dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
1063	1	5	3.5	2.75
668	1	4.5	4.25	3.5
1030	1	4.25	4.25	3.25
901	1		2.5	1.25
959	1	4.5	5.75	4.25
1162	1	5.0	5.75	4.5
920	1	1.5	2.25	1.75

## REDUCING COUPLING MALE X FEMALE

A reducing coupling male x female is a reducing coupling with both ends externally threaded.

One reducing coupling male x male (FS 625) was found with the dimensions of L 11.0", ED 3.5", and ID 3.0".

## BUSHING

Bushings are used to join pipe of dissimilar size. They fit inside other fittings, usually couplings and can be combined to reduce pipe. A bushing is a short plug (threaded with hexagonal top) or nipple (flush) piece with female threads in the interior and males threads on the exterior (Ettlinger 1998:512).

Only one bushing pipe fitting (FS 695) was found in the project area of the Machine Shop. Its dimensions are L 5.5", ED 4.5", and ID 3.0".

## HEX BUSHING

A hex bushing is a type of bushing, which consists of a short plug with an internally threaded hexagonal shaped end top, sometimes referred to as a nipple piece. The purpose of a hex bushing is to join pipe of dissimilar size. Bushings fit inside other pipe fittings, usually couplings, and bushings can be combined to reduce pipe diameter (Ettlinger 1998: 513).

Thirteen hex bushings were found, twelve are complete and one is a fragment (FS 1163). Two hex bushings were found in the same location (FS 970). One (FS 1138) is stamped "NAVY".

Hex bushing dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
988	1	2.25		3.5	2.0
997	1		2.25	3.25	2.75
970	2	2.5		4	3.75
1163	1	2.0		4.0	3.0
281	1	3.5		0.75	
1068	1			3.25	2.25
1472	1		2.0	3.5	2.5
745	1		2	3.5	2.75
1625	1		2.75	3.5	2.75
989	1	4	1.75	3.5	2.75
983	1	2		2	1.5
1138	1	4		4.0	3.25

## FEMALE ADAPTER

A female adapter is an internally threaded pipe fitting. The two openings are at 180-degrees. One end is hex shaped and the other end is round. The fitting tapers so it could be considered a type of reducing fitting.

Nine complete female adapters were identified, one (FS 1182) is stamped "CRANE NAVY".

Female Adapter dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
310	1	1.25		2	1.44
1182	1	1.5		5.25	4.5
1083	1		1.25	4	3.25

FS	N	Length	Width	External Diameter	Internal Diameter
1126	1		2.25	3.75	2.5
1165	1	1.75		5.75	4.5
1145	1		3.5		
1172	1		1.25	3.75	3.0
1482	1		0.75	2.25	1.5
1469	1		0.75	2.5	2.0

#### NIPPLE

Any piece of pipe less than 12 inches in length with male threads at both ends. A nipple functions to connect long sections of pipe, and provides a smoother, neater connection than either a bushing or coupling (Ettlinger 1998: 513).

One nipple (FS 296) was found in the project area and the dimensions are L 10.5", ED 1.63", and ID 1.50".

#### PIPE CAP

A short pipe fitting, closed at one end and with female threads on the opposite end. A pipe cap screws onto male pipe end, providing a seal at the end of a pipe run or when a fitting or valve had been removed (Ettlinger 1998: 509).

Two complete caps were identified in the project area.

#### Pipe cap dimensions (in inches)

FS	N	Length	External diameter	Internal Diameter
1447	1	2.0	2.75	2.5
1743	1	1.25	2.75	2.50

#### PIPE FITTING UNIDENTIFIED

This term is used to describe a pipe fitting that is not able to be identified to a specific type because the artifact is obscured by other artifacts in the assemblage.

Two 'pipe fitting unidentified' were found. One (FS 656) was obscured by other artifacts and no dimensions were attainable. The other (FS 607) has dimensions of L 4.5", ED 5.0", and ID 3.25".

#### WATER PIPE COUPLING

Wood water pipes couplings function to connect two pieces of water pipe (see water pipe, above). The couplings are cylindrical with no interior threading.

Two complete water pipe couplings were identified in the project area..

Water pipe coupling dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
746	1	6	10	7.75
1698	1	8.0	20.5	16.0

## WATER PIPE PLUG

Water pipe plugs are part of the wooden water pipe system. The plugs are made of wood and insert into the pipe sealing the opening.

Two complete water pipe plugs were found in the project area.

Water pipe plug dimensions (in inches)

FS	N	Width	External Diameter
1726	1	3.5	14.0
1094	1	3.75	14.0

## NOZZLE

A nozzle is an end attachment to a hose or pipe system. The nozzle has an opening that regulates the flow of liquid.

One complete brass nozzle was found. Its dimensions are L 1.5" and D 0.75".

## FLANGE

In general, a flange is a round pipe fitting surrounded by a flat round plate with bolt holes that permit attachment to another flange, a floor, or wall (Ettlinger 1998: 512). There are several types of flanges.

## PIPE FLANGE

Pipe flange in this study is a term to describe a threaded flange. A threaded flange is a flange that is internally threaded. Threaded flanges are used in systems where stress and temperature are not present.

There are two design elements noted on pipe flanges found in the project area. Some of the threaded flanges have a decorative raised molding on their face. This element is noted in the description section of the database (appendix III). A second design element is a threaded flange with a short square tang on opposite ends of the flange (3 o'clock and 9 o'clock respectively). The tang may have been useful during the manufacturing process of the flange. Tangs are noted in the description section of the database.

Sixty-four pipe flanges were found; 61 are complete, and three (FS 1177) are incomplete. Thirteen of the threaded flanges have a tang, and only nine have a decorative motif. Six pipe flanges are stamped and the data is presented in the pipe flange stamp table, below.

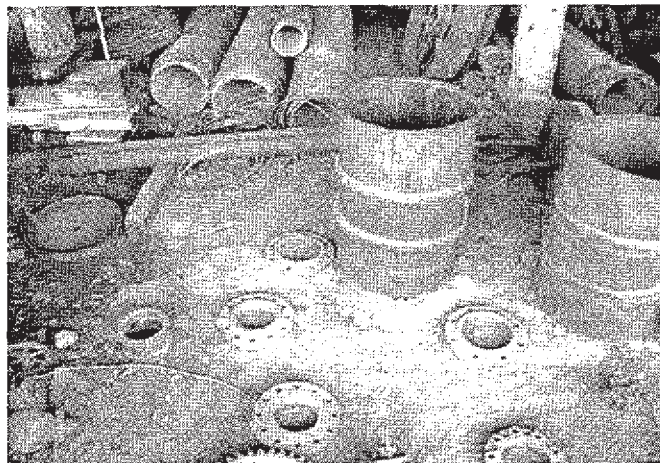
## Pipe flange dimensions (in inches)

FS	N	Identification	Length	Width	External Diameter	Internal diameter
65	1	pipe flange			8	3.5
95	1	pipe flange		4.5	13.0	6.5
220	1	pipe flange		1.13	8	4
735	1	pipe flange		1.5	11	6.5
747	1	pipe flange		1.5	12.5	6.25
751	1	pipe flange		1.75	9	4.25
752	1	pipe flange		2.5	15.5	8.5
756	1	pipe flange		2	11	6.5
759	1	pipe flange		1.5	12.5	6.5
760	1	pipe flange		1.5	13.5	8.5
761	1	pipe flange		1.5	1.5	6.5
767	1	pipe flange			13.5	8.5
769	20	pipe flange			16	
771	6	pipe flange		1.5		
825	1	pipe flange		1	7	2.25
826	1	pipe flange and pipe	3	0.75	8.25	4.25
827	2	pipe flange		1.5	10	4.25
828	1	pipe flange		2	11	6.5
837	1	pipe flange			10	4.25
838	1	pipe flange			13.5	8.5
840	1	pipe flange			13.5	8.25
842	1	pipe flange		2	10.5	4.5
843	1	pipe flange		1.75	12	8
846	1	pipe flange		1.25	7	3.5
848	1	pipe flange		1.25	7	3.5
851	1	pipe flange	1		6	3.25
852	1	pipe flange with cap		1.25	10	4.25
865	1	pipe flange			6.75	3.5
896	1	pipe flange		2	13	4.75
957	1	pipe flange	11.5	2.5		
958	1	pipe flange		1.5	12	6.25
968	1	pipe flange		0.75	7.25	2.75
1056	1	pipe flange			5.5	2
1177	3	pipe flange and pipe	5.0		6.0	2.75
1637	1	pipe flange		2.0	29.0	22.0
1731	2	pipe flange		1.5	8.	4.5

## Pipe flange stamps

FS	N	Description
735	1	C
756	1	C
837	1	L
838	1	L
846	1	NAVY/C
1379	1	C





*Pipe flanges on floor of unit 23.*

#### SLIP ON FLANGE

A slip on flange is a flange that is not internally threaded. During manufacturing the flange is bored slightly larger than the external diameter of the matching pipe. The flange is slipped onto pipe and the interior and exterior of the flange are welded to prevent leaks.

Only one slip on flange (FS1706) was identified. The dimensions of this complete artifact are ED 22.0" and ID 6.0".

#### WELD NECK FLANGE

A weld neck flange is like a slip on flange except that it has a raised bore neck to allow alignment during welding.

Fifteen complete weld neck flanges were. One of the weld neck flanges (FS 175) is stamped "SEATTLE[...]".

Weld neck flange dimensions (in inches)

FS N	Length	External Diameter	Internal Diameter
175 1		19	10
176 1		19	10
198 1		24	8
912 1	13	10	3.25
913 1		10	3.25
938 1		10.5	3.25
941 2		10.5	3.25
942 3		10.5	3.25
949 1		10.5	3.25
950 1		10.5	3.25
1381 1		24.0	17.0
1629 1		11.5	9.75

## BLIND WELD NECK

A weld neck with a square flange at one end which is closed with a blind. On the side of the square flange portion is a pin of a hinge.

One blind weld neck (FS 940) was identified in the project area. The dimensions of the neck are L 11.0", W 8.0" and H 5.5".

## 6. PIPE HANGERS

## PIPE STRAP HANGER

A long rectangular piece of metal (the strap) with mounting holes. A pipe hanger attaches to the strap by a bolt. The pipe hanger is a round bracket bolted around the pipe. Together the pipe strap and hanger hold a pipe in suspension. Pipe hanger straps are present *in situ* hanging down from ceilings to support pipe in several of the buildings at Kennecott.

Fifty-two pipe strap hangers were identified. Only the strap was found, no complete pipe strap hangers were identified. Fifty of the pipe straps are complete, two (FS 478, FS 120) are broken straps.

Pipe strap dimensions (in inches)

FS	N	Length	Width
5	1	41	3
36	6	41	3
76	14	14.5	1.25
111	1	3.5	5
120	1	6	4.5
130	1	7	4.5
133	2	29	2.5
266	1	6	2.5
455	1	4.5	2.5
474	1	25.5	2
475	1	5.5	1.5
478	1	9.5	2
538	4	9	2
549	1	11	2.5
650	1	12	2
654	1	9	4
860	1	10	2
994	3	14.5	2.5
1004	1	10.75	2.25
1029	2	19	2
1046	2	9.5	2
1132	1	6	3
1225	1	14	2
1312	1	6.0	2.0
1383	1	24.0	2.0
1626	1	6.75	1.5

## PIPE STRAP HANGER WITH TWIST

This item is similar to the pipe strap hanger described above. The object is a rectangular piece of metal (the strap) with mounting holes. A pipe hanger attaches to the strap by a bolt. The strap has a 90-degree twist midway along its length.

Six complete pipe strap hanger with twists were found in the project area.

Pipe strap hanger strap with twists dimension (in inches)

FS	N	Length	Width
263	1	27	1.5
559	2	14.5	6
1243	1	5.25	2.0
1655	1	7.0	4.0
1666	1	5.0	

## SPLIT RING PIPE HANGER

A split ring pipe hanger is a two piece donut-shaped pipe hanger. On the top of the round section of the hanger, where the pipe inserts, an internally threaded bore hole allows for support rods to be inserted.

Fourteen split ring pipe hangers were identified in the project area. Three of them have threaded support rods in place (FS 776, FS 145), six are not complete and the remaining eight are complete. Two of the split ring pipe hangers are stamped, one (FS 658) is stamped "649", and the other (FS 649) is stamped "1648".

Split ring pipe hanger dimensions (in inches)

FS	N	Complete?	Length	Width	ED	ID
145	1	Yes	24	1	8.5	5.75
151	1	No	19			12.5
153	1	Yes	19			12.5
154	1	Yes	19	4.5		
519	1	Yes	11	1		7
544	1	No	15	4		1
649	1	No	10	13		7
658	1	Yes	6	13	7	
684	1	Yes	18.5	26		12.5
717	1	No		6		
776	2	Yes	21	9		6
922	1	Yes	26		18	12
1603	1	No	12.0	3.0		7.0
1603	1	No			5.75	



*Split ring pipe hanger in unit 18.*

#### STUB END

A stub end is a short cylindrical pipe fitting with one end capped with a flange. Stub ends are mounts that attach to walls to support pipe ends.

Two complete stub ends were identified in the project area.

Stub end dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
683	1	10	8	4.75	2.5
1061	1	3		3.5	2.5

#### VERTICAL PIPE RISER CLAMP

Vertical pipe riser clamps are two semicircular metal straps bolted together. Each piece is a rectangular flat metal with a semicircular bend in the center. The artifact clamps around a pipe, thus securing it in place.

Three vertical pipe riser clamps were found. One is missing part of a strap (FS 665) and the other two are complete.

Vertical pipe riser clamp dimension (in inches)

FS	N	Length	Width	Diameter
50	1		1.5	21.0
73	1		3	18.0
665	1	12	1	

#### ONE PIECE PIPE HANGER

One piece pipe hanger is a term to describe a round cast iron pipe hanger. The actual name of this piece of equipment is not known.

A single one piece pipe hanger (FS 1532) was identified. This complete artifact has a threaded rod inserted in the outside frame. The

dimensions of the pipe hanger are L 63.0", ED 12.0", and ID 7.0". The diameter of the threaded rod is 2.0".

#### PIPE HANGER

This artifact is a plain section of pipe with a handmade pipe hanger attached. The hanger consists of two pieces of flat metal in an hour glass shape. At one end of hanger are two bolt holes.

Only one of these homemade pipe hangers (FS 895) was identified in the project area, having the dimensions of L 15.0", W 14.0", and D 1.0".

#### HOSE CLAMP

A hose clamp is a round bracket used on air, steam, liquid, or pressure hose. Hose clamps come in various sizes (Industrial Equipment News June 1938:60). Two bolts secure the clamp on the hose.

One complete hose clamp (FS 1053) was found in Area A of the Machine Shop. The dimensions of the clamp are W2.0", ED 7.5", and ID 6.5".

#### REEL

A reel is a piece of equipment similar to a spool or drum, that turns on an axis and is used for winding rope, hose or cable.

One reel, probably for a fire hose (FS 1583) was found in the project area. This particular reel is composed of two flat metal disks each with four spokes/arms extending from edges of disks. The two disks are both on a shaft and the area between the two disks is where the material would wind. The reel's dimensions are L 16.5", W 10.0", and D 18.0".

### D. FIXED ILLUMINATION AND POWER

Fixed illumination and power is the fourth category within the architectural category of the classification system. Artifact categories in fixed illumination and power include wire, fuses, light bulbs electrical insulators, industrial energy transmission systems, and fixed heating and cooling. A total of 352 artifacts fall into the fixed illumination and power category.

#### 1. WIRE

##### ELECTRICAL WIRE

Electrical wire is wire for transmitting electricity.

Twenty-three electrical wire fragments were found. The length and diameter of each wire fragment was recorded. One wire fragment (FS 93) has an electrical ceramic insulator fragment attached.

Electrical wire dimensions (in inches)

FS	N	Length	Diameter
93	1	10	2.5
493	1	30	0.25
732	1	29	0.25
742	1	26	0.5
904	2	14	0.25
1010	1	120	0.5
1089	1	42	0.75
1090	1	36	0.5
1241	1	20	0.5
1248	1	13.0	1.0
1256	1	42.0	1.0
1540	1	36.0	0.38
1550	1	48.5	0.25
1594	4	40.0	0.25
1668	1	13.0	
1671	2	20	0.25
1711	1	42.0	0.13
1723	1	21.0	0.25

## 2. FUSE

### PLUG FUSE

A fuse in this report is a term used to describe a plug fuse. A plug fuse is a safety device for an electric circuit that melts when current exceeds a specific amperage, by opening the circuit (American Heritage Dictionary 1992: 343). Plug fuses have a mica window in a metal cap to allow visibility of the fuse element.

Three plug fuses were found in the project area. One of the fuses (FS 437) is stamped "BRYANT 125 PYROTITE/SOA/TRADEMARK/PAT 4-27-09".

Fuse dimensions (in inches)

Artifact	N	Length	Diameter
362	1	0.25	1.25
437	1	1.5	1.5
1239	1	5.0	1.0

## 3. REASTAT

### REASTAT WHEEL

A reostat wheel is a metal ribbed wheel used in regulating the flow of electricity. Similar reostat wheels are present *in situ* in the Power Plant at Kennecott.

Two reostat wheels were identified in the project area.



Reostat wheel dimensions (in inches)

FS	N	Length	Width	ED	ID	Diameter
906	1	22	19			5
934	1			22	3	

#### 4. LIGHT BULBS

##### LIGHT BULB BASE

A light bulb base is the metal end of a light bulb including the ring and tip contact. The base twists into the socket shell (Bragonier and Fischer 1981: 234).

Three light bulb bases were recorded in the project area. One (FS 439) may be a fuse base and is stamped "BOL-5".

Light bulb base dimensions (in inches)

FS	N	Complete?	Length	Diameter
439	1	No	2	0.25
494	1	Yes	1	1
1591	1	Yes	2.0	1.5

##### LIGHT SHADE

The light shade is a milk glass round lampshade used on fixed ceiling bulbs. The shade has a white underside and black on top. This style of lampshade is common in several structures at Kennecott, including the Power Plant and the Mill building.

Only one light shade (FS 480) was found in the project area. The diameter of the broken shade is 18.0" with an opening at the top measuring 6.0".

#### 5. INSULATOR

##### ELECTRICAL INSULATOR

A ceramic piece used to secure electrical wire to a surface. Wire nails go through the bore holes onto the insulator, but are separate from the electrical wire itself which is caught inside the two piece insulator, or is wedged by a U shaped insulator. Electrical insulators come in different shapes including longenze and rectangular. The shape of the insulator is noted in the description field of the database (Appendix III).

Seventeen white ceramic electrical insulators were found three of which (FS 340, FS 729, FS 730) are stamped "GPCo".

Electrical insulator dimensions (in inches)

FS	N	Identification	Complete?	Length	Width	Diameter
10	1	electrical insulator and bracket	No	3	2.5	1.75
216	1	electrical insulator	No	1		1

FS	N	Identification	Complete?	Length	Width	Diameter
340	1	electrical insulator	Yes	3.25	0.75	
387	1	electrical insulator	No	2.5	0.75	
414	1	electrical insulator	No	2.88	2	
427	1	electrical insulator	No			3
491	1	electrical insulator	Yes	1.63		1.0
499	1	electrical insulator	Yes	1.63		1
515	1	electrical insulator and eyebolt	Yes	9		0.5
729	1	electrical insulator and screw	No	2.5	0.75	
730	1	electrical insulator and screw	No	3.25	0.75	
951	1	electrical insulator	Yes	2	0.75	
1551	1	electrical insulator with nail	No	1.0		1.0
1552	1	electrical insulator with nail	Yes	1.0		1.0
1587	2	electrical insulator	Yes	1.5		1.13
1675	1	electrical insulator	No	2.0	0.5	

## 6. ENERGY TRANSMISSION

The energy transmission category of fixed illumination describes an industrial energy system where energy is transmitted by shafts, pulleys and belts. The category also includes gears, collars, bearings and shaft mounts. A total of 279 energy transmission artifacts are identified.

### a. Gears

#### GEAR

A gear is a toothed wheel that meshes with another toothed machine part to transmit motion or to change speed or direction. Gears come in a variety of sizes. The body of the wheel may be solid or have spokes.

Thirty gears were found in the foundation area of the Machine Shop. Twenty-eight are complete and two (FS 1230) are broken or fragmented. Three were found on shafts (FS 53, FS 60 and FS 719).

The external diameter dimension of the gear refers to the diameter of the entire gear, and the internal diameter refers to the diameter of the hub opening, the location where the shaft inserts. Two gears are stamped with product information. FS 796 is stamped "MEESE & GOTTFRIED" and FS 1051 is stamped "LINK-BELT COMPANY/SILENT".

Gear dimensions (in inches)

FS	N	Identification	Width	Extern	Internal
52	1	Gear	2.25	24	2
53	1	gear and shaft	3.5	9.5	3
56	1	Gear	2	20.25	2
60	1	gear, shaft, and one	1.75	18	1.5
62	1	Gear	4.0	10	3
105	1	Gear		24	4

FS	N	Identification	Widt	Extern	Internal
134	1	Gear		22	3
540	1	Gear	6	36	5
692	1	Gear		6.25	3
719	1	gear and shaft	4	34	2.75
758	1	Gear		18	3
785	2	Gear	3.75	39	2.75
795	1	Gear	1	30	2.5
796	1	Gear	1.5	21	2.25
883	1	Gear	2.5	30.0	2.5
893	1	Gear	2.5	30	2.5
898	1	Gear	3.75	29	3
899	1	Gear	4.5	37	3.75
1049	1	Gear	8	60	4.25
1050	1	Gear	5.25	48	4.5
1051	1	Gear	7	48	3.5
1230	2	Gear	7.0	67.0	6.0
1326	1	Gear	1.0	12.0	2.0
1612	1	Gear	6.0	32.0	5.25
1618	1	Gear	6.25	12.0	3.75
1619	1	Gear	7.75	13.75	7.75
1712	1	Gear	5.0	37.0	4.0
1713	1	Gear	4.0	33.0	2.0



*Two gears in unit 25.*

#### BEVEL GEAR

A bevel gear articulates with and runs at right angle to a pinion (Patterson 1919: 423). The teeth face of the gear is on the same plane

as the hub/socket; that is, the gear teeth are perpendicular in position relative to the teeth on a simple gear.

Two complete bevel gears were identified in the project area.

Bevel gear dimensions (in inches)

FS	N	Width	External Diameter	Internal Diameter
737	1	1	19.5	2
1396	1	1.75	24.0	2.0

#### PINION GEAR

A pinion gear is a small cogwheel that is engaged by a larger cogwheel or a rack. Pinion gears have solid bodies (not a hub and spoke system) and are usually short and relatively squat.

A total of thirteen pinion gears were found in the project area. Two are on a shaft, and the remaining pinion gears were not articulated with any other piece of machinery. On the pinion gear dimension table the Length and Diameter columns refer to shaft measurements.

Pinion gear dimensions (in inches)

FS	N	Identification	Width	External Diam.	Internal Diam.	Length	Diam.
1736	1	pinion gear	8.0	10.0	3.0		
750	1	pinion gear	5.25	10.5	2.75		
964	1	pinion gear	3.0	18	2		
1623	1	pinion gear	2.0	19.0	2.5		
1638	1	pinion gear		8.5	5.0		
963	1	pinion gear	3.0	25.5	3		
61	1	pinion gear	6.5	8.5	2.5		
1578	2	pinion gear	1.0	27.0	4.0		
1608	2	pinion gear	2.0	28.5	4.0	4.5	
51	1	pinion gear and shaft	4	19	3	37	3
1411	1	pinion gear with shaft	4.0	12.0	6.0	39.0	3.0

#### PINION DRIVE GEAR

A pinion drive gear articulates with a pinion gear. The gear is squat and tapered, with the diameter of one end smaller than the other end.

Four complete pinion drive gears were found in the project. Only one (FS1621) was on a shaft.

Pinion drive gear dimensions (in inches)

FS	N	Width	External Diameter	Internal Diameter	Length
921	1		10	3	
202	1	2.5	24	3.75	
59	1	4	8	2.5	
1621	1	7.5	12.0		71.5



### RACK

A rack is a rectangular metal bar with teeth that meshes with a gear wheel or pinion gear.

One rack (FS 88) was found in the project area. The dimensions of the rack are L 27.0" and W 2.0".

## b. Pulley system

### PULLEY

A pulley is a large wheel either turned by, or driving a belt. Pulleys can be constructed from cast iron, steel, or wood, and can be two piece (split) or one piece (solid) construction. A split pulley is divided into two halves, which are connected by bolts at the hub and at the midway point in the interior of the face of the pulley. A solid pulley has one piece forming the hub and face. The face of the pulley is the portion guiding the belt, and can be plain, or flanged. Pulley faces can be flanged either at one side or both sides. The hub can be flush with the rim or extend slightly beyond the face rim. Tight pulleys have a crown face and the hub is flush with the rim of the face. Loose pulleys have a flat face but sometimes are made an inch or two smaller in diameter to reduce belt tensions with a tapered flanged on one side to carry the belt up to the tight pulley. The arms or spokes of the pulley can be one set of single arms or a double set of arms (Patterson 1919:444). Pulleys come in a wide range of diameters. The term pulley in this report indicates a plain, one piece pulley with an un-flanged face.



Seventy-eight pulleys were identified. Seventy-one were complete and seven were incomplete (FS 122, FS 203, FS 298, FS 560, FS 561, FS 1358, FS 1393). Seventy-four were found alone, not articulated with another piece of equipment. Two pulleys (FS 1386, FS 1409) were found on a shaft, and one (FS 1390) was found on a shaft with a one piece set screw collar. Another pulley (FS 100) was found on a shaft with a roller bearing. The dimension table field L and D refer to dimensions of the shaft. Two pulleys were stamped and the product information is presented in the pulley stamp table.

Pulley dimension table (in inches)

FS	N	Identification	Width	External Diameter	Internal Diameter	Length	Diameter
54	1	pulley	6.5	8	2.25		
58	1	pulley	2	9.5	2		
100	1	pulley, shaft, and roller	1.75	16	1	10.5	4.5
122	2	pulley	1.25	21			
141	1	pulley	5.25	18	2.5		
178	1	pulley	8	50	2.5		
179	1	pulley	7	24	2.5		
180	1	pulley	7	24	2.5		
183	1	pulley	6.25	48	2.5		
184	1	pulley	6.5	50	2.5		
185	1	pulley	7.5	49	2.5		
186	1	pulley	6	58	3		
187	1	pulley	9	31	4.25		
188	1	pulley	6.5	24	3		
190	1	pulley		21	2.75		
191	1	pulley	14	14	3		
201	1	pulley	6.25	19			
203	1	pulley	13	17.5	2.75		
212	1	pulley	9.75	12	3		
223	1	pulley	2.5	28	2.5		
227	1	pulley	2.5	2.25			
228	1	pulley	2.5	28	2.25		
230	1	pulley	11.5	40.5	3.25		
231	2	pulley	10.5	26	2.75		
236	1	pulley	2.5	28	2.25		
237	1	pulley	11	22	3.75		
238	1	pulley	8.5	16.75			
241	1	pulley	6	20	3.25		
242	1	pulley	6.25	23	3		
243	1	pulley	13.25	17.5	2.75		
244	1	pulley	13.25	21			
245	1	pulley	12.5	17			
247	1	pulley	14.5	24	2.0		
250	1	pulley	18	41	4		
251	1	pulley	12.25	18	3.5		
252	1	pulley	19	41	4		
253	1	pulley	6.5	18	1.25		
254	2	pulley	10.5	14	2		



FS	N	Identification	Width	External Diameter	Internal Diameter	Length	Diameter
255	1	pulley	9.25	29	2.75		
256	1	pulley	6.75	24	3.25		
257	1	pulley	26.5	33	3		
258	1	pulley	9	32	4.25		
270	1	pulley	4.5	14	2.25		
271	1	pulley	10	11.75	3.75		
298	1	pulley	2.75				
514	1	pulley	8.25	54.5	3		
516	1	pulley	7	16	1.5		
517	1	pulley	0.5	23	1.25		
560	1	pulley	11	5	2.5		
561	1	pulley	11	5	2.5		
604	1	pulley	9	31.5	4.5		
622	1	pulley	5	6	2.5		
641	1	pulley	4.5	24			
743	1	pulley	25	36	3.25		
784	1	pulley	9	42	6.25		
786	1	pulley	2.5	28	1.75		
787	1	pulley	6.75	31	2		
1116	1	pulley	4.25	14.0	4.25		
1121	1	pulley	5.25	17.5	1.75		
1175	1	pulley	5.25	17.5	1.5		
1358	2	pulley	11.25	72.0	3.0		
1373	1	pulley	5.5	14.0	2.5		
1386	1	pulley and shaft	12.0	16.0	12.0	44.5	2.25
1390	1	pulley, shaft, and one	19.0	34.0	3.0	53.0	3.0
1393	1	pulley	9.5	47.0	3.0		
1394	1	pulley	9.5	46.0			
1408	6	pulley	4.25	13.5	2.25		
1409	1	pulley and shaft	24.5	13.5	2.5	64.0	2.5

Pulley stamp table

FS	N	Description
516	1	[...]05-08
231	1	[...]PAT 26/[...]12

## PULLEY DOUBLE FLANGED

A double flanged pulley is a pulley with each side of the face flanged.

Only one (FS 748) complete double flanged pulley was found in the project area. The dimensions are ED 11.0", ID 1.75", and W 6.0".

## PULLEY/GEAR COVER PLATE

A cover plate is a rectangular metal covering for a pulley or gear. The metal is curved to fit around the wheel. The cross section of the metal is rectangular. No bolts or securing mechanisms are present. The

cover plate acts to protect the piece of machinery from losing lubrication and/or getting dirty.

One complete pulley/gear cover plate (FS 1614) was found in the project area. Its dimensions are D 13.5" and W 4.0".

#### HUB

A hub is the center portion of the pulley or gear where the shaft inserts. Some hubs are of two piece construction and are attached with threaded shafts, while other hubs are of one piece construction. Hubs can have plain circular openings or may have specialized shafts in the openings to facilitate key lock shafts. Key lock notches are described in the description portion of the database (Appendix III).

Seven hubs were found in the project area. Five are complete and are incomplete. One (FS 72) is stamped "C2372A".

Hub dimensions (in inches)

FS	N	Complete?	L	W	ED	ID	D
71	1	No	5		7.5	3	
72	1	No	5.5		7	4.5	
106	1	Yes	8	7.5			4
174	1	Yes			6	3	
221	1	No		1.5			10
839	1	Yes			.5	3	
909	1	Yes	19				3.5
1714	1	Yes		4.5	6.0	3.0	

#### CANVAS BELT

Canvas belts are belts that drive the pulleys and transmit energy to various pieces of equipment.

Two fragments of canvas belt were found in the project area.

Canvas belt dimensions (in inches)

FS	N	Length	Width
332	1	33	5
1746	1	52.0	5.0

#### CHAIN

Chain is a connected flexible series of iron links. There are three basic types: *straight chain*, *sash chain*, and *roller chain*. Straight chain consists of oval links, while sash chain has a series of triangular shaped links. Roller chain consists of figure eight shaped solid links tightly connected. Roller chain is also called diamond chain and is specially designed to be flexible and efficient for transmission of power on motors and machinery (Patterson 1919: 406).

In the database the term chain implies straight chain. Six sections of straight chain were identified in the project area.

#### Chain dimensions

FS	N	Length	Width
703	1	6	4
783	1	4.5	3.25
1101	1	4	1
1290	1	4.0	1.5
1742	1	6.5	1.0

#### CHAIN LINK

Chain link is one individual section of straight chain.

One (FS 313) chain link was found and its dimensions are L 3.25", W 1.25", and D 0.25".

#### CHAIN GUIDE TEETH

These items are teeth that insert into a sheave. As a result the sheave functions as pulley for chain and the teeth guide the chain. For each set of teeth there are two V shaped pieces connected at the base section of the V.

A total of 16 chain guide teeth are identified in the project area, only five of which are complete. Chain guide teeth exist *in situ* at Bonanza mine.

#### Chain guide teeth dimensions (in inches)

FS	N	Complete?	Length	Width
1060	2	Yes	7.5	1.5
1071	2	Yes	7.5	1.5
1078	1	No	4.5	1.5
1080	1	No	4.5	1.5
1092	1	No	4.5	1.5
1242	1	No	4.5	2.0
1254	1	No	7.5	3.5
1263	2	Yes	7.5	3.5
1264	1	Yes	7.5	3.5
1271	1	Yes	7.5	3.5
1280	1	Yes	7.5	3.5
1291	1	Yes	4.5	2.0
1346	1	Yes	7.5	1.34

### c. Shaft equipment

#### SHAFT

A shaft is a metal rod used as a drive shaft in an energy transmission system. Pulleys, gears and associated locking mechanisms (bearings and spacers) are typical parts found on a shaft. Shafts of unknown

function are classified under Category 8 of the classification system, Unknown/Unclassified.

Three shafts were identified which can be classified as functioning in an energy transmission system. All three are complete. On the shaft dimension table the length and the diameter refer to the shaft itself while the other fields refer to components found on the shaft.

Shaft dimensions (in inches)

FS	N	Identification	Length	Width	External Diam.	Internal Diam.	Diameter
57	1	shaft with bearing	18.5	10.0	4.0	2.0	2
955	1	shaft with keylock	18				3.5
1186	1	shaft and pinion gear	63.0	6.0	9.0	4.0	4.0

## COLLARS

### ONE PIECE SET SCREW COLLAR

A collar is a donut shaped piece of metal used on shafts to secure and limit the movement of other equipment located on a shaft, such as bearings or hubs. One piece set screw collars are constructed from one piece of metal, and have a screw, which locks the collar in place on the shaft. One piece set screw collars are sometimes called solid set collars (C.T. Patterson Co.1918: 430; McMaster-Carr Catalog 104 1999:739).

Twenty-three complete one piece set screw collars are identified in the project area; all are complete. One collar is located on a shaft securing a pulley. Another is on a shaft with two rail wheels. Two one piece set screw collars are stamped with product information, one (FS 48) is stamped "C. F." and the other (FS 489) is stamped 1 TON-DUPLEX/SCREW BLOCK".

One piece set screw collar dimensions (in inches)

FS	N	Identification	Width	External Diameter	Internal Diameter
17	1	one piece set screw collar	1.75	6.75	4
18	1	one piece set screw collar	2	5.5	3.2
42	1	one piece set screw collar	1.5	4.5	2.75
45	1	one piece set screw collar	1.5	3.25	2
47	1	one piece set screw collar	1.75	3.5	1.75
48	1	one piece set screw collar	2	4	2
489	1	one piece set screw collar	1.5	3.5	1
824	1	one piece set screw collar	1.0	7.0	2.25
995	1	one piece set screw collar	2	6	3
999	1	one piece set screw collar	1.75	5.75	3.5
1001	1	one piece set screw collar	1.75	4.25	2.0
1018	1	one piece set screw collar	2	3.25	2.0
1048	1	one piece set screw collar	1.5	4	2.5
1065	1	one piece set screw collar	2.25	5.0	3.0
1130	1	one piece set screw collar	2.0	8.0	3.25
1147	1	one piece set screw collar	2.0	5.0	2.75

FS	N	Identification	Width	External Diameter	Internal Diameter
1149	1	one piece set screw collar	2.0	4.5	3.0
1156	1	one piece set screw collar	0.75	6.0	3.25
1191	1	one piece set screw collar	1.5	3.0	2.0
1306	1	one piece set screw collar	2.0	5.0	2.75
1432	1	one piece set screw collar	0.75	6.0	3.5

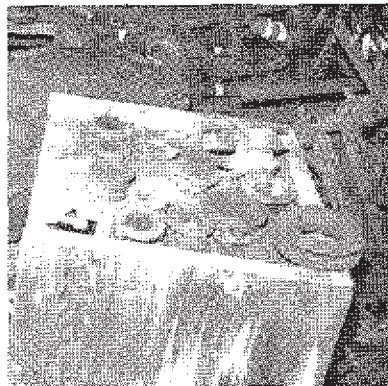
#### ONE PIECE SET SCREW THREADED COLLAR

Internally threaded collars provide "...excellent contact with shaft threads for secure locking and easy adjustment" (McMaster Carr Catalog 104 1999: 741). Threaded collars will not damage the shaft like set screw collars. Today, threaded collars are used on trip rods, depth stops, clutch adjustments, copy machines, and bar feeders.

Two complete one piece set screw threaded collars were identified in the project area.

One piece set screw threaded collar dimensions (in inches)

FS	N	Width	External Diameter	Internal Diameter
172	1	7	7	4.5
647	1	1.75	5	4.5



*Collars on crate in unit 1.*

#### ONE PIECE SET SCREW COLLAR WITH SQUARE FLANGE

This shaft collar is a one piece set screw collar that has the typical donut shape but has a square flange on one side.

Only a single (FS 1338) one piece set screw collar with square flange was found in the project area. Its dimensions are W 6.0", ED 11.0", and ID 6.0".

#### TWO PIECE CLAMP ON COLLARS

Two piece clamp on collars are constructed from two semicircular pieces of metal that clamp onto the shaft. These split collars are easy

to install on shafts, yet lock in place when the set screws are tightened (C.T. Patterson Co 1918:430; McMaster-Carr Catalog 104 1999: 740).

Thirteen two piece set screw collars were stored or discarded in the project area.

Two piece clamp on collar dimensions (in inches)

FS	N	Width	External Diameter	Internal Diameter
4	1	1.75	5	2
19	1	1.75	5	2
40	1	2	4	2
41	1	2	3.25	2.5
43	1	2.5	8	5
44	1	2	4.25	2
46	1	2	5	2.75
49	1	2	4.75	2
932	1	2	4.25	2
1124	1	1.5	3.25	1.5
1228	1		4.0	2.0
1273	1	3.0	5.0	3.0
1604	1		4.5	2.5

#### SHIMS

A washer designed for use on shafts of "...milling equipment cutters, slitters and grinding tools" (McMaster-Carr 1998: 2658). Some shims have tabs and notches, which are designed to fit the keyways on shafts, holding the shim in place. Shims with notches are sometimes referred to as arbor spacers.

Six complete shims were identified in the project area.

Shim dimensions (in inches)

FS	N	Width	External Diameter	Internal Diameter
682	1	2.5	4.25	2.38
1437	1	0.25	2.75	2.5
107	1	4	8	5
721	1	1.5	1.75	1
262	1	2.5	6	2
753	1	2.75	3	1.5

#### BEARINGS AND MOUNTS

Webster's dictionary defines a bearing as follows:

A part supporting another machine part or structure. A device that supports, guides, and reduces the friction of motion between fixed and moving machine parts. Something that bears weight or acts as a support (Webster 1988:160).



Plain bearings allow low-friction, smooth motion between two parts. The load is supported through the sliding motion between two solid surfaces. Plain bearings have no moving parts such as ball bearings. Unmounted plain bearings are replacement parts in larger assemblies (i.e. machine components) (McMaster-Carr: 721).



#### ROLLER BEARING

A bearing utilizing long cylindrical rollers to reduce friction between machine parts (Webster 1988: 1015).

Seventeen roller bearings were found in the project area. Two are resting within their base mount, and three others are completely mounted. Only one was found on a shaft. Three of the roller bearings are stamped and the data are presented in the roller bearing stamp table.

Roller bearing dimensions (in inches)

FS	N	Identification	Complete?	L	W	ED	ID
101	1	roller bearing	Yes	9		3.5	2.5
108	1	roller bearing and base mount	No	5.5	5		
148	1	roller bearing and mount	Yes	19	5	9	7
152	1	roller bearing	Yes	11	4.5		2
163	1	roller bearing	Yes	10.5	5		1.5
171	1	roller bearing	Yes	10.5	5		1.5
197	1	roller bearing	Yes	10	4		3
617	1	roller bearing and base mount	Yes	12	9		
626	1	roller bearing	No	17.5	7.25		
635	1	roller bearing	Yes	15		5	3
637	1	roller bearing	No	17.25		5.75	3.75
640	1	roller bearing and mount	Yes	14.25		5	3.25

FS	N	Identification	Complete?	L	W	ED	ID
651	1	roller bearing	Yes	15		5	3
868	1	roller bearing	Yes	15.5		5	4.25
918	1	roller bearing and mount	Yes	8		4	1.25
1645	1	roller bearing	Yes	7.25		6.0	3.0
1696	1	roller bearing	No	9.0	4.5		

## Roller bearing stamp

FS	N	Description
101	1	PAT NO 116/4876801/B866
197	1	PAT NO 5 508682, 647502, 622218/ROLLER BEARINGS/ HARRISON, NJ
651	1	HARRISON, NJ
1696	1	MEESE & GOTTFRIED/S.F. CAL

## SLEEVE BEARINGS

Sleeve bearings are unmounted plain bearings that support loads perpendicular to their rotating axis (i.e., radial loads) (McMaster-Carr: 721).

Sixteen sleeve bearings were identified in the project area, one of them (FS 143) associated with a belt wheel from an idler conveyor system. Four are incomplete (FS 143, FS 879, FS 1002, FS 1153) and (FS 879) is stamped "2/3".

## Sleeve bearing dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
67	1	7.5		3.5	
131	5	5.5		3.25	2.13
143	1	5		2.5	1.25
147	1	8		14	5
879	1	5.5	3.5		
1002	1	6		3.5	
1003	1	8.5		4.0	2.5
1007	1	5.5		3.75	2.75
1008	1	4.25		3.25	2.0
1054	2	4.5		3.25	2
1153	1	6.5	3.0		

## LINER

A liner is a term used to describe a brass cylinder with lead lined interior. The liner may function as a liner in a bearing.

One liner (FS 909) was identified in the project area. Its dimensions are L 19.0" and D 3.5".

### ROLLER BEARING MOUNT

Roller bearing mounts are two piece semicircular mounts with a rectangular base. Oil reservoirs are not commonly found on roller bearing mounts. In the Machine Shop foundation area we often found half of amount, and would identify it as either a roller bearing mount top, or a roller bearing base mount.

A pillow block and a roller bearing mount are almost interchangeable terms. A pillow block is a housing or mount for any type of (McMaster-Carr 1998; 728).

Eighteen roller bearing mounts were identified. Eleven are complete mounts, two are only top mounts, four are base mounts and two are base mounts containing roller bearings. Five of the mounts have roller bearings in place.

Roller Bearing Mount dimensions (in inches)

FS	N	Identification	Complete?	Length	Width	ED	ID
64	1	roller bearing mount	Yes	11.5	6.5	7	4.5
68	1	roller bearing mount	Yes	14	9		4
77	1	roller bearing mount	Yes	12	3	7	5
108	1	roller bearing and base mount	No	5.5	5		
109	1	roller bearing base mount	Yes	13.25	4.5		3.5
148	1	roller bearing and mount	Yes	19	5	9	7
196	1	roller bearing top mount	Yes	12	3		7
200	1	roller bearing mount	Yes	15.75	5		6.5
205	1	roller bearing mount	Yes	10.5	3		
617	1	roller bearing and base mount	Yes	12	9		
620	1	roller bearing top mount	No	18.5			12.5
638	1	roller bearing base mount	Yes	16	5		
640	1	roller bearing and mount	Yes	14.25		5	3.25
720	1	roller bearing mount	Yes	9			7
734	1	roller bearing mount	Yes	16	4.25		
918	1	roller bearing and mount	Yes	8		4	1.25
980	1	roller bearing mount	Yes	14	4.5		4
1246	1	roller bearing mount	Yes	12.0	7.0		6.0

### BEARING MOUNT

A term to describe a generic bearing mount. The mounts are of two piece construction and often have oil or grease lubricating reservoirs on the top piece. The term pillow block is another common name for bearing mounts.

Five complete bearing top mounts were found in the project area. Two have an oil reservoir present, and two have an *in situ* oil cup.

## Bearing Mount dimensions (in inches)

FS	N	Identification	Length	Width	ED	ID	Diameter
123	1	bearing top mount with oil reservoir	12	7.5		5	
140	1	bearing top mount with oil reservoir		4	18	12	
150	1	bearing top mount		3			13
633	1	bearing top mount with oil cup	18				
676	1	bearing top mount with oil cup	11	18.5		12.5	

## SOLID JOURNAL BOXES

A solid journal box is a solid bearing mount used for machine shafts. They are one piece cast iron pieces bored to receive a shaft (Patterson 1919:432).

Three complete solid journal boxes were found in the project area.

## Solid Journal Box dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
55	1	11	5.5		2
1321	1	10.5	5.25	6.0	4.0
1374	1	10.5	4.0	6.0	4.0

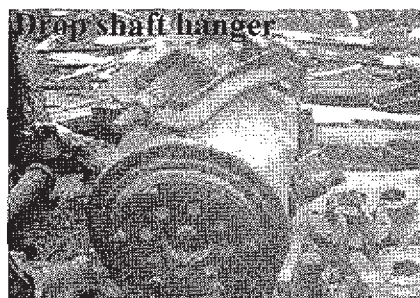
## DROP SHAFT HANGERS

A drop shaft hanger is an H shaped bracket that hangs down from the ceiling. The center portion holds a bearing into which the shaft is inserted.

Five drop shaft hangers were identified in the project area.

## Drop Shaft Hangers (in inches)

FS	N	Complete	Length	Width
142	1	Yes	13	6
930	1	Yes	29	12
948	1	Yes	22	8.5
1229	1	Yes	29.0	12.5
1445	1	No		2.5



*Drop shaft hanger in unit 32.*

#### FLANGED SHAFT MOUNT

A flanged shaft mount is a mount for a shaft. The mount has a flange in the middle with a short shaft cylinder on either side.

Two complete flanged shaft mounts were found in the project area. One of the mounts (FS 663) has a diamond shaped fitting on the mount, and its dimensions are L 4.0", ED 7.0", and ID 2.5". The plain flanged shaft mount dimensions are L 7.5", ED 21.0", and ID 10.0".

#### POST HANGER

A post hanger is part of a two piece closed post hanger for bearings. In this case the frame yoke of the hanger is missing (Patterson 1919:440).

One section of a two piece closed post hanger for bearings was found in the project area. Its dimensions are L 12.0", H 10.5", W 4.0", and ID 2.25". The hanger is stamped "286".

#### TWO-BOLT FLANGE-MOUNT SHAFT SUPPORT

With a two-bolt flange-mount shaft support the shaft inserts into brass lined tube (McMaster-Carr 1999:739).

One (FS 434) two bolt flange-mount shaft support was identified the project area. The dimensions are L 4.25", ED 1.5", and 0.25".

### **F. Fixed heating, cooling, atmospheric conditioning**

Fixed heating and cooling is the 6<sup>th</sup> category of architecture. A total of 27 artifacts are classified in this category.

#### BASEBOARD HEATING GUARD

This is an aluminum or galvanized steel guard that runs along the heating element.

One baseboard heating guard fragment (FS 539) was identified. Its dimensions are L 32.0" and H 4.0".

#### BROOM BRISTLES

Broom bristles are part of a wood frame broom. The bristles attach to a wood piece that is perpendicular to the handle. The broom may have been used to clean exhaust pipes.

One broom bristle head (FS 911) was found. Its dimensions are L 22.0", ED 6.0", and ID 3.5".

#### HEATING AND COOLING UNITS

Heating and cooling units are square metal units that are part of a hot water radiator system. Heating and cooling units are not the typical



radiator unit, but a large rectangular box of galvanized metal. The unit is labeled heating and cooling.

Two heating and cooling units were found in the project area. Both of the units have product information stamped on the body of the artifact. One (FS 357) is stamped "AEROFIN, FOR HEATING OR COOLING AIR; AROFINE CORPORATION, 750 FRELINGHUSEN AVENUE, NEWARK, N. J., PATENT PENDING/ VENTRAFIN TRADEMARK, UNIT HEATER, MADE BY AMERICAN BLOWER COMPANY-DETROIT, MICH./BENT HILL-CINCINNATI, OHIO, SINCE 1881". The other (FS 490) is stamped "VENTURAFIN/TRADEMARK, UNIT HEATER/MADE BY THE AMERICAN BLOWER COMPANY-DETROIT, MICHIGAN-BOND-HILL-CINNCINATTI, OHIO".

#### SMOKE STACK WITH CONE HOOD

A smoke stack with cone hood is an exhaust pipe for a furnace, stove or engine. The cone hood is an inverted triangle that protects the stack opening from rain and snow but allows the exhaust to be released.

Two smoke stacks with cone hoods were identified. The stacks only represent a portion of the entire stack.

Smoke stack dimensions (in inches)

FS	N	Length	Width	ED	ID
33	1	23.5	10.75	10.5	14.5
78	1	23	10.75	10.5	14.5



*Two smoke stacks with cone hoods in unit 1.*



## FIRE EXTINGUISHER

During the mining operations fire extinguishers were situated in every building of Kennecott.

One fire extinguisher canister was found in the project area. The canister (FS 1302) is labeled "FIRE EXTINGUISHER RECHARGE" and its dimensions are L 4.2", W 3.2", and H 4.25".

## FURNACE DOOR

An industrial furnace door is a rectangular heavy iron door with a knob and part of a hinge.

One furnace door (FS 1039) was found. The furnace door dimensions are L 12.5" and W 8.0".

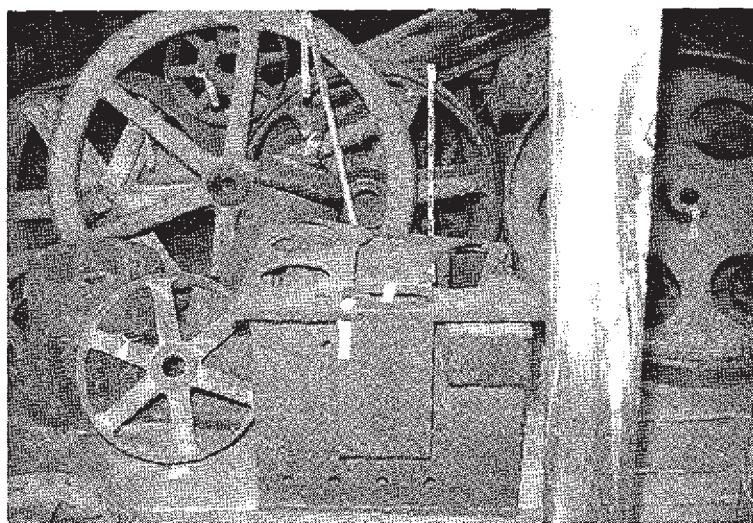
## STOVE

A domestic cooking and heating stove.

One stove (FS 240) was found in the project area. Several stove parts and pieces were found in close proximity to the stove including a stove door (FS 199), a stove piece (FS 239), and a fragment of the stove (FS 408). The stove (FS 240) is stamped with the following numbers "8 18".

Stove and stove parts dimensions (in inches)

FS	N	Identification	Complete?	Length	Width
199	1	stove door	Yes	19	15
239	1	stove piece	No	15	11
240	1	stove	No	35	26
408	1	stove fragment	No	9.25	0.13



Stove in unit 13.

## STOVE PIPE

This term encompasses various shapes and sizes of stove pipe including plain cylindrical stacks.

One complete stove pipe section (FS 1389) was found in the project area. The pipe is L 18.25", and the W 11.0".

## PRESSURE REDUCER

A pressure reducer is a short squat round nickel-plated container with an internally threaded opening at top and bottom. On the body of the container is an externally threaded opening. This specific type of reducer is not labeled.

One example of a plain pressure reducer (FS 986) was found in the project area. The dimensions are L 1.20", W 0.75", and D 3.5". It is stamped with "833 H".

## PRESSURE REDUCER 1

A rounded square shape container with a small male opening and large female opening at opposite ends, and a small female opening midway in the body.

Only one example of pressure reducer 1 (FS 1109) was found in the project area. Its dimensions are L 1.70", W 1.0", and ED 4.5". The pressure reducer is stamped "844 H". Identified by tourist as a pressure reducer and the identification is confirmed in Patterson (1919).

## PRESSURE REDUCER 2

A rounded square shape container with a small male opening and large female opening at opposite ends and a small female opening midway in the body.

One pressure reducer 2 (FS 1114) was found in the project area. The dimensions are L 1.7", W 1.25", and ED 4.0". Stamped on body "844". Identified by a tourist as a pressure reducer, it is confirmed in Patterson (1919).

## PRESSURE TANK

A pressure tank is a tall cylindrical closed tube with small internally threaded opening at top and a small opening near the bottom of the body. The base of the tank is flanged.

Two pressure tanks were identified in the project area. One of the tanks is partially buried by other artifacts (FS 1646), and therefore a diameter measurement was not possible.

Pressure tank dimensions (in inches)

FS	N	Length	External diameter	Internal diameter
1613	1	53.0	16.0	1.0
1646	1	53.0		

## PORTABLE STEAM HEATER

A portable steam heater is a small rectangular mobile heater. This heater is present *in situ* in the mill located close to machinery.

One portable steam heater (FS 832) was found in the project area. The dimensions of the heater are L 17.0" by W 8.0".

## RADIATOR

A radiator is a heating device constructed from metal through which steam or hot water circulates. Heat from the steam or hot water radiates out through the metal body and heats a room.

Three incomplete radiators were identified in the project area.

Radiator dimensions (in inches)

FS	N	Length	Width	Height
1076	1	22	5.5	13.0
1253	1		14.0	6.0
1278	1	20.0	11.5	5.0

## RADIATOR COIL

A radiator coil is a thin, tightly spaced U shaped metal found inside of heating devices. At Kennecott in several structures we identified broken pieces of a single radiator coil or an entire stand of radiator coils located inside of a rectangular heating frame.

Three radiator coil fragments were found in the project. One coil (FS 992) is stamped with the following information "PAT. IN U.S./SEPT. 22, 91 NOV. 18 19[.]".

Radiator coil dimensions (in inches)

FS	N	Length	Width
992	1	4	1
1252	1	6.75	4.25
1266	1	4.0	1.0

## RADIATOR BRACKET

A radiator bracket is a flat U-shaped piece of thin metal found on the bottom of radiators.

Three radiator brackets were identified in the project.

Radiator bracket dimensions (in inches)

FS	N	Complete?	Length	Width
1287	1	No	3.0	3.25
1335	1	No	3.5	3.0
1350	1	Yes	19.0	9.25

## 4. TRANSPORTATION

Transportation, the fourth major section of the classification system, includes vehicles, vehicle parts and accessories, and vehicle maintenance. A total of 41 artifacts are classified under personal and domestic transportation.

### A. VEHICLES

#### 2. VEHICLE ACCESSORIES

##### AUTO SPRING

An auto spring is a half-elliptic rubber suspension spring (Patterson 1919:368).

Two auto springs were found in Area A of the Machine Shop.

Auto Spring dimensions (in inches)

FS	N	Complete?	Length	Width	Height
1247	1	Yes	37.0	2.0	2.0
1294	1	No	14.5	2.0	0.25

##### CLUTCH PLATE

A clutch plate is part of the transmission system of a vehicle.

One round clutch plate (FS 1214) was found in the project area. Its dimensions are W 0.25", ED 11.0", and ID 1.0".

##### TRUCK TIRE

A truck size tire with no rim.

One Firestone brand truck tire (FS 744) was identified in the project area. The dimensions of the tire are W 10.0", ED 24.0", and ID 20.0", and it is stamped with the following information:

"FIRESTONE/MILITARY/ GROUND GRIP/TYPE ND  
MILITARY/7.50-20/HEAVY DUTY/ TRUCK-BUS/8 PLY/MADE  
IN USA/40 AB-736/GUM F DIPPED/ S4/27725W7".

##### VEHICLE HITCH

A vehicle hitch is a term used to describe a part of a vehicle that attaches to a draft animal or perhaps to another vehicle. The hitch in this case is a rectangular wood tongue with a cylindrical opening at one end. Iron plating runs along the edges of the hitch.

One vehicle hitch (FS778) was found in Area A of the Machine Shop.

The dimensions of the hitch are L 52.0", W 5.0", and H 4.0".

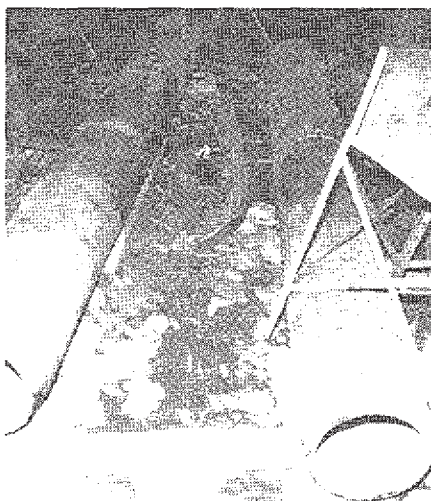
##### SLED/SLEDGE RUNNER

Runners are the part of a sledge or sled that has contact with the trail surface. The runner is wood with iron plate covering the sides.

Four runners were identified in the project area. Three runners were found together at the same location.

Sled runner dimensions (in inches)

FS	N	Identification	Length	Width	Height
394	1	sled/sledge runner	90	5.5	
1368	3	sled/sledge runner	64.0	2.25	5.0



*Sled runner in-between two water pipes in Unit 20.*

#### RAIL TRACK

Rail track is iron rail for tracked vehicles such as trains. The cross section of the rail is I shaped although the top is narrower than the bottom.

Four rail tracks were identified in the project area.

Rail track dimensions (in inches)

FS	N	Length	Width	Height
102	1	72	1.5	3.5
158	1	168	1	
753	1	220	2	4
845	1	220	2.25	4.5

#### RAIL WHEEL

A rail wheel is a wheel used on train rail systems. The wheel is flanged at one end. One side of the wheel has wavy spokes and the other side is plain. Rail wheels can be seen *in situ* on a railroad car at the McCarthy Museum.

Nineteen complete rail wheels were found in the project area. Two of them were on the same shaft/axle, which had a one piece set screw collar. Five rail wheels were each on an individual shaft/axle. The



remaining wheels were not on axles or shafts. One (FS 1385) is stamped with the patent information "PAT 9/8/14".

Rail wheel dimensions (in inches)

FS	N	Identification	Length	Width	ED	ID	Diameter	Height
177	1	rail wheel		10	14	8		
518	2	rail wheel		4	14	2		
697	1	rail wheel		5	16	13		
936	1	rail wheel			16	1.75		3.5
946	1	rail wheel			16	1.75		3.5
965	1	rail wheel		9	16			
1072	1	rail wheel		6.0	13.0			
1275	1	rail wheel		8.0	12	10.75		
1473	1	rail wheel		4.0	16.0	1.75		
1385	1	rail wheel		11.75	12.0	3.5		
1478	1	rail wheel		3.25	13.5	2.0		
1349	1	rail wheel (2), shaft and one-	93.5	9.25	13.0		4.5	
555	1	rail wheel and axle assemblage	58				2.5	
159	1	shaft and rail wheel	58				2.5	
472	1	shaft and rail wheel	4.75				0.5	
1244	1	shaft and rail wheel	92.0		13.0	4.25	4.25	6.0
1250	1	shaft and rail wheel	90.0	9.25	13.0	5.0	4.5	
1360	1	rail wheel and shaft	53.0	4.0	13.25	3.0	3.0	

#### TRAIN ROLLER

A train roller is a cast iron heavy solid cylindrical piece identified by J. Miller of McCarthy, AK.

Five train rollers (FS 125) were found clustered together in one location. The train roller dimensions are L 15.5", ED 5.70", and ID 3.0".

## B. MAINTENANCE

### Bailing wire/ ties

#### BAILING WIRE

A wire bale is a section of wire with specifically formed ends for securing bundles of material such as hay, straw, flax, excelsior, broom corn, cotton, shavings, leather, staves, rags, lintels etc. (Patterson 1919: 182). Bale ties can be single loops, cross heads or patent hooks. One segment of bailing wire (FS 277) is stamped with the following information "CARNE".

Five bailing wire fragments were found in the project area.

Bailing wire dimensions (in inches)

FS	N	Identification	Length	Diameter
213	1	bailing wire eye	2.0	0.5
277	1	bailing wire	2.0	0.38
419	1	bailing wire	5.0	0.06
807	1	bailing wire	9.0	0.25
1727	1	bailing wire	28.0	0.25

## 5. COMMERCE AND INDUSTRY

Commerce and Industry is the fifth major category in the classification. Artifacts in the Machine Shop assemblage can be divided into the following subclasses: hunting, mining, construction and manufacturing. A total of 1179 artifacts are found in this category.

### B. HUNTING

#### CARTRIDGE CASING

A cartridge casing is the metal sleeve that encloses a lead bullet and can be considered the debitage from firing a live round.

One (FS 363) brass 250-3000 savage cartridge casing was found in the project area. The dimensions of the casing are L2.0" and D 0.44". The head stamp is "250-3000 SAVAGE".

### G. MINING

The mining category is split into two divisions: mining and milling. A total of 188 mining related artifacts are described.

#### 1. MINING EQUIPMENT

##### AIR COMPRESSOR WHEEL

Identified as part of an air compressor. The wheel is solid with a protruding cylinder located off center on the body of the wheel. A piston head fits on the protruding cylinder on the body of the wheel. Air compressors are used in conjunction with the rock drills in the drilling processes in the mines.

Two air compressor wheel and shaft components were found in the project area. One (FS 863) has dimensions of L 79.0", W 2.75", ED 24.0", and D 4.5", and the second (FS 137) one's dimensions are ED 21.0", ID 2.25", and W 2.5".

##### CRUCIBLE/CUPEL

Crucibles and cupels are small containers manufactured out of unglazed earthenware. The containers are utilized during the assay process.

Only one fragment of a crucible/cupel (FS 836) was identified. The fragment measured L 8.0" and W 3.0", and the stamp mark reads "DP[...]92".

##### ROCK DRILL BIT

Rock drill bits are the steel drill bits for compressed air machine drills. The bit ends are star-shaped in cross section.

Eight complete rock drill bits were found in the project area.

Rock drill bit dimensions (in inches)

FS	N	Length	Diameter
167	1	25	1.25
170	1	29	1.25
413	1	26	1.25
587	4	22	1.5
710	1	31	1.25

## ROCK DRILL SHAFT

The metal shafts are used to extend the rock machine drills that ran on compressed air.

Thirteen rock drill shafts are found in the project area. Ten are complete and three are incomplete. Six rock drill shafts were found clustered together in one location (FS 586).

Rock drill shaft dimensions (in inches)

FS	N	Complete?	Length	External Diameter	Internal Diameter	Diameter
259	1	No	11.5			1.25
287	1	No	4.5			1
586	6	Yes	29			1.5
731	1	Yes	26			1.25
779	1	Yes	36			1.75
831	1	No	17	1.5	0.5	
1103	1	Yes	27.25			1.0
1691	1	Yes	22.0	1.5		

## 2. MILLING EQUIPMENT

## ROLLER CRUSHER PART

Roller crusher part is a long rod with slightly flanged ends. In the center of the rod is a square section with two holes. This artifact is seen *in situ* on the obsolete roller crusher in the Mill building. The part may be part of the braking mechanism of the machinery.

One roller crusher part (FS 563) was found in the project area. The length of the part is 72.0".

## THREE PULLEY TROUGHING IDLERS

Three pulley troughing idlers are a conveyor system. There are two components to the system: the top and the return. The top part contains three idlers in a trough shape, and is the part where materials ride on the canvas/rubber belt of the conveyor system. The return is on the bottom and acts to return the canvas/rubber, and therefore does not function to carry any loads.

There are several components of the 'idlers', which are the small pulleys on which the canvas or rubber belt runs. There is a center

beltwheel with a smaller beltwheel on each end. A pin attaches an end beltwheel to one of the two mounts. The center beltwheel is attached to both mounts. The mount is often found on its own. To review, the following items comprise the three pulley troughing idlers: a complete idler, beltwheel and mount, beltwheel on pin, beltwheel, mount, and pin.

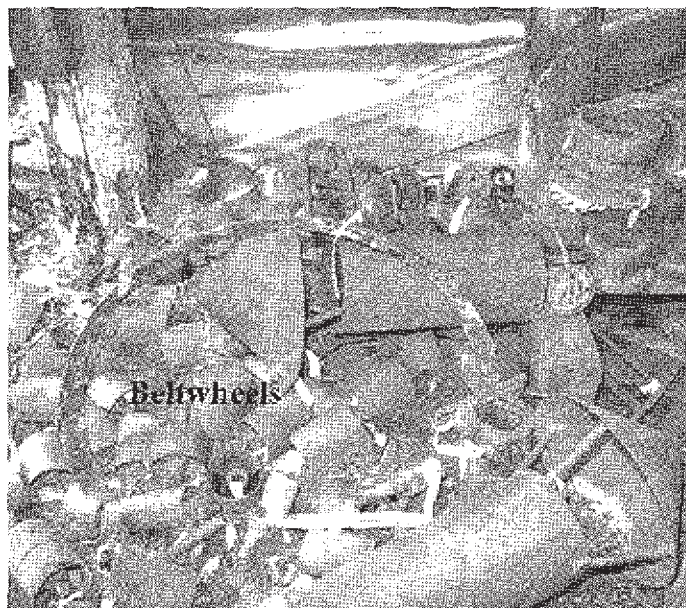
A total of 43 belt wheels, 30 beltwheel mounts and 15 pins were found in the project area. These items were found in a variety of combinations. Seventeen belt wheels were found individually. Nineteen belt wheels were found on mounts and six belt wheels were on pins. Eleven beltwheel mounts and pins were found without any belt wheels. Three complete idler assemblies (three mounted belt wheels) were found. Three belt wheels have product information and the data are presented in the beltwheel stamp table.

Three pulley troughing idler component dimensions (in inches)

FS N	Identification	Complete?	L	W	ED	ID	D	H
14 1	beltwheel	Yes	6		5.5	4		
27 1	beltwheel and mount	No	20		4.5	4.13		
28 1	beltwheel and mount	No	20		4.5	4.13		
29 1	beltwheel	No	47				3	
80 9	beltwheel mount and pin	No	6	4			1.25	4
81 21	beltwheel	No	7		5.5	1.25		
82 7	beltwheel and mount	No	7				4.5	
83 1	beltwheel and mount	No	5.75				3.75	
84 3	beltwheel and pin	No	4				6	
85 2	beltwheel and pin	No	4				6	
86 2	beltwheel	No	7				4.5	
87 2	beltwheel and mount	No	10				4	
118 1	beltwheel	Yes	7		5.5			
235 1	beltwheel	Yes	16				4.5	
246 1	beltwheel and pin	Yes		17.25	13	1.75		
260 1	beltwheel and mount	Yes	7				4.25	
373 1	beltwheel	Yes	6.5	3.5				
694 1	beltwheel	Yes	10		3.75	2.25	12	
1556 1	beltwheel	Yes	7.0		4.5	1.0		
1585 1	beltwheel and mount	Yes	7.0	10.0			4.5	9.0
1586 1	beltwheel and shaft	Yes	24.0				4.5	
1589 1	beltwheel and mount	Yes	4.50		4.0			
1592 1	beltwheel	Yes	34.0				4.5	
1627 1	beltwheel	Yes	7.0				4.75	
1631 1	beltwheel mount	Yes	4.75				2.0	4.5
1677 2	beltwheel and mount	Yes	20.0				5.0	7.0
1679 1	beltwheel and mount	Yes	11.0	4.0			3.5	14.0
1693 4	beltwheel	Yes	20.0				4.5	
1695 3	Idler assembly	Yes	35.0				5.0	6.5
1744 1	beltwheel mount	Yes	4.5	3.5			2.0	5.5
1750 1	beltwheel and beltwheel	Yes	28.0				5.0	5.0

## Beltwheel stamp

FS	N	Description
80	1	M & G Co/ S. F. CAL
81	1	MEESE & GOTTFRIEDE CO/ SF CAL
118	1	MEESE & GOTTFRIEDE CO/ SF CAL



*Three pulley troughing idlers belt wheels in unit 1.*

## CALLOW CONE

A callow cone is a classifier that consists of a smaller cone inside a larger cone. The outside cone is of cast iron and the inside cone is made of boiler iron and is open at the bottom. A handwheel and a screw control the opening. How does a callow cone work? Pulp flows into the inner cones and down through the open bottom, at which point the pulp meets a rising current of wash water. The pulp and wash water flow up through the space between the two cones. The ore has to settle against the combined force of the wash water and the rising pulp stream. The particles which are heavy enough to settle, do so at the bottom and are discharged through pipes and move on to concentrators. The lighter particles float and are carried over with the main pulp stream into the launder and then into the next larger classifier. The larger cone classifier has a slower current and will catch smaller ore particles. By varying both the widths of the spaces between the cones and the amount of wash water, the separation process can be refined. Usually there are three cones present in this system. Cone classifiers range from 12" to 40" in diameter and weigh 100 to 625 pounds.



In the project area the base of a callow cone (FS 624) was found. The dimensions of the piece are ED 14.0", and H 25.0".

#### CONCENTRATING TABLE

Concentrating tables vary in size and shape, but are about twice the size of a pool table. The surface of the tables is covered with linoleum and has a series of riffles. The table was mounted at a slight tilt and shaken by mechanical vibrators either from the end or the side of the table. Heavy metals are caught in the riffles and then captured in a bucket. The waste rock, being lighter, is suspended and washes across the riffles and away to the launder (ICS :1889: 43; Sagstetter 1998: 60).



Five complete concentrating tables are stacked in the project area. These tables show up on the 1928 flow chart but are not found *in situ* at Kennecott today. Two complete concentrating table leg supports were also identified.

Concentrating Table dimensions (in inches)

FS	N	Identification	L	W	H
679	1	concentrating table support	45.5	4.5	21
680	1	concentrating table support	45.5	4.5	22
1410	5	concentrating table	10.0	56.0	89.0

## JAMES SIMPLEX VIBRATOR

The James Simplex Vibrator is a piece of machinery that shakes concentrating tables. They are labeled with the embossing "James Simplex Vibrator". The James Simplex vibrators are present *in situ* in the Mill building today and were used in 1938.



Twelve James Simplex Vibrators were found in the project area. The majority were located together in Unit 37. Four of the vibrators (FS1026, FS1027, FS1044, FS1045) had the following operation directions stamped onto the body of the machine:

"JAMES SIMPLEX VIBRATOR/255 R.P.M./ ROTATE THIS WAY FOR COARSE AND FINE SANDS/ROTATE THIS WAY FOR SLIMES/RIGHT HAND VIBRATOR/910/PATENT APPLIED FOR".

James Simplex Vibrator dimensions (in inches)

FS	N	Complete	Length	Width	Height
1045	1	No	32	11	15
1027	9	No	33	11	16
1026	1	Yes	33	11	16
1044	1	Yes	32	11	15

## VIBRATOR DOOR

A vibrator door is a plate attached to the body of the vibrator with hinges. The surface of the door is marked with operating directions for the vibrator. The doors are part of the James Simplex Vibrators.

One vibrator door (FS 1035) was identified in the project area. The dimensions of the door is L 15.75" and W 7.0". The vibrator door contains embossed directions for operating the vibrator "255 RPM/ ROTATE THIS WAY FOR COARSE AND FINE SANDS/ ROTATE THIS WAY FOR SLIMES/ RIGHT HAND VIBRATOR/ 910".

#### VIBRATOR SPRING BRACKET AND VIBRATOR SPRING BRACKET 2

A vibrator spring bracket is an iron bracket located on the James Simplex Vibrators. The bracket is located at distal end of compression spring. A second bracket is oval shaped and located at the proximal end of the spring. This second bracket is referred to in the database as "vibrator spring bracket 2".

Two complete vibrator spring brackets (FS 1017, FS 1023) and one complete vibrator spring bracket 2 (FS 1104) were identified in the project area. The spring bracket 2 (FS1014) has the following information stamped onto it: "909".

Vibrator bracket dimensions (in inches)

FS	N	Identification	Length	Width	Height
1014	1	vibrator spring bracket 2	9.5	4.0	
1017	1	vibrator spring bracket	7.5	3.5	3
1023	1	vibrator spring bracket	7.5	3.5	3

#### ORE BAG

An ore bag is a burlap bag usually yellow or buff colored woven in a coarse weave. Ore was shipped out of Kennecott in ore bags.

Thirty-six ore bags or ore bag fragments were found in the project area. On one of the ore bags (FS 532) are remnants of a label "84". A second bag (FS 1206) had the label "ARR".

Ore bag dimensions (in inches)

FS	N	Complete?	Length	Width	Height
265	1	No	23	12	
346	1	No	24	7	
368	1	Indeterminate	25	11	
369	1	Indeterminate	26	7	4
532	1	Yes	27	19	
554	1	Yes	12	6	
588	1	No	32	29	1.5
722	1	No	6	3	
789	1	No	21	8	
833	1	No	22	10	
885	1	No	10	8	1
886	1	Yes	22	17	0.5
897	1	Yes	26	17	0.5
933	1	Yes	27	15	0.5



FS	N	Complete?	Length	Width	Height
1067	2	Indeterminate	28	14	
1087	1	No	20	15	
1123	1	No	18.0	14.0	
1158	1	No	22.0	11.0	
1168	1	No	22.0	10.0	
1193	1	No	20.0	16.0	
1194	1	No	19.0	11.0	
1197	1	Yes	20	13	
1204	1	Yes	28.0	17.0	
1205	1	Yes	30.0	17.0	
1206	1	Yes	27.0	14.0	
1208	2	No			
1212	1	Yes	30.0	16.0	
1219	1	Yes	24.0	16.0	
1272	1	Yes	22.0	12.0	1.0
1274	1	No	14.0	8.0	1.0
1403	1	No	24.0	3.0	
1424	1	No	17.0	12.0	
1427	1	No	23.0	18.0	

#### ORE SORTING BLADE

A rectangular piece of metal used as the working end of a rake to sort ore and unclog the chutes.

One ore sorting blade (FS 113) was identified, which measured L 32.0", W 7.0", and P 0.5".

#### ORE CHUTE

Ore chutes are U shaped metal liners that fit inside the wood ore chutes seen *in situ* in the Mill building at Kennecott. Some of ore chutes have an oval opening at one end.

Six ore chutes of varying size and preservation were found in the project area.

Ore chute dimensions (in inches)

FS	N	Length	Width	Height
181	1	120	17	
169	1	120	15	3.25
215	2	106	15	3.5
219	2	74.5	14	3.5



*Ore chute in unit 7.*

#### ORE CHUTE FRAME

An ore chute frame is a metal frame that secures the top of an ore chute to the floor or ceiling. The frame consists of four flat metal bars forming the frame and two ore chute guides. The ore chute itself is not present.

One ore chute frame (FS 566) was found in the project area. The frame dimensions are L 12.25", W 12.10", and H 3.0".

#### ORE CHUTE, ANGLED

Ore chute angled identifies an open ore chute section attached to a covered ore chute section. The open section is at a 45-degree angle, guiding materials down into the flat, covered ore chute portion.

One angled ore chute (FS 1420) was identified in the project area. The dimensions of the chute are L 34.0", W 22.0" and H 9.0".

#### ORE CHUTE HANDLE

An ore chute handle regulates the flow of ore out of a chute. These handles are present today *in situ* in the Mill building where the ore bags are filled. The artifact is an L shaped handle mounted on a stem and round base. One end of the handle has a semicircular shaped solid end.

One ore chute handle (FS 75) was found the project area. The dimensions of the handle are L 16.0", W 8.0", and H 5.5", and has the following product information stamped onto the handle: "23495 B".

## TRAM HANGER

A tram hanger is the metal fulcrum bar and sheaves that run along the wire of an aerial tram and holds the bucket.

One tram hanger (FS 513) was found in the project area. The dimensions of the hanger are L 39.0" and H 32.0".

## TRAM BUCKET

Tram buckets are the rectangular buckets used on the aerial tramways at Kennecott.

One tram bucket (FS 1644) was identified in the project area. The dimensions of the bucket are L 20.0", W 26.70", and H 17.5".



*Tram bucket in unit 31.*

## TRUMP WEIGHING MACHINE FRAME

The weighing machine is a rectangular frame with an A-frame top. The frame is constructed from U-beam shaped stock. In the top center of the frame is an arm, likely serving as a support for the weighing equipment. The actual scale is not present. The weighing machine was labeled on a metal plate and therefore identified.

One (FS 1426) Trump Weighing Machine frame was identified in the project area. Dimensions of the frame are L 35.0", W 28.0", and H 46.0". The weighing machine has the following product information stamped onto the body of the frame: "TRUMP MEASURING MACHINE/ PATENTED APRIL 24 1906 - SEPTEMBER 11 1906/ SOLE MANUFACTURERS/ THE CONVEYING WEIGHER CO./ 90 WEST STREET NEW YORK/ SIZE 36 INCH ORDER 306".



## WIRE MESH

Wire mesh includes various sizes of wire cloth and perforated metals sheets.

Two pieces of wire mesh were found in the project area.

Wire mesh dimensions (in inches)

FS	N	Length	Width
1363	1	40.0	26.0
1528	1	60.5	36.0

## H. CONSTRUCTION

Construction is one of the classes of Commerce and Industry. All artifacts within this subclass are tools, totaling 25.

## CHISEL

A chisel is a metal tool with a sharp beveled cutting edge.

One complete chisel (FS 818) was identified. The dimensions of the chisel are L 9.25", W 1.0", and H 1.0".

## CANT HOOK

A cant hook is a steal hook for a cant or peavey. The hook found in the project area is a duckbill hood (Patterson 1919: 323).

One duckbill hood cant hook (FS 700) was identified, and its dimensions are L 19.0" and W 1.0".

## BOX WRENCH

Box wrenches have long narrow handles with ring shaped ends. The ends have 6 or 12 interior facets called teeth or points. The rings come in different sizes and are used for tightening or loosening nuts and bolts in situations where the wrench could be slipped over the bolt head. The box wrench is good for use in tight quarters, instead of an adjustable wrench.

One complete box wrench (FS 39) was found in the project area. Its dimensions are L 36.0", ED 3.0", and ID 1.75".

## CROW'S FOOT WRENCH

A crow's foot wrench is a type of wrench consisting of a wrench head, but no handle. This tool is an open-end wrench with a square hole into which a socket wrench or extension can be inserted for driving. A Crow's foot wrench is used to tighten and loosen nuts accessible only from the side and located in places difficult to reach (Ettlinger 1998: 62).

One complete crow's foot wrench (FS 452) was found in the project area. Its dimensions are L 4.25", W 1.5", and ID 0.75".

#### OPEN-END WRENCH

An open-end wrench is a wrench with open fixed jaws on a narrow steel handle. This wrench is usually 4 to 6" in length. The jaw openings get larger as the handle gets longer. The ends on one wrench are usually of different sizes (Ettlinger 1998:57). Open-end wrenches are also known as double-end open-end wrenches.

One open-end wrench (FS 613) was found in the project area. The dimensions of the wrench are L 22.0", W 1.25", and H 0.5". Stamped onto the handle of the wrench is "833/W".

#### SOCKET WRENCH

A wrench with a round head containing a reversible ratchet mechanism. A square point sticks out of ratchet mechanism and this point snaps into a short cylindrical socket. Each socket has 6 or 12 points. A socket wrench is also commonly known as a ratchet wrench (Ettlinger 1998:61).

One complete socket wrench (FS 112) was found in the project area. The dimensions are L 20.25", W 0.5", and D 2.0".

#### KEY LOCK WRENCH

One complete wrench (FS 94) was identified to function with key lock heads. The dimension of the wrench are L 8.5", ED 3.5" and ID 1.5".

#### WRENCH

One complete wrench (FS 1377) was not identified beyond the term wrench during field work. The wrench is probably an open-end wrench. Its dimensions are L 44.0", W 23.0", and H 2.0".

#### DRILL BIT

A pointed, threaded tool for drilling and boring. Drill bits are secured in a brace, bitstock or drill press (American Heritage Dictionary 1992:89).

One complete drill bit (FS 430) was found in the project area. The dimensions are L 5.38" and D 0.13".

#### PAINT BRUSH

A wood handled flat end brush with hog bristles.

Two paintbrushes were found in the project area. One complete paint brush (FS 1661) was found with the dimensions of W2.5" and H 3.0".

One paint brush handle (FS 1709) was also identified, measuring W 2.5", and H 3.0".

## SAW BLADE

A metal saw blade used in a bow saw.

Eight fragments of saw blades were found in the project area.

Saw blade dimensions (in inches)

FS	N	Identification	Complete?	Length	Width
9	1	saw blade	No	5	1
326	1	saw blade	No	5.06	0.75
358	1	saw blade	No	7.13	0.25
365	1	saw blade	Yes	1.25	0.5
399	1	saw blade	No	2.5	1
451	1	saw blade	No	6	1
598	1	saw blade	No	9.5	0.75
579	1	saw blade	No	7.25	0.75

## TOOL HANDLE

A wooden tool handle, such as for a hammer. The specific type of tool attached to the handle is not known.

One wood tool handle (FS 1327) was found in the project area. Its dimensions are L 19.5", W 1.0", D 1.25".

## VISE

A vise is a gear device that opens and closes two flat jaws. A vise is used to hold pieces steady during a job. If bolted to the top of a workbench it is a bench vise. If the jaws are steel the vise is a machinist's vise. If the jaws are faced with wood the tool is a woodworker's vise. Vises may have a swivel base or may clamp directly onto the bench (Ettlinger 1998: 70).

One fragment of a machinist vise (FS 90) was found in the project area. The dimensions of the vise are W 3.75" D 7.0", and H 9.5". It has the following information stamped onto it "[...]NY".

## WHEELBARROW

A wheelbarrow is a one or two wheeled iron cart for moving small loads.

Three wheelbarrow bodies, lacking the wheel, were identified in the project area.

Wheelbarrow dimensions (in inches)

FS	N	Length	Width	Height
892	1	38	26.5	12
1662	2	71.1	24.4	16.0

## UNIDENTIFIED TOOL

The unidentified tool is a tool head consisting of two arms attached at the base with a bolt. The arms are not adjustable and they are neither grooved nor have teeth. This tool may possibly be a gear catch.

One such unidentified tool (FS 740) was found in the project area. Its dimensions are W 4.0", H 4.0", and ID 0.5".

## I. MANUFACTURING

Manufacturing is a subclass of Commerce and Industry, which includes artifacts that are the byproduct of a manufacturing technique. In the Machine Shop foundation artifact assemblage several lots of metal scrap were found, a byproduct from an industrial process. A total of 892 manufacturing artifacts are described in the database.

## 2. INDUSTRIAL

## METAL SCRAP

Metal scrap is defined as any type of metal, which is a by-product of another process. This includes pieces of flat metal where a form has been cut out of the metal. Apparently, the metal scrap was kept for possible re-use of this raw material.

Forty-one pieces of metal scrap was found in the project area. One of the pieces (FS 1237) has the following product information stamped onto the body: "8 /81".

Metal Scrap dimensions (in inches)

FS	N	L	W	ED	ID	D	P	H
135	5	7	3.25		1.5			
264	1	15	9	0.13				
279	1	6	0.5		0.25			
351	1	10.25			0.06			
352	1	7.31			0.06			
366	1	4.5	1.5	0.5				
375	1	7.5						
418	1	2.5	2.44	1.5	0.06			
485	1	9	3					
495	1	3.5	1.25		0.13			
496	1	6.75	0.5					
502	1	27	5.5	0.19				
509	1	72	40.0		0.25			
606	1	3.5	2					
812	1	8					20.0	16
835	1	22	0.5		0.25			
935	1	11	8	5.5			5.5	3
1081	1	22.5					1	0.88
1088	1	53	35	48				
1097	1		0.5				12	.75
1133	1	4					4.0	3.25

FS	N	L	W	ED	ID	D	P	H
1237	1	4.5	2.0	3.5				
1245	1	90.0	9.25			4.5	13.0	5.0
1249	1	7.5	3.5	2.0				
1277	1	13.75	2.0	0.13				
1282	1	3.0	3.25	1.0				
1283	1	16.0	12.0	3.0				
1352	1	83.					6.5	5.75
1367	1	11.75	4.25			2.0		
1481	1	7.0					2.5	
1539	1	15.0	0.75		0.8			
1602	1	29.5	24.0	2.0	0.5			1.0
1674	1	11.0	4.0	14.0		3.5		
1686	1	22.0					1.5	
1721	1		3.5				14.0	
1722	1	28.0				0.25		

#### METAL SHEAR TRIMMING

Metal shear trimmings are metal trimmings that are the result of cutting metal plates and objects. The trimmings are a waste byproduct from a manufacturing process.

Two concentrations of metal shear trimmings were recorded. Each concentration contained more than 300 individual trimmings.

#### Metal shear trimmings dimensions (in inches)

FS	N	Length	Width
699	300	4.5	0.13
927	300	0.13	0.25

#### PUNCHED BLANKS

Flat iron circle with a dimple in its center. Punched blanks are an exact match to the openings found in the metal plates described above.

Punched blanks can also be described as metal working debitage.

In the project area, 250 punched blanks (FS 568) were found inside of a deteriorating wood barrel. One individual blank was found separately (FS 417).

#### Punched blank dimensions (in inches)

FS	N	Width	Diameter
417	1	0.25	2
568	250	0.25	1

## J. COMMERCIAL SERVICES

Commercial service is a subclass of Commerce and Industry. This category includes storage artifacts, such as oil drums and barrels. A total of 65 commercial service artifacts are described.

### 1. STORAGE

#### 55 GALLON DRUM

A 55 gallon drum is a large metal barrel which can hold 55 gallons of liquid. Typically fuel and other industrial liquids are transported in 55 gallon drums.

Nineteen 55 gallon drums were identified. All of them were complete, although some were missing one end. Usually, if the 55 gallon drums had material culture contents, the material culture would also be inventoried. However, in four instances the drum was utilized as a storage receptacle for artifacts but we were unable to inventory. As a result, there are four descriptions of material culture lots present in the database (FS 857, FS 858, FS 1032, FS 1034).

One 55 gallon drum lid fragment (FS 774) was identified. The dimensions of the lid are ED 13.0" and H 0.5".

55 gallon drum dimensions (in inches)

FS	N		Complete?	ED	ID	Diameter	Height
533	1	55 gallon drum	No			23	30
768	1	55 gallon drum	No			23	34
770	1	55 gallon drum	No			23	34.0
823	1	55 gallon drum	No	22.5			31
853	1	55 gallon drum	Yes	23	22		31
854	1	55 gallon drum	Yes	22	21.75		35
857	13	assorted material culture	Yes				
858	11	assorted material culture	Yes				
1019	1	55 gallon drum	Yes	22.75	22.5		31.5
1032	1	55 gallon drums contents	Yes				
1034	1	55 gallon drum contents	Yes				
1037	1	55 gallon drum	Yes	22.75	22.5		31.5
1127	1	55 gallon drum	No			23.0	31.0
1134	1	55 gallon drum	No			23.0	32.0
1142	1	55 gallon drum	No			22.75	32.0
1142	1	55 gallon drum	No			13.0	30.0
1157	1	55 gallon drum	No			22.0	35.0
1166	1	55 gallon drum	Yes			23.0	35.0
1173	1	55 gallon drum	No			22.0	34.5
1207	1	55 gallon drum	No	22.5	22.0		33.0
1259	1	55 gallon drum	No	22.25	21.75		34.5
1314	1	55 gallon drum	No			22.5	34.5
1616	1	55 gallon drum	Yes	25.0	7.0		33.0





*55 gallon drums in Area A of the machine shop*

#### BARREL

The term barrel describes a wooden barrel.

One barrel (FS 567) was found with the dimensions of H 22.30" and D 18.5".

#### BARREL LID

A wooden barrel lid

One barrel lid (FS 1370) was found having the dimensions of D 10.0", W 5.0", and H 0.5".

#### BARREL END

An incomplete wooden barrel end and part of the barrel's body.

One barrel end (FS 1542) was found. The dimensions are L 13.0" and W 4.5".

#### BARREL REMNANT

A barrel remnant is a skeleton of a wooden barrel including a few staves and the barrel straps.

One barrel remnant (FS 1477) was found in the project area. The dimensions of the object are D 13.5" and H 7.25".

## BARREL STAVE

A barrel stave is an individual wood slat. Together several barrel staves make up the body of a barrel.

Four barrel staves were identified. Three of the stave were found together (FS 1369) and have the following dimensions L 18.0", W 4.0" and H 0.5". The fourth stave's (FS 1203) dimensions are L 14.5", W 4.0", and H 1.0".

## BARREL STRAP

Barrel straps are the metal hoops that hold the wood slats of a barrel in place. There are usually two sets of straps around the body of a barrel.

One barrel strap (FS 325) was identified in the project area. The strap dimensions are L 12.0", W 1.25, and H 0.19".

## BURLAP BAG

A term to describe storage/shipping bags not identified to function, used, for example, when it is unknown if the bags stored ore or dry goods such as flour and sugar. The bags are of a coarse weave.

Twenty burlap bag fragments were found in the project area.

Burlap bag dimensions (in inches)

FS	N	Complete?	Length	Width
1443	1	No	19.0	8.5
1452	4	No	24.5	14.0
1455	1	No	20.0	10.0
1464	1	No	10.5	14.5
1559	1	No	14.0	12.0
1576	2	Yes	12.0	9.0
1596	1	No	30.0	26.0
1600	1	No	11.0	24.0
1609	2	No	32.0	9.0
1654	1	Yes	24.0	8.0
1660	1	Yes	10.0	9.0
1663	1	No	13.0	8.0
1689	2	No	22.0	8.5
1737	1	No	21.0	9.0

## CRATE

Crate indicates a wood-shipping crate. Crates may have metal strapping present on the body.

Eight crate fragments were identified in the project area. One crate lid (FS 1347) was found with dimensions of L 21.30" and W 10.7". The crate lid is labeled in black paint: "NO#/ 4003 FORD/1-2580 1-3111-C/1-3070 1-3279/ 1-3071 1-3379/ 1-3102C 2-3377-1 1-3363 LONG/

1-3363 SHORT". Several of the crate fragments contain painted product information, which is presented in the crate label table.

Crate dimensions (in inches)

FS	N	Length	Width	Height
24	1	15	15	24.5
182	1	20	9	8
269	1	4.5	4.5	
1299	1	8.0	6.0	1.0
1315	1	21.0	9.25	15.0
1364	1	36.0	36.0	20.0
1438	1	16.5	2.0	

Crate label

FS	N	Description
269	1	AH 40 [...]
1299	1	CROUSE-HINDS / CONDULETS/ SYRACUSE NY USA/ LB17/ FORM 7/ GALVANIZED/ QUANTITY 5/ SIZE 1/2
1315	1	KENNECOTT COPPER/ CORPORATION/ KENNECOTT AK./ T20 FIRE TEST/ STANDARD OIL COMPANY/ CALIFORNIA[...]
1438	1	KENNECOTT ALASKA

#### CRATE STRAPPING

Crate straps are flat rectangular metal strips used to secure staves of crates and boxes. Usually, evidence of small nail holes are present in the straps.

Eight crate straps were identified in the project area.

Crate strapping dimensions (in inches)

FS	N	Complete?	Length	Width
601	1	No	9.5	0.75
819	1	No	23	1
1025	1	Yes	33	11
1454	1	Indeterminate	26.0	3.5
1544	1	Yes	15.0	0.75
1548	1	Yes	16.0	0.75

#### K. BLACKSMITHING

Blacksmithing is the final division of the Commerce and Industry category. A total of eight blacksmithing tools are identified in the project area.

##### BOLT HEADER

A bolt header is the die used to shape bolts. Cast iron bolt headers wear out after approximately 500 applications (Richardson 1978:219).

One bolt header (FS 469) was found in the project area. The dimensions of the bolt header are L 14.0", W 1.0", and ID 0.25".

## SWAGE

Swages come in a variety of shapes and sizes and are used to shape hot iron. Swages come in matched sets: top and bottom. Swages are used by blacksmiths to form a piece of steel to a specific standard size. A swage forms the metal into a specific shape such as making a rectangular rod into a round rod. There are top and bottom swages. The bottom swage has a groove or other shape cut into it and its handle fits into the hardie hole in the anvil. The top swage has a similar shape with a handle positioned like a hammer. The top swage is held on top of the work piece and hit with a hammer. A second person may be required to hold the top swage in place (personal communication Neal Bullington SLBE Interpretation; John Neary, Anvilfire, 11/19/99).

Four swages were found in the project area.

Swage dimensions (in inches)

FS	N	Complete?	Length	Width	Diameter
472	1	No	4.75		0.5
816	1	Yes	16	1.75	1.5
979	1	Yes		3	8.5
1667	1	Yes	12.0	3.0	5.0

## BOTTOM ROUND SWAGE

Bottom half of a swage for shaping round iron.

One bottom round swage (FS 1405) was found in the project area. The dimensions are L 2.5", W 2.0", H 3.25" and D 1.5".

## FIRE IRONS

Fire irons are implements such as tongs and pokers used to tend a fire. In this case, fire iron refer to a poker; a metal rod to stir a fire.

One fire iron (FS 806) was identified, and its dimensions of the iron are L 42.0" and D 0.75".

## PUNCH

A punch is a tool for piercing or stamping. A punch is also a tool that forces a pin, bolt, or rivet, in or out of a hole.

One punch (FS 817) with dimensions of L 9.25 and D 1.25", was found in the project area.

## 8. UNKNOWN/UNCLASSIFIED

Unknown/unclassified is the final major category of the classification. Artifacts in this category have either an unidentified function or a multiple function. The following divisions are within the unknown/unclassified category: glass fragments, miscellaneous metal, engine parts, paper, wood, textiles, cordage and rubber. A total of 399 Unknown/Unclassified artifacts are described.

### A. GLASS FRAGMENTS, UNIDENTIFIED TO FUNCTION

#### BOTTLE FRAGMENT

One amethyst bottle base fragment (FS 691) was identified. The round bottle is undecorated and the original contents of the bottle are not known. The dimensions of the bottle fragment are D2.0" and H 1.5".

#### VIAL

A vial is a clear glass narrow container.

One vial fragment (FS 1659) was found in the project area. The base and body fragment had no seams present. The exact function of the vial is not known. The dimensions of the vial fragment are L 4.25", ED 1.5", and ID 1.44".

### C. MISCELLANEOUS METAL

Miscellaneous metal includes the following subcategories: wire, cans, hardware, construction beams, and unidentified miscellaneous metal. A total of 225 artifacts fall under the category of miscellaneous metal.

## 2. WIRE

#### WIRE FRAGMENTS

Unidentified wire fragments. For each section of wire the length of the fragment and the diameter of the wire is recorded.

Thirty-nine wire fragments were found.

Wire dimensions (in inches)

FS	N	Length	Diameter
355	1	15	0.13
570	5	18	0.13
574	1	36	0.25
577	1	16	0.25
592	1	15.5	0.25
600	1	12	0.13
609	2	22	0.25
884	1	28	0.13

FS	N	Length	Diameter
939	1	14	0.13
952	1	4	0.13
1091	1	10	0.5
1450	2	9.5	0.13
1470	1	11.0	0.13
1475	1	7.5	0.25
1427	1	23.0	
1480	1	15.0	0.13
1541	1		0.13
1547	1	10.0	0.25
1549	2	17.0	
1555	1	6.5	0.13
1557	1	22.0	0.25
1566	1	57.0	0.06
1570	1	16.0	0.06
1575	1	36.0	0.06
1582	1	67.0	0.25
1597	1	30.0	0.06
1615	2	22.0	0.25
1641	1	7.75	0.06
1728	1	8.5	0.25
1729	1	4.0	0.25
1749	1	12.0	0.25

## 2. CAN

### CANS AND TIN CAN FRAGMENTS.

Six cans whose functions could not be determined were found in the project area. The cans were three piece cylindrical cans. Four were complete and only missing one end, and two individual can ends were found.

#### Can dimensions (in inches)

FS	N	Identification	Complete?	L	W	ED	ID	D	H
415	1	can	No					3.25	3.5
339	1	can end	Yes					4	
612	1	can	No	3				3	
1235	1	can	No					2.5	0.25
1267	1	can	No			6.0	5.88		7.0
1442	1	can end	No					11.0	

## 3. HARDWARE

Hardware is a category for functionally unknown hardware items or for hardware with multiple functions. A total of 180 hardware artifacts are identified.



## BATTERY ROD

A battery rod is the graphite core of a battery.

Six battery rod fragments were found in the project area.

Battery rod dimensions (in inches)

FS	N	Length	Diameter
420	1	1	0.5
329	3	0.25	0.5
534	1	0.75	0.75
536	1	1.25	0.75

## CASTER

A caster is a small wheel on a swivel that attaches to the underside of a heavy or light object to facilitate easy movement of the object. Casters are manufactured in a variety of styles and sizes. Casters can be mounted on hollow or solid legs, may rotate or lock in place, and can be made of rubber, plastic or metal. Typical styles include the stem caster, the plate caster, ball-bearing caster and ball-type caster (Ettliger 1998:224).

A total of five casters were found in the project area. Four were complete stem casters and one was the wheel only.

Caster dimensions (in inches)

FS	N	Identification	Complete?	L	W	D	H
115	1	caster and mount	Yes	10	205	3	0.5
121	1	caster	Yes	10	2.5	3	0.5
132	1	caster	Yes	4.25	1	4.25	4
156	1	caster wheel	No		1	4.25	
1210	1	caster	No	7.25	2.5	3.5	

## CROWN GEAR

A crown gear is a term to describe a small artifact with five gear teeth on the top and a rounded bottom with a square center hole. The function of a crown gear is not known.

One crown gear (FS 1041) was found. The dimensions of the gear are L 2.5", W 2.0", and ID 0.5".

## GASKET

A gasket is a soft material that fits between two hard items in order to make a seal. Gaskets may be made of rubber, plastic, or strong paper and are shaped for each particular use (Ettliger 1998:543). Gaskets are used to seal joints in a variety of situations such as pipe fittings, valves etc.

Two rubber gaskets were found in the project area.

Gasket dimensions (in inches)

FS	N	Identification	External Diameter	Internal Diameter	Height
583	1	gasket	1.25	0.5	0.5
302	1	gasket and shaft	3.13	0.25	0.5

## SHAFT

A shaft is a long cylindrical iron rod. A drive shaft rotates and transmits power from an engine to a point of application.

Thirty-two shafts were identified. One shaft is articulated with a sheave, another shaft is articulated with a pinion gear. These are described above.

Thirty shafts are unidentified to specific function. One shaft is through a roller bearing and another shaft has a cotter pin through one end. Finally, one shaft is in association with a split ring pipe hanger.

Shaft dimension (in inches)

FS	N	Identification	Complete?	Length	Diameter
195	1	shaft	Yes	37.5	3
291	1	shaft	No	1.5	2.0
309	1	shaft	No	4.13	0.5
395	1	shaft	Yes	72	3
458	1	shaft	Yes	6.19	2.25
460	1	shaft	No	4	1.25
473	1	shaft	No	9	0.75
557	1	shaft	Yes	20	1
677	1	shaft	Yes	36	1
726	1	shaft	No	9.63	0.75
765	1	shaft with cotter pin	Yes	4.5	0.5
800	1	shaft	Yes	41.5	1
802	1	shaft	Yes	4	1
803	1	shaft	Yes	3.5	1
822	1	shaft	Yes	15	1.5
900	1	shaft	Yes	32	1.75
910	1	shaft	Yes	19	3.5
914	1	shaft	Yes	7.5	1
916	1	shaft	Yes	18	3.5
1015	1	shaft	Yes	43.5	2
1040	1	shaft	No	4.13	0.13
1075	1	shaft	No	2.88	2.0
1148	1	shaft	No	7	2.25
1164	1	shaft	Yes	11.0	0.75
1232	1	shaft	Yes	20.0	1.75
1233	1	shaft	No	15.0	0.5
1295	1	shaft	Yes	34.25	0.25
1434	1	shaft	No	5.0	2.0
1553	1	shaft	Yes	41.5	2.5

FS	N	Identification	Complete?	Length	Diameter
1684	1	shaft	Yes	220.0	0.75

#### SHAFT WITH KEY-LOCK

Shaft with key-lock is a term to describe a short shaft with a key lock groove and with one end cut. The intact end is narrower than the cut end. The exact function of this shaft is not known.

Only one example of a shaft with key-lock (FS 955) was found in the project area. The dimensions are L 18.0" and D 3.5".

#### IRON BLOCK

An iron block consists of three components, the sheave, the sheave frame, and the mounting ring. A sheave is a pulley with a grooved face. If the sheave frames come down half-way over the sheave, or partially covers the sheave, the frame is called a "Skidder block" (Patterson 1919: 310). If only the frame is found, the item is called a sheave frame.

One iron block (FS 1624) was found. The dimensions of the iron block are L 16.0", W 7.0", and H 9.5".

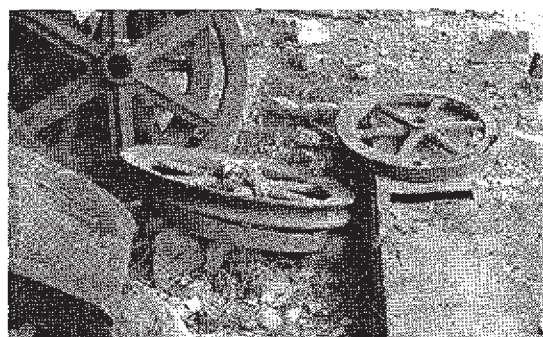
#### SHEAVE

A sheave is a pulley with a groove in the face. The groove acts as a guide for rope or cable.

Eighteen individual sheaves of various sizes were found. Two sheaves have information stamped onto the body of the artifact. One (FS 1332) stamp reads "VULCAN/TA[...]BLOCK" and another (FS 1324) stamp reads "RANKIN TOOL WKS/SEAT".

#### Sheave dimensions (in inches)

FS	N	Width	External Diameter	Internal Diameter
224	2	3	40.75	2.5
225	1	3	43.5	4
226	1	3.75	36	
229	1	3	44	4
249	1	3	52	2
1231	2	2.5	10.0	1.0
1622	1	1.75	18.0	2.5
1640	9	3.75	9.5	1.25



*Sheave in unit 7*

#### SHEAVE FRAME

Eight sheave frames were identified in the project area.

Sheave dimensions (in inches)

FS	N	Complete?	Length	Width	ED	ID	Diameter	Height
1217	1	Yes	27.0	13.0				
1320	1	No		1.25			15.0	19.5
1324	1	Yes		1.5	13.0			17.0
1332	1	Yes		1.0			13.5	24.0
1339	1	No	15.5	1.5	11.0			
1632	1	Yes		19.5				18.0
1634	1	Yes		19.0	17.5	16.25		
1739	1	No					14.0	19.0

#### SINGLE GIN BLOCK

A single gin block for wire rope (Patterson 1919: 310).

Two incomplete single gin blocks were found in the project area, both missing the mounting hook.

Single gin block dimensions (in inches)

FS	N	Length	Width	Diameter	Height
1187	1	9.0	3.5	10.0	0.5
1200	1	9	3.5	10.0	0.5

#### SPLIT RING PIPE HANGER WITH INSERT

An unidentified split ring pipe hanger with a unique insert. The insert has two semicircular openings that are separated opposite of each other like a split circle. The top of the split ring hanger has an oil reservoir.

Eleven split ring pipe hangers with inserts were identified. Two inserts (FS 380, FS 944) were found separately.

## Split ring pipe hanger with insert dimensions (in inches)

FS	N	Identification	Complete?	L	W	E	ID	D	H
380	1	insert	Yes					7.5	3.5
636	1	split ring pipe hanger with insert	Yes	14	13		8		
643	1	split ring pipe hanger with insert	Yes	15	13		7.5		
713	1	split ring pipe hanger with insert	No	16	12			7.5	2
714	1	split ring pipe hanger with insert	Yes	16	12			7.5	
715	1	split ring pipe hanger with insert	Yes	16	12			7.5	
716	1	split ring pipe hanger with insert	No	16	12			7	
718	1	split ring pipe hanger with insert	No	12.5	13			7.25	
944	1	insert	Yes		3.5	7.5			
976	1	split ring pipe hanger with insert	Yes		4.5	7.7			16
978	1	split ring pipe hanger with insert	Yes		4.5	7.7			16
982	1	split ring pipe hanger with insert	Yes		4.5	7.7			16
1028	1	split ring pipe hanger with insert	Yes	16	12.5			7.5	

## STEEL ASSEMBLY

Steel assembly is a generic descriptive term to describe two Z shaped iron beams connected by a mending plate and two bolts.

One steel assembly (FS 1647) was found the project area. The dimensions of the assembly are L 42.0" and H 35.0".

## THREADED SHAFT

A threaded shaft is a solid rod threaded at both ends.

Seventeen threaded shafts were identified in the project area.

## Threaded shaft dimensions (in inches)

FS	N	Identification	Complete?	Length	Diameter
146	1	Threaded shaft	Indeterminate	30.25	1.25
155	1	Threaded shaft	Yes	18	2.5
232	2	Threaded shaft and nut	Yes	1.25	0.75
323	1	Threaded shaft	Yes	19	1.25
407	1	Threaded shaft	Yes	17	1.0
727	1	Threaded shaft	Yes	5.5	1
728	1	Threaded shaft	No	9.38	1.5
811	1	Threaded shaft	Yes	102	1.5
967	1	Threaded shaft	Yes	31.5	1.5
971	1	Threaded shaft	Indeterminate	9.25	1.0
1222	1	Threaded shaft	Yes	11.0	2.0
1342	1	Threaded shaft	Yes	63.0	1.2
1371	1	Threaded shaft	Indeterminate		1.0
1376	3	Threaded shaft	Yes	49.0	2.5

## THREADED SHAFT WITH SLOT

A solid shaft with threaded ends. One set of threads has wide spacing and the other end has more tightly spaced threading. In the center of the shaft is a hollow slot.

Five complete threaded shafts with slots were identified.

Threaded shaft with Slot dimensions (in inches)

FS	N	Length	Diameter
1738	1	74.0	2.5
923	1	116	4
924	1	116	4
688	1	105	4
687	1	105	4

## THREADED SHAFT AND BASE

One end of a threaded shaft is screwed into a base. The base is pyramid shaped and the threaded shaft inserts into apex of base.

In the project area two threaded shaft and bases were identified. The dimensions of one (FS 1375) is, for the shaft L 47.0" and D 2.5", and of the base are W 47.0" and H 19.0". The second threaded shaft and base (FS 129) is missing the shaft so the dimensions of the base are L 8.0", W 8.0", and ID 1.25". FS 129 is stamped "1 1/2 & 1 1/4".

## FLANGED CYLINDER

A section of wide pipe with one end having a blind flange. The other end of the pipe is open but two metal bars crisscrossing the pipe. The bars form an X over the pipe end. The function of this pipe is not known.

Two complete flanged cylinders were found in the project area.

Flanged cylinder dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
30	1	19	14.5	13.75
31	1	17	12.25	10

## UNIDENTIFIED 52

Unidentified 52 is a U shaped pipe (with 90-degree elbow fitting) with a round disk near the open end over both pipes. The flat round metal disk is perforated with 12 holes. In addition, a mending plate, midway on the pipe assemblage, crosses both pipes. This item is reminiscent of steam radiator assemblies seen throughout the mill building.

Only one example of unidentified 52 (FS 1362) was found in the project area. The dimensions of the assemblage are L 61.0" and ED 19.0".



## UNIDENTIFIED 53

The function of unidentified 53 is unknown. The artifact is a wide diameter pipe with closed ends. One end is closed with a flat piece of metal welded onto pipe. Other end is closed with a blind flange. Narrow diameter pipe extends from each end of artifact. Pipe ends are externally threaded. This artifact type is possibly a homemade pressure tank, or perhaps a filter.

Two examples of unidentified 53 were found in the project area.

Unidentified 53 dimensions (in inches)

FS	N			Length	ED	Diameter
1333	1	8	d	53.0	15.75	9.0
1735	1	8	d	45.0	15.0	9.0

## UNIDENTIFIED 76

Unidentified 76 is a potbellied shaped pipe with flanged ends. It is possibly a specialized pipe fitting.

In the project area only one unidentified 76 (FS 1730) was found and the dimensions are L 24.0", ED 9.0", and ID 3.75".

## UNIDENTIFIED 8

Unidentified 8 is circular rod with an eye at one end. The opposite end has a 90-degree bend, is flattened to a rectangular shape and contains three bolt holes. A bolt is inserted through the eye. The function of this artifact is not known.

One unidentified 8 (FS 13) was found in the project area, with dimensions of L 141.0", W 2.0", and D 0.13".

## UNIDENTIFIED 9

Unidentified 9 consists of four square stacked sheets of iron. The sheets are pinned with bolts on each of the four corners. The sheets are stacked slightly spaced apart on the bolts and therefore the metal sheets do not articulate.

One unidentified 9 (FS 173) was found in the project area. The dimensions of the artifact are L 17.0", W 17.0", and H 7.25".

## UNIDENTIFIED 19

Unidentified 19 is a short hollow metal tube with a pin inserted through it at one end. The function of this artifact is not known.

One unidentified 19 (FS 459) was found in the project area. Its dimensions are L 2.0", ED 1.20" and ID 1.0".

## UNIDENTIFIED 26

This artifact is possibly a washer or a shim. The object is a flat disc with a central bore hole. The area around the center opening is beveled. The opening is plain, not threaded.

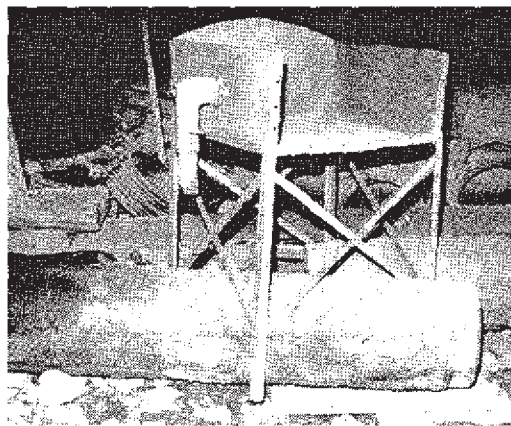
Only one example of unidentified 26 (FS 705) was found. The dimensions of the artifact are W 1.5", ED 13.0", and ID 5.0".

## UNIDENTIFIED 27

The object is a metal stand with a rectangular metal sink. One side of sink is open or missing. There is a pipe entry hole on one side of the basin. The four legs are given additional support by a cross frame on each side.

Unidentified 27 is a possible sink.

One unidentified 27 (FS 391) was identified in the project area, with the dimensions of L 32.0", H 50.0", and W 28.5".



*Unidentified 27 in unit 20*

## UNIDENTIFIED 30

A flat square metal plate with two J shaped brackets on one side. There is a bore hole in each of the four corners of the metal plate. The function of this artifact is not known.

One unidentified 30 (FS 1038) was found in the project area. The dimensions of the artifact are L 18.25" and W 10.0".

## UNIDENTIFIED 43

Unidentified 43 is probably a wide L shaped bracket. The flat metal L shaped artifact has three evenly spaced rows of perforations on both sides of metal.

One wide L shaped bracket (FS 1135) was found the dimensions of L 16.0", W 9.5", and H 10.0.

#### UNIDENTIFIED 44

This artifact is an Y shaped rod. At the top of each arm of the Y is an eye. Therefore, there are two parallel eyes on a single stem.

One example of unidentified 44 (FS 1201) was found with the dimensions of L 14.0", W 7.0", H 2.0", ED 4.7", and ID 2.5.

#### UNIDENTIFIED 48

Unidentified 48 consists of four rectangular metal plates forming a wedge shaped bracket. Two bolts extend through entire body of wedge.

One unidentified 48 (FS 1284) was found with dimensions of L 10.25", W 2.0", and H 3.0".

#### UNIDENTIFIED 56

Unidentified 56 is a tall, L shaped item. One stem of the L is a metal rod with two circular sockets at one end. The other stem of the L consists of two items a pipe and a worm each inserted into their respective socket. A U shaped bracket secures the pipe and worm together.

One unidentified 56 (FS 1319) was found in the project area. Its dimensions are L 56.0", ED 3.1", and ID 2.5".

#### UNIDENTIFIED 68

A thin metal alloy washer or shim. The face of the artifact has three concentric ridges. The exact function of this artifact is not known.

One unidentified 68 (FS 1568) was found in the project area. The dimensions of the fastener are ED 2.5" and ID 5.0".

#### UNIDENTIFIED 69

Two right angle triangles connected at their stems forming a right, L shaped angle. At the top and bottom of two triangles is a square metal plate connected at a right angle. This item is probably some sort of mount or bracket. The exact function is not known. The bracket is stamped: "289F".

Two unidentified 69 artifacts were found in the project area

Unidentified 69 dimensions (in inches)

FS	N	Length	Width	Height
1633	1	6.0	6.0	12.0
1656	1		2.0	12.0

## K-1 DETACHABLE CHAIN

This style of detachable chain attachment is described in an industrial catalog as K-1 (Patterson 1919: 398).

Two K-1 detachable chain pieces were found together (FS 1703) the project area. The dimensions of the chain are W 5.25", ID 0.25", and H 3.0".

## UNIDENTIFIED 140

Unidentified 140 is a U shaped bracket with a J shaped bracket extending from each end of the U shaped bracket. The function of this artifact is not known.

One unidentified 140 (FS 117) with dimensions of L 10.0" and W 3.13" was found.

## UNIDENTIFIED 143

An unidentified component of a valve or an unusual pipe fitting. The piece is a domed flange. Protruding at a 45-degree angle from the top of dome are two pipe extensions. The artifact is stamped "CRANE". The function of the artifact is not known.

One unidentified 143 (FS 522) was found in the project area. Its dimensions are ED 11.0", ID 6.0", and H 14.0".

## UNIDENTIFIED 144

A round, flat iron plate with a small diameter perforation in the center. This artifact could be an industrial shim or washer, but its exact function is not known.

One unidentified 144 (FS 526) was found, with dimensions of ED 8.7", ID 0.5", and W 0.25".

## UNIDENTIFIED 149

A term to describe a conical hat shaped piece of cast iron with a bore hole in the center. Reminiscent of a gate valve bonnet.

Two examples of unidentified 149 were found together (FS 1313). The dimensions are ED 3.0", ID 1.0", and H 1.25".

## 4. METAL BEAMS

## I BEAM

Iron beam with an I shaped cross section. I-beams are utilized in building construction, overhead conveyor systems, and trolleys (McMaster-Carr 1998:761). At Kennecott, I beams are present *in situ* as part of hoist systems and also for machinery bases and supports.

Ten I beams were found in the project area.

## I beam dimensions (in inches)

FS	N	Identification	Complete?	Length	Width	Height
23	1	I beam	No	120	5	12
34	1	I beam	No	33.25	12	5
35	1	I beam	No	47	10	
99	1	I beam and brace	Indeterminate	58	6	
161	1	I beam	Yes	25	10	5
162	1	I beam	Yes	47	10	5
164	1	I beam	No	12	8	4
165	1	I beam	Yes	129	9	4
166	1	I beam	Yes	47.25	7	4
1392	1	I beam	Yes	146.0	10.	

## L BEAMS

L beams are heavy iron beams with an L shaped cross section.

Three complete L-beams were found in the project area.

## L beam dimensions (in inches)

FS	N	Length	Width	Height
16	1	60	7	3.5
594	1	17	3	
1590	1	2.0	1.5	

## U BEAM

A U beam is a heavy iron beam that is U-shaped in cross section.

A total of nine U beams were found. Two U beams (FS 11, FS 25) have the same stamped information, "Illinois - 5-USA".

## U beam dimensions (in inches)

FS	Complete?	Length	Width	Height
11	No	180	8	2
15	Yes	96	10	2.75
25	Indeterminate	180	8	2
168	Yes	18	10	2.75
396	Yes	44.5	3	3.5
830	Yes	114	15	3.5
866	Yes	42	15	3.5
1288	Yes	16.0	12.0	3.0
1710	Yes	19.0	9.0	1.0

## UNIDENTIFIED 51

Unidentified 51 is a U beam with three square metal support braces. It was possibly used to support equipment.

Two unidentified 51 (FS 1378) were found at the same location in the project area. Their dimensions are L 123.5", W 8.0 and H 10.0".

## 5. GENERIC UNIDENTIFIED MISCELLANEOUS METAL

## UNIDENTIFIED 1

Unidentified 1 is a long piece of thin U shaped metal. The function of this artifact may possibly be a molding of some kind.

One unidentified 1 was found in the project area. The dimensions of the artifact are L 5.75" and W 0.38".

## UNIDENTIFIED 5

Unidentified 5 is a flat square piece of sheet metal with a square hole in center. Flat rectangular tab extends from each corner. Each tab has two bolt holes. The function of this object is not known.

One artifact designated as unidentified 5 (FS 925) was found, having dimensions of are L 14.0, W 14.0", and H 3.5".

## UNIDENTIFIED 14

Unidentified 14 is a semicircular/horseshoe shaped metal stock. The ends of the piece turn 90 degrees, forming short tabs. There are no bore holes present. The function of this artifact is not known.

A single unidentified 14 (FS 209) was found in the project area. The dimensions of the object are L 14.0" and W 6.0".

## UNIDENTIFIED 15

A solid, heavy cast iron object consisting of a square bottom on a round shaft. No holes, threading, or articulating surface are present.

Two unidentified 15 artifacts were found in the project area.

*Unidentified 15 dimensions (in inches)*

FS	N	Width	Diameter	Height
233	1	4.75	3	18
234	1	4	3	12

## UNIDENTIFIED 18

Unidentified 18 is a solid iron cylinder with a flanged end. One end is concave and flanged end is flat. The function of the artifact is not known.

Two unidentified 18 were found in the project area.

*Unidentified 18 dimensions (in inches)*

FS	N	Length	Diameter
443	1	1.5	1.75
477	1	3	1.5



## UNIDENTIFIED 21

Unidentified 21 is a short brass rod. One end is flat with a dimple and the other end has a curved tang.

One example of unidentified 21 (FS 423) was found in the project area. Its dimensions are L 4.0" and D 0.5".

## UNIDENTIFIED 46

This item is a cast iron cylindrical piece with a bore hole down the middle of the cylinder. The exact function of this piece is not known.

Two unidentified 46 were found.

Unidentified 46 dimensions (in inches)

FS	N	Length	ED	ID
1167	1	30	4.25	1.0
1170	1	5.5	4.25	1.75

## UNIDENTIFIED 49

Unidentified 49 is a hollow, U shaped, covering or casing. The function of the artifact is not known.

One unidentified 49 (FS 1292) was found, with dimensions of L 6.25", W 2.0", and H 4.2.5".

## UNIDENTIFIED 50

Flat square rectangular iron plate with a flat square end. Two bolt holes are present in the square end. The function of this piece is unknown.

One unidentified 50 (FS 1380) was found in the project area. The dimensions of the object are L 60.0" and W 4.0".

## UNIDENTIFIED 59

This artifact is a large U shape metal plate and is possibly part of chassis. Three bore holes on each short end and two large perforations along the long axis of the plate.

One unidentified 59 (FS 1334) was found. Its dimensions are L 33.0", and W 29.5".

## UNIDENTIFIED 63

This artifact is a flat heavy duty square iron plate. A bore hole is present on two corners of the plate. Opposite the bore hole side is a pyramid shaped indentation. The function of this item is not known.

One example of unidentified 63 (FS measuring L 7.25", W 0.75", and H 2.75", was found in Area A of the Machine Shop.

## UNIDENTIFIED 64

This rectangular piece of iron stock has a rectangular cross section. The piece tapers from one end to the other. A bore hole is present at each end and a larger oval perforation is in the center. The function of this artifact is not known.

One unidentified 64 (FS 1446) was found. The dimensions of this artifact are L 11.5", W 1.75", and H 2.0".

## UNIDENTIFIED 71

This artifact is not complete and consists of a J shaped piece of round iron stock with a square tab. The function of the artifact is not known.

One unidentified 71 (FS 1657) was found. The dimensions of the artifact are W 7.5" and H 7.0". The artifact is stamped: "[...]TOWER".

## UNIDENTIFIED 74

Unidentified 74 is a flat piece of oval metal alloy with a rectangular strap at each end. On the oval metal contains a series of perforations patterned with eight columns of four holes. The function of this artifact is not known.

One unidentified 74 (FS 1715) was found. The dimensions of the artifact are L 15.0", W 6.0", and H 0.75".

## UNIDENTIFIED 147

This artifact is a multi-component metal table or sink. Four I shaped legs support a flat rectangular platform. The center of the platform has a drain and a drainage pipe extends from the bottom. The flat portion of the sink has a rim and bolt holes and therefore another component of the sink completes the artifact.

Only one large example of unidentified 147 (FS 1107) was found in the project area. Its dimensions are L 34.0", W 20.0", and H 28.0".

**D. UNIDENTIFIED MACHINE/ENGINE PARTS**

This category describes machine parts that are not identified to a specific function. The artifacts are usually versatile and could function in a variety of settings. A total of 148 unidentified machine and engine parts are described.

## BRAKE

A brake for a large piece of machinery composed of a wood wheel of wood assembly with several brake shoes on the periphery.

Four brakes were found in project area. Two of the brakes (FS 1692) were found together at the same location. One brake (FS 97) is

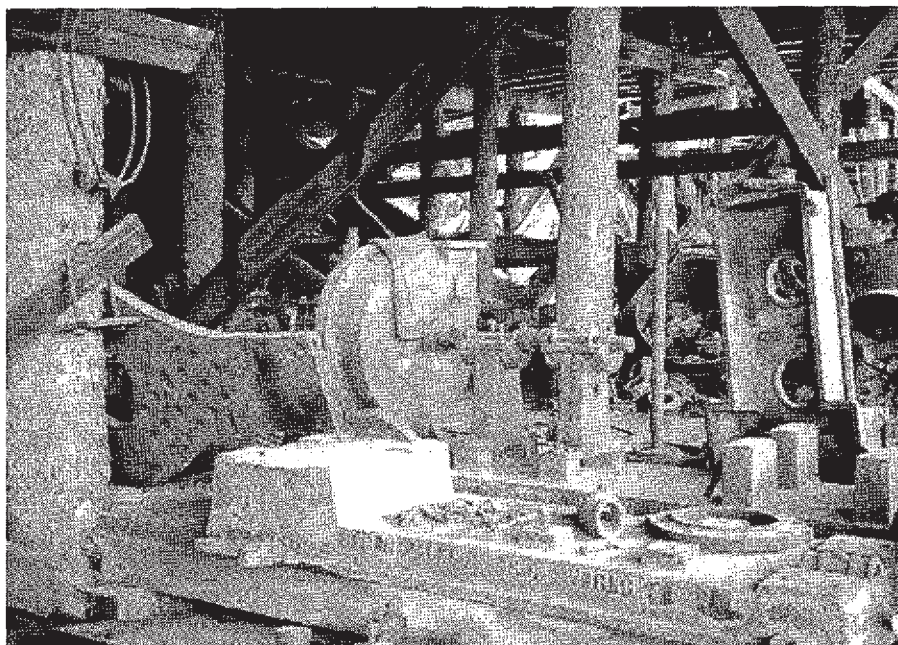
stamped" S45/HILL[...]SON/HOV[...]". Another (FS 98) is stamped:"945[...]6".

Brake dimensions (in inches)

FS	N	Complete?	Length	Width	ED	ID	Diameter
97	1	No		1.5	26	3	
98	1	No	5				5
1692	2	Yes	40.0	3.5			

#### BYRON CHASSIS

A rectangular equipment platform that supports machinery, such as water pumps. Bryon is a common name embossed on these heavy cast iron pieces.



Two Byron chassis were found in the project area, one of which had a Pelton water pump in place on top of the platform. The dimensions of one of the Byron Chassis (FS 873) are L 64.0", W 22.0" and H 5.0". The dimensions of the Byron Chassis (FS 966) found with the Pelton wheel pump are L 66.0", W22.0", and H 5.0".

#### KC1182 CHASSIS

This chassis is a T shaped platform that supports machinery. The chassis has a raised platform at the cross section ends and has four raised platforms in the stem of platform. This chassis is smaller than the Byron chassis. Embossed on the body is "KC 1182", hence the name of artifact.

Only one example (FS 974) of this type of chassis was found in the project area and it has a Pelton water pump *in situ* on top of platform. The dimensions of the chassis are L 36.0", W 14.5", and H 5.0". The

chassis is stamped with the manufacturer's name "MORRIS MACHINE WORKS/BALDWINVILLE/N.Y."

#### CHASSIS 1

Chassis 1 is a term to describe a rectangular machine/equipment platform. The chassis is constructed of two I-beams running parallel to each other, and covered with two flat pieces of thick metal. This piece is locally made since hand welded seams are evident and there are no embossing or maker-marks present.

One (FS 856) complete chassis 1 was found in the project area. The dimensions are L 55.0", W 18.0", and 6.0'.

#### CHASSIS 2

Chassis 2 is a term to describe a rectangular flat heavy machinery platform with 24 bore holes evenly spaced around the perimeter. Four iron I shape footings support the chassis, with one foot positioned in each corner.

Only one complete example (FS 1316) of this type of chassis was identified in the project area. The dimensions are L 53.0", W 29.5", and H 13.0". Ten chassis 2 artifacts are present, but missing their legs.

Chassis 2 without legs dimensions (in inches)

FS#	N	Length	Width	Height
1457	1	2.75		
1560	1	2.0	13.5	
1563	1	32.5	17.5	
1572	1	34.25	13.0	2.5
1573	1	53.0	26.0	2.5
1574	1	34.0	27.0	1.0
1574	1	21.0	13.0	2.75
1599	1	13.0	21.0	2.25
1606	1	29.5	24.0	2.0
1607	1	29.5	24.0	2.0

#### CHASSIS 3

Chassis 3 is a term to describe a rectangular equipment platform frame of heavy metal stock. Six tabs with bore holes are evenly spaced around the perimeter of the platform and function to secure the platform. The bottom side of the platform flares out. Unlike the other equipment platforms this is not a solid rectangular piece, instead it is a platform frame.

A single chassis 3 (FS 1571) frame was identified. Its dimensions are L 36.0", W 29.0", and H 3.0".

## WATER PUMP CHASSIS

A large, heavy, rectangular metal platform where a water pump is bolted.

One water pump chassis (FS 614) was identified. The chassis measures L 72.0", W 33.5", and H 5.0". The place of manufacture is stamped on the chassis: "JEANSVILLE".

## CAPSTAN

A capstan is a vertical spool shaped revolving cylinder for hoisting weights by winding in a cable.

Five capstans were identified in Area A of the Machine Shop. All of them found together (FS 1649) and have the following dimensions, L 13.5", ED 13.0", and ID 3.5".

## CHAIN GUARD

A chain guard is a tear-drop shaped container that encloses a chain system. The guard protects the chain or belt mechanism from flying off and also protects the system from foreign objects and human interference (McMcaster-Carr 199 : 698). The guards are locally made at Kennecott from pieces of flat metal scrap and are hand welded.

Three chain guards were found in the project area.

Chain guard dimensions (in inches)

FS	N	Complete?	Length	Width	Height
32	1	Yes	57.5	26	7.75
1546	1	No	46.0	19.0	5.0
1558	1	No	47.0	19.0	5.0

## COMPRESSION SPRING

A compression spring is a heavy-duty industrial spring. Compression springs are present *in situ* on multiple pieces of machinery, including the James Simplex Vibrators and ore crushers.

Six compression springs were identified, all of them complete.

Compression spring dimensions (in inches)

FS	N	Length	Width	Diameter
119	1	12	4.0	0.75
593	1	9.5	0.75	3.75
214	1	2	0.5	1
286	1	0.75	0.13	2
102	1	7.5	3.25	
335	1	9		1.25



## CRANK

A crank is "A device for transmitting rotary motion having of a handle or arm attached to a shaft at right angles." (Webster 1988: 324)

Two cranks were found and their dimensions are L 9.0", W 4.0", and H 3.0" (FS 157), and L 32.5", and D 2.25" (FS 521). One (FS 157) is stamped: "V1834".

## DRIVE CHAIN

Drive chain is a type of chain that provides flexible and efficient drive for the transmission of power on all kinds of machinery and motors.

One fragment of a drive chain (FS 799) was found in the project area. The dimensions of the chain are L 15.0", W 1.0", and H 1.0".

## DRUM

A drum is a wide cast iron wheel or roller with flanged ends. This artifact possibly functions as a spool or drum.

Four complete drums were identified.

Drum dimensions (in inches)

FS	N	Length	Height	External Diameter	Internal Diameter
711	1	32	9.5		
872	1	24	25	3	19
1199	1	16.0	16.0	4.0	
1359	1	30.0			25.5

## ELEVATOR BUCKET

An elevator bucket is a trapezoid shaped bucket with a rectangular opening that tapers toward the bottom of the bucket. Elevators are manufactured in various sizes from 2-½ inch x 2-½ inch to 30 x 8 inches (Industrial Equipment News 1938: 53).

Four complete elevator buckets were identified in the project area.

Elevator bucket dimensions (in inches)

FS	N	Length	Width	Height
70	1	11	7	5
627	1		4	7.5
646	1	5	4.25	7.75
652	1	5	4.25	7.75

## ENGINE 1

Engine 1 is a term to describe an unidentified engine part. The engine part is a cylindrical piece with rectangular box inside, and a smaller cylindrical tube attached. The smaller cylindrical tube has a side opening and rod is visible. The artifacts may be part of steam engine, which was used to heat up fuel (J. Miller, maintenance crew, Kennecott

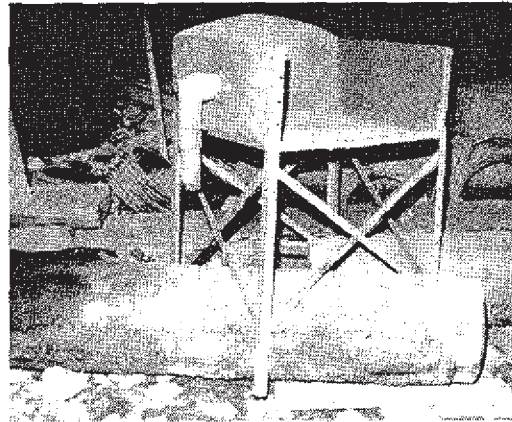


NPS, personal communication 1999). An example of engine 1 is present *in situ* is in the Power Plant at Kennecott.

Two examples of engine 1 were found in the project area.

Engine 1 dimensions (in inches)

FS	N	Complete?	Length	Width	External Diameter
861	1	Indeterminate	55		12
1732	1	Yes	41.0	12.0	



Engine 1 and engine 2 in unit 28.

#### ENGINE 2

Engine 2 is a term to describe an unidentified engine component. The engine part is a cylindrical casing with a rod that extends out from one side.

Two complete examples of engine 2 were found in the project area.

Engine 2 dimensions (in inches)

FS	N	Length	Width	Height
678	1	12	8.5	14
681	1	12	8.5	14

#### ENGINE 3

Engine 3 is a term to describe an unidentified engine component. The part consists of a cylindrical casing with one rectangular side. A rod connects to flat side of cylinder. The engine is stamped with the manufacturer's name "AMERICAN HOIST AND DERRICK CO/ST PAUL MINN". Engine 3 is probably a component of a hoisting engine.

Three examples of engine 3 were found in the project area. Two were found together (FS 1734).

Engine 3 dimensions (in inches)

FS	N	Length	Width	Diameter
1734	2	32.0		11.0
1740	1	32.0	2.0	11.0

## ENGINE PART 1

An unidentified engine part consisting of a rectangular iron arm with two circular sockets at each end. The sockets are key lock and have two screws to secure the item into the socket.

Three examples of engine part 1 were found in the project area. Two were found together (FS 1221).

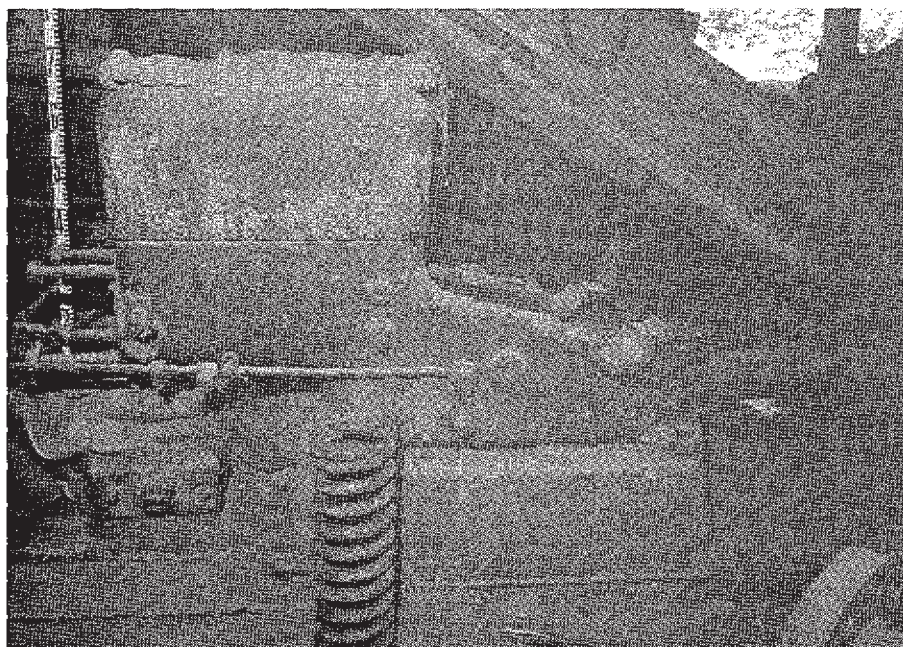
Engine part 1 dimensions (in inches)

FS	N	Length	Width	External Diameter	Internal Diameter
1013	1	13	2	2.75	1.5
1221	2	17.25	3.0	7.0	4.0

## FAIRBANKS MORSE ENGINE CASING

The body casing of a Fairbanks Morse steam engine. The engine is not complete; it is missing many components.

In the project area one Fairbanks Morse engine casing was identified with the dimensions of L 30.0", W 18.0", and H 9.0".



## ENGINE END PLATE

This term describes a large round industrial size machine end plate. The plate probably fit onto some type of engine.

One (FS 1453) engine end plate was found in the project area. Its dimensions are ED 29.0", ID 26.0", and H 19.0".

## GOULD PUMP

Gould Pumps have been manufactured for almost 150 years. Such pumps serve a variety of purposes in mining operations and in general industry.

Only one Gould pump (FS 1093) was found in the project area. The pump was incomplete and the dimensions are L 53.0", W 35.0", and H 48.0". On the pump is stamped the following product information: "GOULDS, SENECA FALLS, NY/MADE IN USA/0752".



*Gould pump in unit 13.*

## MACHINE CASING

A term to describe a trapezoid shaped metal cover with four bolt holes, one on each corner of base. The base is slightly flanged to accommodate the bolt holes. The artifact may function as a protective cover for intricate machinery.

Two complete machine casings were found in the project area.

Machine casing dimensions (in inches)

FS	N	Length	Width	Height
110	1	7.5	4	3.5
891	1	24	13	7

## MACHINE PLATE END

Machine plate end is a term to describe a flat semi-circular piece of metal that fits on the outside of a large piece of machinery.

One machine plate end (FS 1741) was found with the dimensions of D 28.0", ID 7.0" and W 2.0".

## MACHINERY LEG

Machinery leg is a term to describe an "H" shaped heavy stock leg for machinery or a platform. This piece is a solid, heavy piece weight estimated to be about 70-150 #.

Two machinery legs were found in the project area. Both (FS 1238) were found at the same location and have the same dimensions, L 18.0", H 9.75", and W 3.0".

## METAL DISK

Metal disk is a generic descriptive term used to describe a solid cast iron metal disk with a small center hole. The function is not known.

Two complete metal disks were identified in Area A of the Machine Shop.

Metal disk dimensions (in inches)

FS	N	External Diameter	Internal Diameter	Height
993	1	14.5	2.5	3.5
1265	1	7.5	5.0	1.0

## OIL CUP

Oil cups are cylindrical objects that can be glass or metal, typically bronze. Oil cups function as a gauge and reservoir for lubricating a piece of equipment. An internal tub holds a wick in many oil cup styles. Glass cups allow for visual inspection of oil level and are usually used on stationary bearings and are equipped with needle valve feed control (Patterson 1919: 1000).

Two cylindrical metal oil cups were identified in the project area. The cups were not associated with any individual piece of equipment.

Oil cup dimensions (in inches)

FS	N	Complete?	Length	Width	Diameter	Height
321	1	No	2		2	
361	1	Yes	0.75	1.75	0.75	2

## OIL LUBRICATOR

An oil lubricator is an iron trapezoid container with a stem and round handle. The handle regulates the oil lubrication. Oil lubricators are



larger than oil cups and do not have a gauge. The reservoirs are identified by M. Shields and L. Hovis as an oil reservoir for machinery.

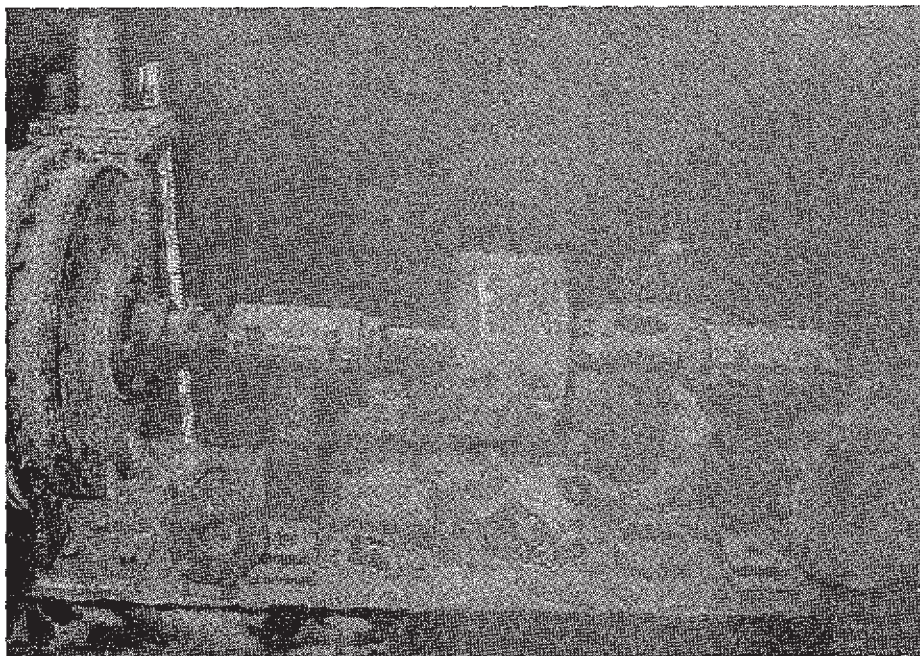
One oil lubricator was found in the project area although several are present *in situ* in the Mill building at Kennecott. The dimensions of the lubricator are L 6.5" and H 45.5".

#### PELTON WATER PUMP

A specific type of water pump or turbine designed by a man named Lester Pelton. Three Pelton water pipes were identified in the project area. One was on a byron chassis platform, one on a KC1182 platform, and one was not situated on any chassis but stood alone.

Pelton water pump dimensions (in inches)

FS	Identification	Complete?	L	W	H
966	Pelton wheel pump and byron chassis	Yes	66	22	5
974	Pelton wheel pump and KC1182 chassis	No	36	14.5	5.0
1074	Pelton wheel pump	Yes	2.44		



*Pelton wheel pump cover*

A cover is part of the Pelton wheel water pump. The pump cover is the piece that encloses the snail shaped portion of the pump.

Only one Pelton wheel water pump cover (FS 766) was found in the project area. Its dimensions are ED 20.0", ID 1.5", and H 2.0".

#### PELTON PUMP FLANGE

The blind flange end of a Pelton water pump, including the rubber washer.

One water pump flange (FS 381) from a Pelton pump was found in the project area. The dimensions are ED 12.0" and ID 2.5".

#### WATER PUMP

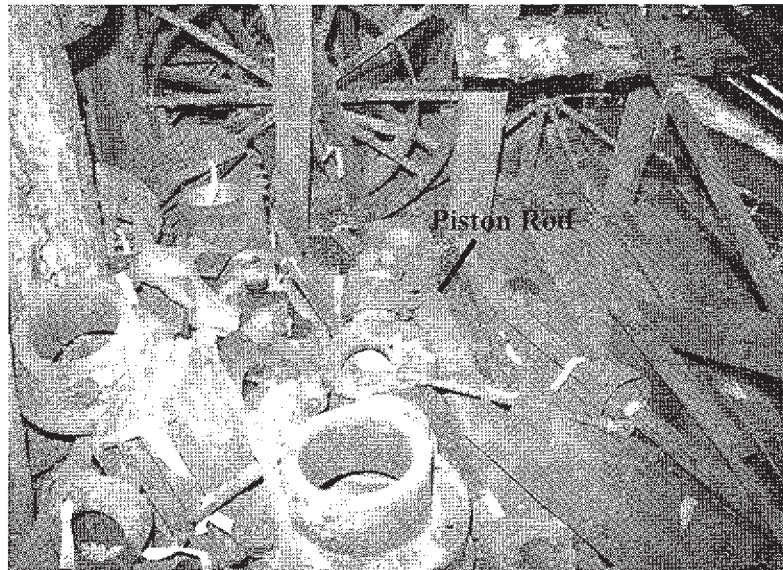
A generic unidentified centrifugal water pump.

One incomplete water pump (FS 945) was identified, with dimensions of L 72.0", W 23.0", and H 41.0".

#### WATER PUMP WASHER PLATE

Water pump end plate including the rubber gasket. The washer plate is snail shaped and is seen *in situ* on Pelton and Worthington water pumps.

Two water pump washer plates were found together (FS905) and have the dimensions of L 29.0" and W 24.0".



*Piston rod in unit 4.*

#### PISTON ROD

A piston is an engine part. Webster's Dictionary describes a piston as "A solid cylinder or disk that fits snugly into a large cylinder and moves back and forth under fluid pressure, as in a reciprocating



engine, or displaces or compresses fluids, as in pumps and compressors.” (Webster 1988:895).

A piston rod is a connection rod that is either powered by a piston or that transmits power.

Ten piston rods were identified in the project area and they vary in size. One of the piston rods is associated with an artifact described as unidentified 72. One piston rod (FS 675) is stamped with product information that reads “314 2/5”.

Piston rod dimensions (in inches)

FS	N	Identification	Length	Width	Diameter
104	1	piston rod	40.0	4.5	1.5
119	1	piston rod	16		1.5
139	1	piston rod	40		0.5
144	1	piston rod	78	8	
675	1	piston rod	37.5		1.25
1680	2	piston rod	13.0		1.25
1700	1	piston rod and unidentified 72	38.0	6.0	2.0
1701	2	piston rod	46.0	7.0	1.5

#### SCREW JACK

A screw jack is a solid rod threaded at both ends. One end has a narrower diameter than the other end, and both ends have similarly spaced threads. A small internal hole exists in the center of the cross section of both ends.

Two screw jacks were identified in the project area.

Screw jack dimensions (in inches)

FS	Length	External Diameter	Internal Diameter
385	60	1.75	0.5
402	60	2	0.25

#### SIMPLEX CONDENSATION METER

A nameplate located on the object identified this piece of equipment. This rectangular iron piece of equipment has a lid, and is not connected to any piping. A dial is present on front of the equipment but is obscured by rust and grime.

Only one simplex condensation meter (FS 1361) was found in the project area. Its dimensions are L 11.5", W 6.5", and H 16.0". The product information stamped on the meter reads “SIMPLEX CONDENSATION METER/ PATENTED JUNE 21 1905 - DEC

1, 1906/ AMERICAN DISTRICT STEAM CO./ NORTH  
TONAWANDA, N. Y. / SIZE 2/ SERIAL NO. 13062".

#### SPROCKET WHEEL

A sprocket wheel is a wheel with widely spaced rectangular teeth and solid center. A sprocket wheel functions to drag chain.

Two sprocket wheels were found, and both (FS 1577, FS 1580) have the same dimensions, ED 15.0", ID 225", and W 2.5". One of the sprocket wheels (FS 1577) is stamped: "LINK-BELT  
COMPANT/18/1/2".

#### TRAPEZOID MACHINERY SIDE PLATE

This side plate is a flat piece of heavy, metal stock in a trapezoid shape. Solid rivets run along all of the edges. This artifact is probably an end plate or side plate for a piece of machinery.

One trapezoid machinery side plate (FS 1535) was identified in the project area. Its dimensions are L 51.0" and W 24.0".

#### TRIANGULAR METAL PLATE

This term describes a triangular shaped flat metal plate with bore holes at the base corners of plate. It is probably a piece of scrap metal.

One triangular metal plate (FS 1388) was identified. Its dimensions are L 14.5" and H 5.5".

#### TUBULAR BOILER

A tubular boiler is a steam boiler with long tubes running the length of the interior of the cylinder. The body of the boiler held water and a fire was build beneath the body of the boiler. The smoke and the heat were drawn into the tubes of the boiler heating the water in the boiler (Sagstetter and Sagstetter 1998; 53).

Three complete tubular boilers were found in the project area.

Tubular boiler dimensions (in inches)

FS	N	Length	Diameter
862	1	59	11
931	1	38	24
1011	1	72	20



*Tubular boiler in back left corner of photo, unit 37.*

#### WHEEL WITH SLOTS

The term is used to describe a cast iron one piece wheel with a key lock hub. The wheel has a web center with the openings tear dropped shaped instead of circular. The face (rolling surface) of the wheel has a series of open rectangular slots. The function of this wheel is not known.

Two wheel with slots were found. One (FS 973) is a complete wheel with a shaft and measures ED 13.0", ID 1.75", and W 3.75". The second example (FS 1479) is just the hub of a wheel and measures ED 14.0", ED 1.5", and W 1.0".

#### UNIDENTIFIED 2

Unidentified 2 is a broken piece of unidentified machinery.

One example of unidentified 2 (FS 333) was found in the project area. The dimensions of the artifact are L 3.25", W 3.69", and H 1.75". The object is embossed with "SKINNE[...]".

#### UNIDENTIFIED 3

A one piece cylindrical object with one end flat closed with a blind flange and the other end curved. On the curved end are three small rectangular arms. It is possibly a filter of some kind, described by a tourist (a pump engineer) as a basket type filter.

One artifact (FS 907) designated as unidentified 3 was found, with dimensions of L 34" and D 12".

## UNIDENTIFIED 4

Unidentified 4 is a capped pipe with a nozzle at one end. From one end a small diameter pipe extends with a nozzle attachment for a rubber hose. The other end has a small diameter pipe extension. The function of this artifact might relate to welding.

One unidentified 4 (FS 926) was found in the project area. The dimensions of the object are L 33.0" and D 4.5".

## UNIDENTIFIED 7

Unidentified 7 is a multi-composite artifact that is possibly a single action jack with the base and lever present, but the pole missing.

Only one (FS 937) unidentified 7 was found. The dimensions of the artifact are L 16.0", W 5.5", and H 14.0". Embossed on the artifact is "No. 3J T".

## UNIDENTIFIED 22

Unidentified 22 is an iron three piece composite artifact including a circular housing, a set of two arms (stirring arms?) and a disk upon which the arms rest. A center bolt connects all three pieces. The function is unknown.

One unidentified 22 (FS 530) was found. The dimensions of the artifact are D 13.0" and H 2.0".

## UNIDENTIFIED 23

The function of unidentified 23 is unknown. The item is a grooved shaft with a head at one end. The head has semi-circular cross section. The face of the head has one threaded bore and one unthreaded bore.

One example of unidentified 23 (FS 589) was found in the project area. Its dimensions are L 20.0", D 2.5", ED 1.5", and ID 0.75".

## UNIDENTIFIED 25

This artifact is a tall square iron container with a top cover. The cover has a thin slot. Four corner rods support the sheet metal body. The body of the container has four sides and a bottom. There is an open space of about 8 inches between the body and the top cover. The function of this item is unknown, but was used as some sort of container.

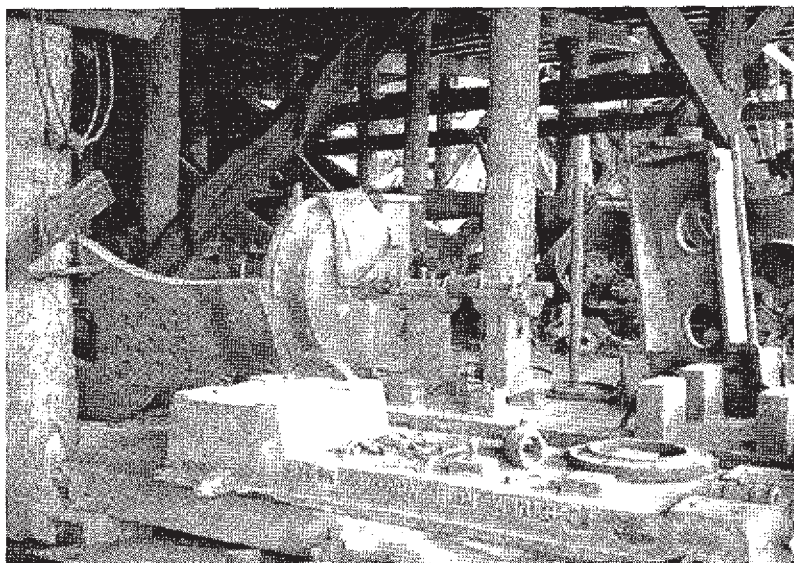
One example of unidentified 25 (FS 379) was found in the project area. Dimensions of the container are L 24.5", W 24.5" and H 54.0".

## UNIDENTIFIED 29

The function of unidentified 29 is unknown. The artifact is a very large flat metal object. The shape is round with a center hole and with a rectangular stem or handle on one side. A series of three parallel

rows of small bore holes run diagonal from handle into the round section. It is possibly a very large wrench.

One unidentified 29 (FS 962) was found, with dimensions of L 52.5", W 1.75", and ID 12.0".



*Unidentified 29, on left side of photograph leaning against post, in unit 32.*

#### UNIDENTIFIED 32

This machinery part fragment is unidentified to function. Two flat rectangular iron plates slide against each other on a small track.

Two examples of unidentified 32 were found in the project area.

Unidentified 32 dimensions (in inches)

FS	N	Length	Width	Height
1066	1	16	4	1.5
1344	1	6.0	2.0	

#### UNIDENTIFIED 35

Unidentified 35 is a large cylindrical container of unknown function. A plug fitting closes an opening near the bottom of the artifact. The top has an oval opening along one edge. Three rectangular brackets extend out midway down the body of the cylinder, and a fourth rectangular bracket is secured at the top of artifact.

One unidentified 35 (FS 1113) was found in the project area. The dimensions of the container are H 30.25", D 30.0" and ID 9.0".

#### UNIDENTIFIED 37

Unidentified 37 is another large cylinder. From the top extends three pipe assemblages including two gate valves. Two U shaped handles are



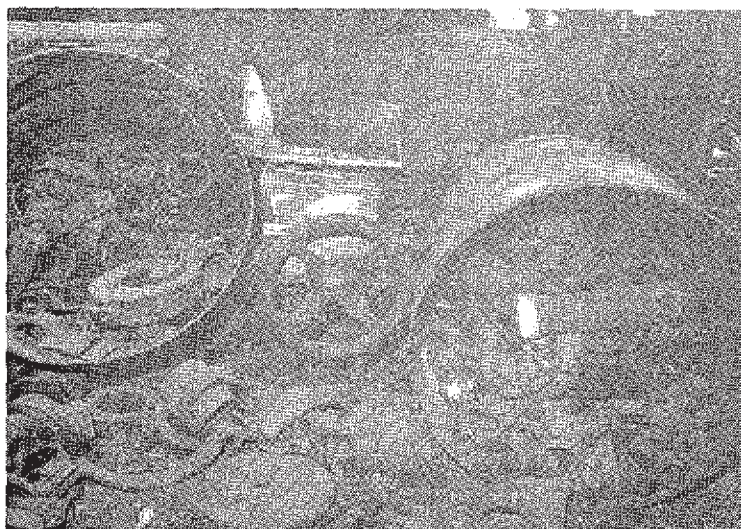
soldered on opposite sides of the tank and act has handles. The function of this item is not known.

Only one example of unidentified 37 (FS 119) was found in the project area. Its dimensions are H 19.5" and D 14.0".

#### UNIDENTIFIED 38

Unidentified 38 is a possible filter. Four short legs support a metal frame holding eight square metal plates. The plates are each covered with canvas and are stained green. At one end is a large circular wheel that compresses all of the plates together.

A single unidentified 38 (FS 1128) is present in the project area. The dimensions are L 36.0", W 13.0", and H 18.0". A separate individual filter plate was found (FS 1129), with dimensions of L 10.75" and W 10.7".



*Unidentified 38 is in-between the two 55 gallon drums in unit 38.*

The round handle of unidentified 38 is clearly visible in photograph.

#### UNIDENTIFIED 40

This artifact is unidentified to function. The artifact is an iron spring with a circular matching end plate at one end. At the other end of the spring is a circular iron housing topped with a knob, screw, and nut.

One example of unidentified 40 (FS 1189) with the dimensions of L 9.5" and D 5.0" was found in the project area.



## UNIDENTIFIED 42

An incomplete engine casing with one piston rod present. This artifact may possibly be part of the housing of a steam engine.

One unidentified 42 (FS 1198) was found in the project. Its dimensions are L 41.0", W 15.5", and H 27.0".

## UNIDENTIFIED 45

Unidentified 45 is part of a machine housing. The artifact is a rectangular shaped housing piece with one end squared off and the other end rounded, possibly to receive a shaft. Eleven bolt holes are present for securing the housing over a piece of machinery

Two unidentified 45 were found in the project area.

Unidentified 45 dimensions (in inches)

FS	N	Length	Width	Height
1209	1	17.0	15.0	7.5
1215	1	17.0	15.0	7.5

## UNIDENTIFIED 54

Unidentified 54 is an iron shaft sandwiched between two rectangular braces. Four bolt holes attached rectangular braces to the shaft.

One unidentified 54 (FS 1341) was found in the project area. Its dimensions are L 62.0" and ED 2.5".

## UNIDENTIFIED 55

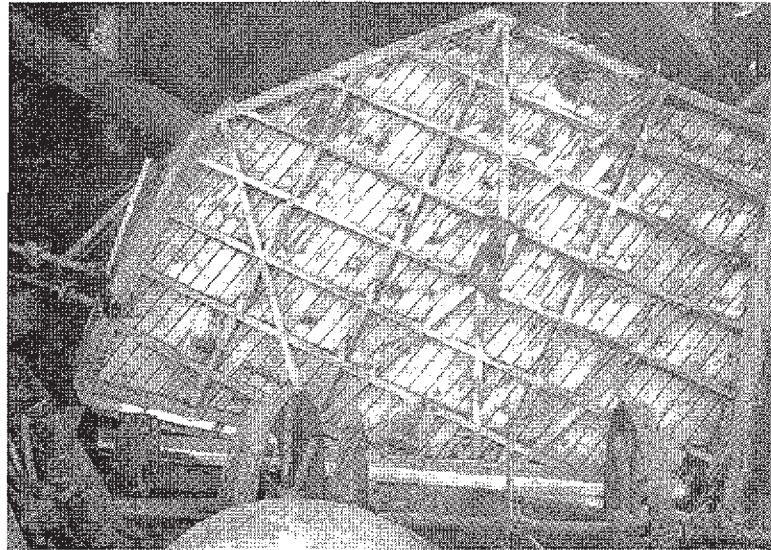
This artifact is a flat metal rectangular plate with an I shaped cross section. Three oval openings are on the face of plate. This plate may slide along another piece. The function of unidentified 55 is unknown.

One unidentified 55 (FS 1310) with the dimensions of L 15.0" and W 6.5" was found.

## UNIDENTIFIED 60

Unidentified 60 is a large industrial object consisting of a shaft with a pulley at each end. Two thin flat round solid metal disks are evenly spaced in between the pulleys. The object is possibly a grinder.

One unidentified 60 (FS 1395) was found. Its dimensions are L 87.0" and ED 36.0".



*Unidentified 60 is located in the foreground of the photograph, in front of the concentrating table. Unidentified 60 is located in unit 43.*

#### UNIDENTIFIED 62

Unidentified 62 is a U shaped frame constructed of a U-beam base and two L beam sides. Inserted through both L beams near the open end is simple iron round handle. One end of the handle is Y shaped. This Y shaped portion is on the outside of the L-beam. The other end has a simple elongated Z shaped handle. The function of this artifact is not known.

In the project area one unidentified 62 (FS 1425) was recorded. The dimensions are L 45.0", W 8.0", and H 45.0".

#### UNIDENTIFIED 65

Tens of very thin rectangular metal plates are sandwiched between two galvanized plates of the same shape. All of the plates are connected at their bases by a bolt that inserts through all of the plates. This item may be a part of a radiator.

One unidentified 65 (FS 1456) was found with the dimensions of L 4.0" and W 1.5".

#### UNIDENTIFIED 70

A covering or end piece for a piece of machinery. The artifact is shaped like a round cap with a flanged edge. In the center of the round covering is a shaft fragment.

Two unidentified 70, one with a weld neck flange, were found in the project area.

Unidentified 70 dimensions (in inches)

FS	N	ED	ID	Diameter	Height
1635	1	35.0	3.0		7.0
1643	1	34.25	29.0	0.75	13.0

## UNIDENTIFIED 75

A cylindrical shaped artifact. Two round plates form the ends. The body of the artifact consists of six metal spokes running from one end to the other. The interior of the artifact is open. The function of unidentified 75 is not known.

One unidentified 75 was found in the project area. The object's measurements are L 5.0", ED 3.5" and ID 2.0

## MACHINE STAND

The term describes a cast iron machine stand. The object is stamped, "The Fairbanks 50/ Machine Tools and Supplies". The machine stand has a round top and long narrow stem and a rectangular foot.

One machine stand (FS 63) was identified in the project area. The dimensions of the stand are H 31.5", W 10.5", and ED 6.0".

## UNIDENTIFIED 141

A possible rim for a piece of machinery. The rectangular flat metal is curved into a semi-circle. There are four beveled teeth extending from the convex side of the artifact, and a rectangular tab with a bore hole at each end of the piece is on the convex side.

One unidentified 141 (FS 141) was found in the project area. The dimensions of the object are W 5.25", ED 18.0", and ID 2.5".

## UNIDENTIFIED 142

A metal shaft with bore holes evenly spaced on shaft. The function of the artifact is not identified.

One example of unidentified 142 (FS 282) was found in the project area, with dimensions of L 4.0", ED 1.0", and ID 0.25".

## UNIDENTIFIED 145

A cast iron flat rectangular artifact bent into a semi-circle. Two tabs with eyes are located near each end of the artifact. It is possibly part of a machinery mount, machinery end-piece, or brace. The function of the artifact is not known.

One unidentified 145 (FS 571) was found in the project area. The dimensions of the artifact are L 18.0" and W 5.0".

## UNIDENTIFIED 146

Unidentified 146 is a component of a piece of machinery. The multi-component artifact consists of a pulley, a chain guard, two shafts and a crank. The two parallel shafts insert one end into the crank and the other end into the chain guard. The pulley is situated in line with the rest of the components behind the chain guard.

One unidentified 146 (FS 1105) is present with the dimensions of L 53.0", W 2.25", and D 17.0".

## UNIDENTIFIED 148

A squat alloy plate cylinder with a scalloped edged flat lid. The bottom of the cylinder is open with a spring and fitting in the interior. The function of this item is unknown. The artifact is embossed " BEAR NO. 3/POWELL PAT CIN. O."

One example (FS 1110) of unidentified 148 was found in the project area. The dimensions are D 4.0" and H 3.0".

**F. PAPER**

## DOCUMENT

A generic descriptive term to indicate any paper with printing or handwriting. The document may or may not be legible.

Two document fragments (FS 1218) were found together in the project area. The documents were illegible, and were on standard 8 1/2" x 11" paper.

**G. WOOD**

## WOOD BLOCK

A wood block is a term used to describe a trapezoid piece of solid wood with two V shaped notches cut into the sides. The function of this artifact is not known.

Two wood blocks were found in the project area.

Wood block dimensions (in inches)

FS	N	Identification	Complete	Length	Width	Height
372	1	wood block	Yes	6	5	3.5
411	1	wood block	Yes	6.25	6	3.25

## CARVED WOOD

A term to describe an unidentified piece of curved wood. The wood is a piece of dimensional lumber with three semi-circles carved out on one side. This artifact possibly functioned as a pipe holder.

One piece of carved wood (FS 1605) was identified. Its dimensions are L 12.0" and W 2.38".

## L. TEXTILES

Unidentified textile cotton fragments. The function of the cloth is not known.

Nine cotton textile fragments were identified.

Textile dimensions (in inches)

FS	N	Length	Width	Diameter	Height
484	1	24	4		
498	1	7	8		
576	1			20	6
1073	1	9.0	5.0		1.0
1142	1	30	13		
1142	1			22.75	32.0
1255	1	26.0	20.0		
1678	1	21.0	8.0		
1706	1	22.0	6.0		

## O. CORDAGE

### ROPE

Rope is the general term to describe fibrous, braided or twisted rope that is not identified to function.

Two pieces of rope were found in the project area.

Rope dimensions (in inches)

FS	N	Length	Diameter
1070	1	11.5	0.75
1483	1	20.0	1.0

## R. RUBBER

### RUBBER HOSE

Rubber hose fragment that is unidentified to function.

Six rubber hose fragments were found in the project area.

Rubber hose dimensions (in inches)

FS	N	Length	External Diameter	Internal Diameter
610	1	18	6	
915	1	16	1	
1257	1	18.0	1.0	0.25
1270	1	54.0	1.0	0.5
1690	1	19.0	0.75	0.5
1725	1	12.0	0.5	0.25

## RUBBER

Rubber is the generic term used to describe fragments of rubber. The function of the fragments are not known.

Two scraps of rubber were identified. One of the rubber fragments (FS 1296) has the trademark "GOODYEAR/MADE IN USA",

Rubber scrap dimensions (in inches)

FS	N	Length	Width	Height
1084	1	21	10	0.13
1296	1	15.0	12.5	0.13



## Appendix II Artifacts Per Unit

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
1				
8	3 b 2 a 8	1		machine bolt
21	3 b 2 c	1		metal strapping
6	3 b 2 d	1		L brace
2	3 b 2 d	1		mending plate
1	3 b 2 d	1		mending plate
12	3 c 1	1		pipe 1 1/2"
20	3 c 1	1		pipe 1 1/4"
7	3 c 5	2		45-degree elbow fitting
3	3 c 5	1		90-degree elbow fitting
5	3 c 6	1		pipe strap hanger
10	3 d 5	1		electrical insulator and bracket
18	3 d 6	1		one piece set screw collar
17	3 d 6	1		one piece set screw collar
19	3 d 6	1		two piece clamp on collar
4	3 d 6	1		two piece clamp on collar
14	5 g 2 b	1		beltwheel
9	5 h 1 j	1		saw blade
13	8 c 3	1		unidentified 8
22	8 c 3	1		unidentified hardware
11	8 c 4	1		U beam
23	8 c 4	1		I beam
15	8 c 4	1		U beam
25	8 c 4	1		U beam
16	8 c 4	1		L beam
2				
31	3	1		flanged cylinder
30	3	1		flanged cylinder
74	3 b 2 a	1		hook bolt
91	3 b 2 a 8	1		U bolt
66	3 c 1	1		pipe 8" and threaded flange
91	3 c 1	1		pipe 2"
69	3 c 1	1		pipe 11" and threaded flange
26	3 c 1	1		pipe 1"

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	79	3 c 4	2	gate valve bonnet and gate
	65	3 c 5	1	pipe flange
	38	3 c 5	1	T fitting
	36	3 c 6	6	pipe strap hanger
	50	3 c 6	1	vertical pipe riser clamp
	73	3 c 6	1	vertical pipe riser clamp
	76	3 c 6	14	pipe strap hanger
	72	3 d 6	1	hub
	61	3 d 6	1	pinion gear
	71	3 d 6	1	hub
	60	3 d 6	1	gear, shaft, and one piece set screw collar
	62	3 d 6	1	gear
	59	3 d 6	1	pinion drive gear
	58	3 d 6	1	pulley
	57	3 d 6	1	shaft with bearing
	47	3 d 6	1	one piece set screw collar
	46	3 d 6	1	two piece clamp on collar
	64	3 d 6	1	roller bearing mount
	54	3 d 6	1	pulley
	43	3 d 6	1	two piece clamp on collar
	53	3 d 6	1	gear and shaft
	52	3 d 6	1	gear
	51	3 d 6	1	pinion gear and shaft
	48	3 d 6	1	one piece set screw collar
	49	3 d 6	1	two piece clamp on collar
	56	3 d 6	1	gear
	55	3 d 6	1	solid journal box
	45	3 d 6	1	one piece set screw collar
	68	3 d 6	1	roller bearing mount
	41	3 d 6	1	two piece clamp on collar
	42	3 d 6	1	one piece set screw collar
	44	3 d 6	1	two piece clamp on collar
	40	3 d 6	1	two piece clamp on collar
	77	3 d 6	1	roller bearing mount
	67	3 d 6	1	sleeve bearing
	88	3 d 6 a	1	rack

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	33	3 f	1	smoke stack with cone hood
	78	3 f	1	smoke stack with cone hood
	37	5 g	1	shaft and sheave
	27	5 g 2 b	1	beltwheel and mount
	80	5 g 2 b	9	beltwheel mount and pin
	85	5 g 2 b	2	beltwheel and pin
	83	5 g 2 b	1	beltwheel and mount
	28	5 g 2 b	1	beltwheel and mount
	81	5 g 2 b	21	beltwheel
	82	5 g 2 b	7	beltwheel and mount
	87	5 g 2 b	2	beltwheel and mount
	86	5 g 2 b	2	beltwheel
	84	5 g 2 b	3	beltwheel and pin
	29	5 g 2 b	1	beltwheel
	75	5 g 2 b	1	ore chute handle
	90	5 h 1	1	vise
	39	5 h 1	1	box wrench
	24	5 j 2	1	crate
	35	8 c 4	1	1 beam
	34	8 c 4	1	1 beam
	32	8 d	1	chain guard
	70	8 d	1	elevator bucket
	63	8 d	1	machine stand
3				
	103	3 c 1	1	pipe 2 1/5"
	96	3 c 1	1	pipe 1 1/2", 45-degree elbow fitting, and valve
	95	3 c 5	2	pipe flange
	93	3 d 1	1	electrical wire and insulator
	100	3 d 6	1	pulley, shaft, and roller bearing and bracket
	238	3 d 6	1	pulley
	101	3 d 6	1	roller bearing
	102	4 d	1	rail track
	94	5 h 1 c	1	wrench key lock
	99	8 c 4	1	1 beam and brace
	97	8 d	1	brake

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
4	98	8 d	1	brake
	149	3 b 1 d 3	1	anti-slip tread
	160	3 b 2 a 8	1	eyebolt and chain
	128	3 b 2 a 8 a	1	machine bolt
	116	3 b 2 b	2	strap hinge
	127	3 c 1	1	pipe 3"
	136	3 c 4	1	globe valve stem and damper
	114	3 c 5	1	coupling fitting
	126	3 c 5	1	coupling fitting
	175	3 c 5	1	weld neck flange
	176	3 c 5	1	weld neck flange
	120	3 c 6	1	pipe strap hanger
	130	3 c 6	1	pipe strap hanger
	111	3 c 6	1	pipe strap hanger
	145	3 c 6	1	split ring pipe hanger on threaded rod
	153	3 c 6	1	split ring pipe hanger
	133	3 c 6	2	pipe strap hanger
	154	3 c 6	1	split ring pipe hanger
	151	3 c 6	1	split ring pipe hanger
	109	3 d 6	1	roller bearing base mount
	108	3 d 6	1	roller bearing and base mount
	105	3 d 6	1	gear
	106	3 d 6	1	hub
	147	3 d 6	1	sleeve bearing
	174	3 d 6	1	hub
	172	3 d 6	1	one piece set screw threaded collar
	171	3 d 6	1	roller bearing
	163	3 d 6	1	roller bearing
	152	3 d 6	1	roller bearing
	131	3 d 6	5	sleeve bearing
	148	3 d 6	1	roller bearing and mount
	143	3 d 6	1	sleeve bearing and beltwheel
	142	3 d 6	1	drop shaft hanger
	140	3 d 6	1	bearing top mount with oil reservoir
	122	3 d 6	2	pulley
	138	3 d 6	1	flanged shaft mount

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	134	3 d 6	1	gear
	107	3 d 6	1	shim
	123	3 d 6	1	bearing top mount with oil reservoir
	141	3 d 6	1	pulley
	150	3 d 6	1	bearing top mount
	159	4 a 2	1	shaft and rail wheel
	125	4 a 2	5	train roller
	177	4 a 2 d	1	rail wheel
	158	4 d	1	rail track
	170	5 g 1	1	rock drill bit
	167	5 g 1	1	rock drill bit
	169	5 g 2 b	1	ore chute
	118	5 g 2 b	1	beltwheel
	112	5 h 1 c	1	socket wrench
	135	5 l 2	5	metal scrap
	155	8 c 3	1	threaded shaft
	146	8 c 3	1	threaded shaft
	121	8 c 3	1	caster
	132	8 c 3	1	caster
	173	8 c 3	1	unidentified 9
	117	8 c 3	1	unidentified 140
	156	8 c 3	1	caster wheel
	115	8 c 3	1	caster and mount
	166	8 c 4	1	I beam
	165	8 c 4	1	I beam
	164	8 c 4	1	I beam
	162	8 c 4	1	I beam
	168	8 c 4	1	U beam
	161	8 c 5	1	I beam
	157	8 d	1	crank
	144	8 d	1	piston rod
	104	8 d	1	piston rod
	139	8 d	1	piston rod
	137	8 d	1	air compressor wheel
	129	8 d	1	threaded shaft and base
	119	8 d	1	piston rod
	141	8 d	1	unidentified 141

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
5	110	8 g	1	machine casing
	179	3 d 6	1	pulley
	178	3 d 6	1	pulley
	180	3 d 6	1	pulley
	181	5 g 2 b	1	ore chute
6	211	3 b 1 c 5	1	brick
	189	3 b 1 c 5	1	brick
	210	3 b 1 c 5	1	brick
	207	3 b 2 a 3	1	cotter pin
	208	3 b 2 a 3	1	cotter pin
	204	3 b 2 d	1	unidentified bracket
	193	3 b 2 d	1	h plate
	192	3 c 1	1	pipe 3/4"
	194	3 c 1	1	pipe 3 1/2"
	198	3 c 5	1	weld neck flange
	206	3 c 5	1	90-degree elbow fitting
	185	3 d 6	1	pulley
	205	3 d 6	1	roller bearing mount
	212	3 d 6	1	pulley
	183	3 d 6	1	pulley
	191	3 d 6	1	pulley
	203	3 d 6	1	pulley
	202	3 d 6	1	pinion drive gear
	186	3 d 6	1	pulley
	187	3 d 6	1	pulley
	201	3 d 6	1	pulley
	190	3 d 6	1	pulley
	200	3 d 6	1	roller bearing mount
	197	3 d 6	1	roller bearing
	196	3 d 6	1	roller bearing top mount
	184	3 d 6	1	pulley
	188	3 d 6	1	pulley
	199	3 f 1	1	stove door
	182	5 j 2	1	crate
	195	8 c 3	1	shaft



UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
7	209	8 c 5	1	unidentified 14
	222	3 b 1 c 5	1	brick
	218	3 b 2 a 8	1	nut
	217	3 b 2 c	1	iron stock
	89	3 c 2	1	grate cover
	220	3 c 5	1	pipe flange
	216	3 d 5	1	electrical insulator
	221	3 d 6	1	hub
	223	3 d 6	1	pulley
	227	3 d 6	1	pulley
	228	3 d 6	1	pulley
	230	3 d 6	1	pulley
	231	3 d 6	2	pulley
	236	3 d 6	1	pulley
	237	3 d 6	1	pulley
	213	4 b 1	1	bailing wire eye
	215	5 g 2 b	2	ore chute
	235	5 g 2 b	1	beltwheel
	219	5 g 2 b	2	ore chute
	225	8 c 3	1	sheave
	224	8 c 3	2	sheave
	226	8 c 3	1	sheave
	229	8 c 3	1	sheave
	232	8 c 3	2	threaded shaft and nut
	234	8 c 5	1	unidentified 15
	233	8 c 5	1	unidentified 15
	214	8 d	1	compression spring
8	261	3 b 1 c 5	1	brick
	248	3 c 1	1	pipe 3/4" and elbow fitting
	247	3 d 6	1	pulley
	242	3 d 6	1	pulley
	251	3 d 6	1	pulley
	252	3 d 6	1	pulley
	244	3 d 6	1	pulley
	241	3 d 6	1	pulley

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	245	3 d 6	1	pulley
	243	3 d 6	1	pulley
	258	3 d 6	1	pulley
	257	3 d 6	1	pulley
	256	3 d 6	1	pulley
	255	3 d 6	1	pulley
	250	3 d 6	1	pulley
	254	3 d 6	2	pulley
	253	3 d 6	1	pulley
	239	3 f 1	1	stove piece
	240	3 f 1	1	stove
	259	5 g 1	1	rock drill shaft
	260	5 g 2 b	1	beltwheel and mount
	246	5 g 2 b	1	beltwheel and pin
	249	8 c 3	1	sheave
9				
	276	3 b 2 a 8	1	square nut
	283	3 b 2 a 8	1	square nut
	278	3 b 2 a 8 a	1	machine bolt and washer
	274	3 b 2 a 8 a	2	machine bolt
	295	3 b 2 a 8 a	1	machine bolt and gasket
	288	3 b 2 a 8 a	1	machine bolt
	275	3 b 2 a 8 a	1	machine bolt
	292	3 b 2 a 1	1	washer
	289	3 b 2 c 1	1	metal strapping
	284	3 b 2 c	1	iron stock
	272	3 c 1	1	pipe 3/4"
	294	3 c 1	1	pipe 1"
	280	3 c 1	1	pipe 1/2"
	268	3 c 1	1	pipe 1 1/2"
	267	3 c 1	1	pipe 1 1/2"
	290	3 c 1	1	pipe 1 1/4"
	281	3 c 5	1	hex bushing
	273	3 c 5	1	45-degree elbow fitting
	293	3 c 5	1	coupling fitting
	266	3 c 6	1	pipe strap hanger
	263	3 c 6	1	pipe strap hanger with twist

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262	3 d 6	1	shim
270	3 d 6	1	pulley
271	3 d 6	1	pulley
277	4 b 1	1	bailing wire
285	4 d	1	cable
287	5 g 1	1	rock drill shaft
265	5 g 2 b	1	ore bag
279	5 l 2	1	metal scrap
264	5 l 2	1	metal scrap
269	5 j 2	1	crate
291	8 c 3	1	shaft
282	8 d	1	unidentified 142
286	8 d	1	compression spring
330	3 b 1 c 1 b	2	corrugated sheet metal
322	3 b 2 a	1	all thread and nut
311	3 b 2 a 1 a	1	wire nail
315	3 b 2 a 1 a	2	wire nail
316	3 b 2 a 1 a	1	wire nail
312	3 b 2 a 1 a	1	wire nail
301	3 b 2 a 8	1	hex nut
331	3 b 2 a 8 a	2	machine bolt
308	3 b 2 a 8 a	1	machine bolt
306	3 b 2 a 8 a	1	machine bolt
303	3 b 2 a 8 a	1	machine bolt
319	3 b 2 a 8 a	1	machine bolt
320	3 b 2 a 8 a	1	machine bolt
324	3 b 2 a 8 a	1	machine bolt
327	3 b 2 a 8 a	1	machine bolt
328	3 b 2 a 8 a	1	machine bolt
317	3 b 2 a 8 a	1	machine bolt and washer
314	3 b 2 a 1	1	washer 1
305	3 b 2 a 1	2	nut lock washer
297	3 b 2 c	1	iron stock
307	3 c 1	1	pipe 1"
300	3 c 1	1	pipe 1"
299	3 c 1	6	pipe 1 1/4"
304	3 c 4	1	valve handle

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	310	3 c 5	1	female adapter
	296	3 c 5	1	ripple
	318	3 c 5	1	coupling fitting
	313	3 d 6	1	chain link
	298	3 d 6	1	pulley
	332	3 d 6	1	canvas belt
	326	5 h 1 j	1	saw blade
	325	5 j 2	1	barrel strap
	309	8 c 3	1	shaft
	323	8 c 3	1	threaded shaft
	302	8 c 3	1	gasket and shaft
	329	8 c 3	3	battery rod
	321	8 d	1	oil cup
	333	8 d	1	unidentified 2
11	433	3 b 1 c 1 b	5	corrugated sheet metal
	479	3 b 1 c 1 b	6	corrugated sheet metal
	482	3 b 1 c 5	1	brick
	481	3 b 1 c 5	1	brick
	468	3 b 1 c 5	9	brick
	465	3 b 1 d 2	1	insulation
	441	3 b 2 a 1 a	1	wire nail
	464	3 b 2 a 1 f	1	spike
	435	3 b 2 a 3	1	cotter pin
	483	3 b 2 a 8 a	1	machine bolt
	462	3 b 2 a 8 a	1	machine bolt
	461	3 b 2 a 8 a	1	machine bolt
	488	3 b 2 a 8 a	1	machine bolt
	456	3 b 2 a 8 a	1	machine bolt
	454	3 b 2 a 8 a	1	machine bolt
	450	3 b 2 a 8 a	1	machine bolt
	449	3 b 2 a 8 a	1	machine bolt
	448	3 b 2 a 8 a	1	machine bolt
	446	3 b 2 a 8 a	1	machine bolt
	444	3 b 2 a 8 a	1	machine bolt and nut
	440	3 b 2 a 8 a	1	machine bolt
	436	3 b 2 a 8 a	1	machine bolt

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	486	3 b 2 a 8 a	1	machine bolt
	457	3 b 2 a 8 a	1	machine bolt
	467	3 b 2 a 8 a	1	machine bolt
	476	3 b 2 a 8 a	1	machine bolt
	470	3 b 2 a 8 a	1	machine bolt and nut
	453	3 b 2 a 1 1	1	washer
	447	3 b 2 d	1	metal plate
	442	3 b 2 d	1	rectangular brace
	438	3 b 2 c	1	iron stock
	466	3 c 1	1	pipe 3/4"
	445	3 c 5	1	nozzle
	487	3 c 5	1	coupling fitting
	463	3 c 5	1	coupling fitting
	474	3 c 6	1	pipe strap hanger
	475	3 c 6	1	pipe strap hanger
	478	3 c 6	1	pipe strap hanger
	455	3 c 6	1	pipe strap hanger
	437	3 d 2	1	fuse
	439	3 d 4	1	lightbulb or fuse base
	480	3 d 4	1	light shade
	434	3 d 6	1	two-bolt flange-mount shaft support
	489	3 d 6	1	one piece set screw collar
	472	4 a 2 d	1	shaft and rail wheel
	452	5 h 1 c	1	crow's foot wrench
	451	5 h 1 j	1	saw blade
	485	5 l 2	1	metal scrap
	472	5 k	1	swage
	469	5 k	1	bolt header
	459	8 c 3	1	unidentified 19
	460	8 c 3	1	shaft
	458	8 c 3	1	shaft
	473	8 c 3	1	shaft
	443	8 c 5	1	unidentified 18
	477	8 c 5	1	unidentified 18
	484	8 l 1	1	canvas
	432	3 a	1	A-frame

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	431	3 b 2 a 1 a	1	wire nail
	412	3 b 2 a 1 a	1	wire nail
	421	3 b 2 a 1 a	1	wire nail
	426	3 b 2 d	1	brace/frame
	409	3 b 2 d	1	L brace
	422	3 b 2 e	1	iron stock
	425	3 c 1	1	pipe 2"
	424	3 c 1	1	pipe 1"
	410	3 c 1	1	pipe 1 1/4"
	416	3 c 4	1	gate valve
	428	3 c 5	1	90-degree male elbow fitting
	427	3 d 5	1	electrical insulator
	414	3 d 5	1	electrical insulator
	408	3 f 1	1	stove fragment
	419	4 b 1	1	bailing wire
	413	5 g 1	1	rock drill bit
	430	5 h 1 h	1	drill bit
	418	5 l 2	1	metal scrap
	417	5 l 2	1	punched blank
	415	8 c 2 a	1	can
	420	8 c 3	1	battery rod
	407	8 c 3	1	threaded shaft
	429	8 c 5	1	unidentified 1
	423	8 c 5	1	unidentified 21
	411	8 g	1	wood block
	535	3 b 2 a 8	1	machine bolt
	556	3 b 2 a 8 a	1	machine bolt
	558	3 b 2 d	1	metal plate
	531	3 b 2 d	1	bracket unidentified
	542	3 c 1	1	T-pipe
	520	3 c 1	1	pipe 6" with flanged ends
	562	3 c 1	1	pipe 3"
	537	3 c 1	1	pipe 1/4"
	550	3 c 4	1	clip valve
	546	3 c 4	1	gate valve body
	545	3 c 4	1	gate valve body



UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	527	3 c 4	1	gate valve
	525	3 c 4	1	globe valve
	543	3 c 4	1	pipe valve
	551	3 c 4	1	liquid relief valve body
	564	3 c 5	1	90-degree elbow fitting
	553	3 c 5	1	T fitting
	565	3 c 5	1	90-degree elbow fitting
	552	3 c 5	1	T fitting
	541	3 c 5	1	90-degree elbow fitting
	529	3 c 5	1	90-degree elbow fitting
	528	3 c 5	1	45-degree elbow fitting
	524	3 c 5	1	45-degree elbow fitting
	523	3 c 5	1	90-degree elbow fitting
	547	3 c 5	1	45-degree elbow fitting
	548	3 c 5	1	45-degree elbow fitting
	559	3 c 6	2	pipe strap hanger with twist
	519	3 c 6	1	split ring pipe hanger
	549	3 c 6	1	pipe strap hanger
	538	3 c 6	4	pipe strap hanger
	544	3 c 6	1	split ring pipe hanger
	515	3 d 5	1	electrical insulator and eyebolt
	514	3 d 6	1	pulley
	540	3 d 6	1	gear
	516	3 d 6	1	pulley
	560	3 d 6	1	pulley
	517	3 d 6	1	pulley
	561	3 d 6	1	pulley
	539	3 f	2	baseboard heating guard
	518	4 a 2 d	2	rail wheel
	555	4 a 2 d	1	rail wheel and axle assemblage
	563	5 g 2 a	1	roller crusher part
	532	5 g 2 b	1	ore bag
	554	5 g 2 b	1	ore bag
	533	5 j 2	1	55 gallon drum
	526	8 c 3	1	unidentified 144
	522	8 c 3	1	unidentified 143
	557	8 c 3	1	shaft

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
14	536	8 c 3	1	battery rod
	534	8 c 3	1	battery rod
	521	8 d	1	crank 2
	530	8 d	1	unidentified 22
14	575	3 b 1 c 5	1	brick
	581	3 b 2 a 1 a	1	wire nail
	582	3 b 2 a 1 a	1	wire nail
	569	3 b 2 a 8	1	hex nut
	585	3 b 2 a 8	1	all thread
	580	3 b 2 a 8 a	1	machine bolt and nut
	597	3 b 2 a 8 a	1	machine bolt
	572	3 b 2 b	1	strap hinge
	584	3 b 2 d	1	U bracket
	599	3 b 2 d	1	mending plate
	591	3 c 1	1	pipe 1"
	573	3 c 1	1	pipe 1 1/4"
	590	3 c 1	1	pipe 3/4"
	596	3 c 1	1	pipe 1 1/4"
	595	3 c 1	1	pipe 1"
	578	3 c 5	1	90-degree male elbow fitting
	586	5 g 1	6	rock drill shaft
	587	5 g 1	4	rock drill bit
	566	5 g 2 b	1	ore chute frame
	588	5 g 2 b	1	ore bag
	598	5 h 1 j	1	saw blade
	579	5 h 1 j	1	saw blade
	568	5 i 2	250	punched blank
	567	5 j 2	1	barrel
	601	5 j 2	1	crate strapping
	574	8 c 1	1	wire
	570	8 c 1	5	wire
	600	8 c 1	1	wire
	577	8 c 1	1	wire
	592	8 c 1	1	wire
	583	8 c 3	1	gasket
	594	8 c 4	1	L beam

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
15	589	8 d	1	unidentified 23
	593	8 d	1	compression spring
	571	8 d	1	unidentified 145
	576	8 l	1	textile
15	383	3 b 1 c 5	1	brick
	374	3 b 1 c 5	1	brick
	376	3 b 1 c 5	1	brick
	364	3 b 1 c 5	1	brick
	334	3 b 2 a	1	all thread
	367	3 b 2 a	1	all thread
	341	3 b 2 a 1 a	4	wire nail
	354	3 b 2 a 7	1	rivet
	356	3 b 2 a 8	1	nut
	336	3 b 2 a 8	3	U bolt
	344	3 b 2 a 8 a	1	machine bolt
	377	3 b 2 a 8 a	1	machine bolt
	345	3 b 2 a 8 a	1	machine bolt
	348	3 b 2 a 8 a	1	machine bolt
	342	3 b 2 a 8 a	1	machine bolt and nut
	363	3 b 2 a 8 a	1	machine bolt
	359	3 b 2 a 8 a	15	machine bolt
	360	3 b 2 a 8 a	1	machine bolt
	343	3 b 2 a 8 b	1	cap screw bolt
	347	3 b 2 d	2	metal plate
	337	3 b 2 d	2	U bracket
	349	3 b 2 e	1	iron stock
	350	3 b 3 c	1	special steel stock
	338	3 c 1	1	pipe 2"
	382	3 c 1	1	pipe 3/4"
	371	3 c 1	1	pipe 3/4"
	370	3 c 1	1	pipe 1 1/2"
	362	3 d 2	1	fuse
	340	3 d 5	1	electrical insulator
	357	3 f	1	heating and cooling unit
	353	5 b 2 b	1	cartridge casing
	373	5 g 2 b	1	beltwheel

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	346	5 g 2 b	1	ore bag
	368	5 g 2 b	1	ore bag
	369	5 g 2 b	1	ore bag
	365	5 h 1 j	1	saw blade
	358	5 h 1 j	1	saw blade
	366	5 l 2	1	metal scrap
	375	5 l 2	1	metal scrap
	351	5 l 2	1	metal scrap
	352	5 l 2	1	metal scrap
	355	8 c 1	1	wire
	339	8 c 2 b	1	can end
	380	8 c 3	1	split ring pipe hanger insert
	379	8 c 5	1	unidentified 25
	361	8 d	1	oil cup
	381	8 d	1	pelton pump flange
	335	8 d	1	compression spring
	372	8 g	1	wood block
16				
	492	1 a 4	1	glove
	501	1 a 4	1	glove
	512	3 b 1 c 5	1	brick
	497	3 b 2 a 8	1	U bolt
	505	3 b 2 d	1	metal plate
	500	3 b 2 d	1	metal plate
	506	3 b 2 e	1	iron stock
	508	3 c 1	1	pipe 1 1/4"
	507	3 c 1	1	pipe 1 1/4"
	510	3 c 1	1	pipe 1 1/4"
	511	3 c 1	1	pipe 1 1/4"
	504	3 c 1	1	pipe 1"
	503	3 c 1	1	pipe 1/8"
	493	3 d 1	1	electrical wire
	494	3 d 4	1	lightbulb base
	499	3 d 5	1	electrical insulator
	491	3 d 5	1	electrical insulator
	490	3 f	1	heating and cooling unit
	513	5 g 2 b	1	tram hanger

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
17	509	5 I 2	1	metal scrap
	496	5 I 2	1	metal scrap
	502	5 I 2	1	metal scrap
	495	5 I 2	1	metal scrap
	498	8 I	1	textile
	608	3 a	1	A-frame
	611	3 b 1 c 1 b	1	corrugated sheet metal
	615	3 b 2 a 8 a	1	machine bolt
	603	3 b 2 d	1	U bracket and bolt
	605	3 c	1	hot water tank
	602	3 c 4	1	gate valve bonnet and stem
	607	3 c 5	1	pipe fitting unidentified
	604	3 d 6	1	pulley
	613	5 h 1 c	1	open ended wrench
	606	5 I 2	1	metal scrap
	609	8 c 1	2	wire
	612	8 c 2 a	1	can
18	614	8 d	1	water pump chassis
	610	8 r	1	rubber hose
	690	1 a 2	1	clothing fragment
	696	3 b 2 a 1 f	1	spike
	689	3 b 2 a 8 a	1	machine bolt
	693	3 c 1	1	pipe 3"
	616	3 c 1	1	U pipe
	619	3 c 1	1	pipe flange and pipe 1"
	644	3 c 4	1	gate valve body
	648	3 c 4	1	gate valve and pipe 3/4" assemblage
	618	3 c 4	1	gate valve bonnet and stem
	630	3 c 4	1	liquid relief valve
	634	3 c 4	1	gate valve bonnet and gate
	686	3 c 4	1	gate valve bonnet
	674	3 c 4	1	gate valve bonnet and stem
	673	3 c 4	1	gate valve body
	628	3 c 4	1	gate valve body
	623	3 c 4	1	gate valve body, bonnet and stem

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	657	3 c 5	1	T fitting
	660	3 c 5	1	90-degree elbow fitting
	698	3 c 5	1	90-degree elbow fitting
	695	3 c 5	1	bushing pipe fitting
	685	3 c 5	1	90-degree elbow fitting
	672	3 c 5	1	T fitting
	671	3 c 5	1	90-degree elbow fitting
	670	3 c 5	1	90-degree elbow fitting
	669	3 c 5	1	T fitting
	667	3 c 5	1	T fitting
	664	3 c 5	1	cross fitting
	663	3 c 5	1	diamond pipe flange
	655	3 c 5	1	T fitting
	661	3 c 5	1	90-degree elbow fitting
	621	3 c 5	1	90-degree elbow fitting
	659	3 c 5	1	T fitting
	666	3 c 5	1	90-degree elbow fitting
	656	3 c 5	1	pipe fitting unidentified
	653	3 c 5	1	T fitting
	645	3 c 5	1	90-degree elbow fitting and nipple
	642	3 c 5	1	T fitting
	639	3 c 5	1	T fitting
	632	3 c 5	1	90-degree elbow fitting
	631	3 c 5	1	T fitting
	629	3 c 5	1	T fitting
	625	3 c 5	1	reducing coupling, male and male
	662	3 c 5	1	T fitting
	668	3 c 5	1	reducing coupling fitting
	665	3 c 6	1	vertical pipe riser clamp
	649	3 c 6	1	split ring pipe hanger
	650	3 c 6	1	pipe strap hanger
	658	3 c 6	1	split ring pipe hanger
	683	3 c 6	1	stub end
	684	3 c 6	1	split ring pipe hanger
	654	3 c 6	1	pipe strap hanger
	651	3 d 6	1	roller bearing
	633	3 d 6	1	bearing top mount with oil cup



UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	637	3 d 6	1	roller bearing
	638	3 d 6	1	roller bearing base mount
	640	3 d 6	1	roller bearing and mount
	641	3 d 6	1	pulley
	626	3 d 6	1	roller bearing
	622	3 d 6	1	pulley
	647	3 d 6	1	one piece set screw threaded collar
	620	3 d 6	1	roller bearing top mount
	617	3 d 6	1	roller bearing and base mount
	692	3 d 6	1	gear
	635	3 d 6	1	roller bearing
	676	3 d 6	1	bearing top mount with oil cup
	682	3 d 6	1	shim
	697	4 a 2 d	1	rail wheel
	624	5 g 2 b	1	callow cone base
	694	5 g 2 b	1	beltwheel
	679	5 g 2 b	1	concentrating table support
	680	5 g 2 b	1	concentrating table support
	691	8 a 1	1	bottle fragment
	636	8 c 3	1	split ring pipe hanger with insert
	677	8 c 3	1	shaft
	688	8 c 3	1	threaded shaft with slot
	687	8 c 3	1	threaded shaft with slot
	643	8 c 3	1	split ring pipe hanger with insert
	627	8 d	1	elevator bucket
	652	8 d	1	elevator bucket
	681	8 d	1	engine 2
	678	8 d	1	engine 2
	675	8 d	1	piston rod
	646	8 d	1	elevator bucket
	723	3 b 1 c 5	1	brick
	733	3 b 2 a 8	1	nut
	724	3 b 2 a 8 a	1	machine bolt
	725	3 b 2 a 8 a	1	machine bolt
	712	3 c 1	1	water pipe
	706	3 c 4	1	gate valve stem

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	708	3 c 4	1	gate valve bonnet
	702	3 c 4	1	gate valve bonnet
	701	3 c 4	1	brass throttle valve
	709	3 c 5	1	T fitting
	707	3 c 5	1	T fitting
	704	3 c 5	1	T fitting
	717	3 c 6	1	split ring pipe hanger
	732	3 d 1	1	electrical wire
	730	3 d 5	1	electrical insulator and screw
	729	3 d 5	1	electrical insulator and screw
	721	3 d 6	1	shim
	703	3 d 6	1	chain
	720	3 d 6	1	roller bearing mount
	734	3 d 6	1	roller bearing mount
	719	3 d 6	1	gear and shaft
	710	5 g 1	1	rock drill bit
	731	5 g 1	1	rock drill shaft
	722	5 g 2 b	1	ore bag
	700	5 h 1	1	cant hook
	726	8 c 3	1	shaft
	705	8 c 3	1	unidentified 26
	713	8 c 3	1	split ring pipe hanger with insert
	714	8 c 3	1	split ring pipe hanger with insert
	716	8 c 3	1	split ring pipe hanger with insert
	728	8 c 3	1	threaded shaft
	718	8 c 3	1	split ring pipe hanger with insert
	727	8 c 3	1	threaded shaft
	715	8 c 3	1	split ring pipe hanger with insert
	711	8 d	1	drum
	393	3 b 1 c 5	1	brick
	405	3 b 1 c 5	1	brick
	397	3 b 1 c 5	2	brick
	388	3 b 2 a 1 a	1	wire nail and washer
	386	3 b 2 a 1 a	1	wire nail and washer
	400	3 b 2 a 1 f	1	spike
	401	3 b 2 a 1 f	1	spike

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	398	3 b 2 a 1 f	1	spike
	389	3 b 2 a 8 a	1	machine bolt
	406	3 b 2 a 8 a	1	machine bolt
	384	3 c 1	1	water pipe
	392	3 c 1	1	water pipe
	390	3 c 1	1	water pipe
	403	3 c 1	1	pipe 2"
	387	3 d 5	1	electrical insulator
	394	4 a 2	1	sled/sledge runner
	399	5 h 1 j	1	saw blade
	404	8 c 1	1	wire
	395	8 c 3	1	shaft
	391	8 c 3	1	unidentified 27
	396	8 c 4	1	U beam
	402	8 d	1	screw jack
	385	8 d	1	screw jack
21				
	1747	3 b 1 c 5	7	brick
	1745	3 b 2 d	1	rectangular plate
	1746	3 d 6	1	canvas belt
	1744	5 g 2 b	1	beltwheel mount
	1750	5 g 2 b	1	beltwheel and beltwheel mount
	1748	5 l 2	1	metal scrap
	1749	8 c 1	1	wire
22				
	749	3 b 1 c 5	1	brick
	736	3 b 2 a 8 a	1	machine bolt and nut
	739	3 c	1	water pipe wire
	738	3 c	1	water pipe wire
	747	3 c 5	1	pipe flange
	741	3 c 5	1	coupling fitting
	752	3 c 5	1	pipe flange
	735	3 c 5	1	pipe flange
	751	3 c 5	1	pipe flange
	745	3 c 5	1	hex bushing
	746	3 c 5	1	water pipe coupling
	742	3 d 1	1	electrical wire

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	750	3 d 6	1	pinion gear
	748	3 d 6	1	pulley, double flanged
	743	3 d 6	1	pulley
	737	3 d 6	1	bevel gear
	744	4 a 2 d	1	truck tire
	740	5 h 1	1	unidentified tool
	699	5 I 2	300	metal shear trimming
23	772	3 b 2 a 8	1	nut
	782	3 c 1	1	water pipe
	775	3 c 1	10	water pipe stave
	781	3 c 1	1	water pipe
	780	3 c 1	1	water pipe stave
	754	3 c 4	1	pipe valve
	763	3 c 4	1	gate valve and pipe
	777	3 c 4	1	handle wheel
	757	3 c 4	1	gate valve bonnet, stem, and gate
	762	3 c 5	1	T fitting
	767	3 c 5	1	pipe flange
	769	3 c 5	20	pipe flange
	764	3 c 5	1	T fitting
	756	3 c 5	1	pipe flange
	759	3 c 5	1	pipe flange
	761	3 c 5	1	pipe flange
	771	3 c 5	6	pipe flange
	773	3 c 5	1	coupling fitting
	760	3 c 5	1	pipe flange
	776	3 c 6	2	split ring pipe hanger and shaft
	753	3 d 6	1	shim
	758	3 d 6	1	gear
	778	4 a 2	1	vehicle hitch
	755	4 d	1	rail track
	779	5 g 1	1	rock drill shaft
	770	5 j 2	1	55 gallon drum
	774	5 j 2	1	lid
	768	5 j 2	1	55 gallon drum
	765	8 c 3	1	shaft with cotter pin

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
24	766	8 d	1	pelton wheel pump cover
	792	3 c 1	1	water pipe
	790	3 c 1	1	pipe 2"
	791	3 c 1	1	pipe 3/8"
	793	3 c 1	1	water pipe stove
	788	3 c 1	1	water pipe
	787	3 d 6	1	pulley
	784	3 d 6	1	pulley
	785	3 d 6	2	gear
	786	3 d 6	1	pulley
	783	3 d 6	1	chain
	789	5 g 2 b	1	ore bag
25	804	3 b 2 a 1 f	1	spike
	808	3 b 2 a 8	1	eyebolt
	815	3 b 2 a 8 a	1	machine bolt
	809	3 b 2 a 8 a	1	machine bolt and nut
	794	3 b 2 a 8 a	1	machine bolt
	798	3 b 2 a 1 1	1	washer
	805	3 c 1	1	pipe 3/4"
	801	3 c 1	1	water pipe
	810	3 c 1	1	water pipe
	814	3 c 1	1	water pipe
	813	3 c 1	1	water pipe
	797	3 c 1	1	pipe 2"
	821	3 c 1	1	water pipe
	820	3 c 1	1	water pipe
	795	3 d 6	1	gear
	796	3 d 6	1	gear
	807	4 b 1	1	bailing wire
	818	5 h 1 n	1	chisel
	812	5 i 2	1	metal scrap
	819	5 j 2	1	crate strapping
	806	5 k	1	fire iron
	816	5 k	1	swage
	817	5 k	1	punch

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
26	802	8 c 3	1	shaft
	822	8 c 3	1	shaft
	803	8 c 3	1	shaft
	800	8 c 3	1	shaft
	811	8 c 3	1	threaded shaft
	799	8 d	1	drive chain
26	1687	1 a 1 f	1	buckle
	1672	1 a 4	1	glove
	1664	2 b 5 b	1	fuel can
	1669	3 b 1 c 5	9	brick
	1665	3 b 2 a 1 a	1	wire nail
	1673	3 b 2 a 8	1	U bolt
	1697	3 b 2 a 8 a	1	machine bolt and washer
	1694	3 b 2 a 8 a	1	machine bolt
	1676	3 b 2 a 8 a	1	machine bolt and washer
	1670	3 b 2 a 1 1	1	washer
	1683	3 c 1	1	pipe 1 1/2"
	1682	3 c 1	1	pipe 4"
	1681	3 c 1	1	pipe 3/4"
	1685	3 c 1	1	pipe 1 1/2"
	1688	3 c 1	1	pipe 2"
	1698	3 c 5	1	water pipe coupling
	1699	3 c 5	1	T fitting
	1666	3 c 6	1	pipe strap hanger with twist
	1671	3 d 1	2	electrical wire
	1668	3 d 1	1	electrical wire
	1675	3 d 5	1	electrical insulator
	1696	3 d 6	1	roller bearing
	1691	5 g 1	1	rock drill shaft
	1677	5 g 2 b	2	beltwheel and mount
	1693	5 g 2 b	4	beltwheel
	1695	5 g 2 b	3	idler assembly
	1679	5 g 2 b	1	beltwheel and mount
	1662	5 h 1	2	wheel barrow
	1686	5 l 2	1	metal scrap
	1674	5 l 2	1	metal scrap



UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
27	1663	5 j 2	1	burlap bag
	1689	5 j 2	2	burlap bag
	1667	5 k	1	swage
	1684	8 c 3	1	shaft
	1692	8 d	2	brake
	1680	8 d	2	piston rod
	1678	8 l	1	textile
	1690	8 r	1	rubber hose
28	844	3 b 1 c 5	1	brick
	829	3 c 1	1	pipe 1"
	834	3 c 4	1	gate valve bonnet
	838	3 c 5	1	pipe flange
	840	3 c 5	1	pipe flange
	837	3 c 5	1	pipe flange
	842	3 c 5	1	pipe flange
	828	3 c 5	1	pipe flange
	827	3 c 5	2	pipe flange
	826	3 c 5	1	pipe flange and pipe
	825	3 c 5	1	pipe flange
	843	3 c 5	1	pipe flange
	841	3 c 5	1	90-degree elbow fitting
	824	3 d 6	1	one piece set screw collar
	839	3 d 6	1	hub
	832	3 f 2	1	portable steam heater
	836	5 g	1	crucible/cupel fragment
	831	5 g 1	1	rock drill shaft
	833	5 g 2 b	1	ore bag
	835	5 l 2	1	metal scrap
	823	5 j 2	1	55 gallon drum
	830	8 c 4	1	U beam
	876	3 b 2 a 8	13	hex nut
	847	3 b 2 a 8 a	1	machine bolt
	875	3 b 2 a 8 a	13	machine bolt
	874	3 b 2 d	2	U plate
	869	3 b 2 d	1	angle brace

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	871	3 c 1	1	pipe 1 1/2"
	849	3 c 1	1	pipe 1 1/4"
	864	3 c 1	1	water pipe
	867	3 c 1	1	pipe 3"
	880	3 c 1	1	pipe 2"
	870	3 c 1	1	water pipe
	881	3 c 4	1	gate valve handle
	850	3 c 4	1	gate valve bonnet and stem
	846	3 c 5	1	pipe flange
	848	3 c 5	1	pipe flange
	877	3 c 5	1	90-degree elbow fitting
	852	3 c 5	1	pipe flange with cap
	851	3 c 5	1	pipe flange
	859	3 c 5	1	coupling fitting
	865	3 c 5	1	pipe flange
	860	3 c 6	1	pipe strap hanger
	868	3 d 6	1	roller bearing
	879	3 d 6	1	sleeve bearing
	845	4 d	1	rail track
	863	5 g 1	1	air compressor wheel and shaft
	858	5 j 2	11	assorted material culture
	857	5 j 2	13	assorted material culture
	854	5 j 2	1	55 gallon drum
	853	5 j 2	1	55 gallon drum
	866	8 c 4	1	U beam
	862	8 d	1	tubular boiler
	861	8 d	1	engine 1
	872	8 d	1	drum
	873	8 d	1	byron chassis
	855	8 d	1	engine 1
	856	8 g	1	chassis 1
	902	3 b 2 a 8 a	1	machine bolt
	889	3 c 1	1	water pipe
	888	3 c 1	1	pipe 1"
	894	3 c 1	1	pipe 2"
	882	3 c 1	1	water pipe

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	878	3 c 1	1	pipe 1"
	903	3 c 1	1	pipe 3/4"
	890	3 c 1	1	water pipe
	901	3 c 5	1	reducing coupling fitting
	896	3 c 5	1	pipe flange
	895	3 c 6	1	pipe hanger
	904	3 d 1	2	electrical wire
	899	3 d 6	1	gear
	898	3 d 6	1	gear
	893	3 d 6	1	gear
	883	3 d 6	1	gear
	897	5 g 2 b	1	ore bag
	886	5 g 2 b	1	ore bag
	885	5 g 2 b	1	ore bag
	892	5 h 1	1	wheel barrow
	884	8 c 1	1	wire
	900	8 c 3	1	shaft
	887	8 d	1	tubular boiler
	891	8 d	1	machine casing
30	1708	1 h 5 d	1	baseball
	1716	3 b 2 a 8	1	all thread and split ring pipe hanger
	1705	3 b 2 a 8 a	1	machine bolt
	1707	3 b 2 d	1	rectangular plate
	1724	3 c 1	1	pipe 1 1/2"
	1720	3 c 1	1	water pipe
	1719	3 c 1	1	water pipe
	1702	3 c 1	1	pipe 1"
	1733	3 c 1	1	pipe with capped ends
	1743	3 c 5	1	pipe cap
	1726	3 c 5	1	water pipe plug
	1731	3 c 5	2	pipe flange
	1717	3 c 5	1	cross fitting
	1706	3 c 5	1	slip on flange
	1723	3 d 1	1	electrical wire
	1711	3 d 1	1	electrical wire

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1714	3 d 6	1	hub
	1736	3 d 6	1	pinion gear
	1713	3 d 6	1	gear
	1742	3 d 6	1	chain
	1712	3 d 6	1	gear
	1727	4 b 1	1	baling wire
	1709	5 h 1 1	1	paint brush handle
	1722	5 l 2	1	metal scrap
	1721	5 l 2	1	metal scrap
	1737	5 j 2	1	burlap bag
	1728	8 c 1	1	wire
	1729	8 c 1	1	wire
	1739	8 c 3	1	sheave frame
	1738	8 c 3	1	threaded shaft with slot
	1703	8 c 3	2	K-1 detachable chain
	1730	8 c 3 j	1	unidentified 76
	1735	8 c 3 j	1	unidentified 53
	1710	8 c 4	1	U beam
	1715	8 c 5	1	unidentified 74
	1718	8 d	1	unidentified 75
	1734	8 d	2	engine 3
	1700	8 d	1	piston rod and unidentified 72
	1701	8 d	2	piston rod
	1741	8 d	1	machine plate end
	1740	8 d	1	engine 3
	1732	8 d	1	engine 1
	1706	8 l	1	textile
	1725	8 r	1	rubber hose
	1652	3 b 2 a 8 a	1	machine bolt and washer
	1651	3 b 2 a 8 a	1	machine bolt
	1658	3 b 2 a 1 1	1	washer
	1653	3 c 1	1	pipe 1 1/4"
	1648	3 c 1	1	pipe assemblage
	1650	3 c 5	1	90-degree elbow fitting
	1655	3 c 6	1	pipe strap hanger with twist
	1645	3 d 6	1	roller bearing

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1646	3 f 2	1	pressure tank
	1644	5 g 2 b	1	tram bucket
	1661	5 h 1 l	1	paint brush
	1660	5 j 2	1	burlap bag
	1654	5 j 2	1	burlap bag
	1659	8 a 2	1	vial
	1656	8 c 3	1	unidentified 69
	1647	8 c 3	1	steel assembly
	1657	8 c 5	1	unidentified 71
	1649	8 d	5	capstan
32	917	1 a 4	1	glove
	947	3 b 1 c 5	1	brick
	929	3 b 2 a 1 f	1	spike
	954	3 b 2 a 2	1	screw
	928	3 c 1	2	pipe 1 1/2"
	953	3 c 1	1	water pipe
	919	3 c 1	1	pipe 1"
	908	3 c 4	1	gate valve body
	956	3 c 4	1	clip valve
	920	3 c 5	1	reducing coupling fitting
	912	3 c 5	1	weld neck flange
	942	3 c 5	3	weld neck flange
	940	3 c 5	2	blind weld neck
	949	3 c 5	1	weld neck flange
	950	3 c 5	1	weld neck flange
	913	3 c 5	1	weld neck flange
	941	3 c 5	2	weld neck flange
	943	3 c 5	1	coupling fitting
	938	3 c 5	1	weld neck flange
	922	3 c 6	1	split ring pipe hanger
	934	3 d 3	1	reastat wheel
	906	3 d 3	1	reastat wheel
	951	3 d 5	1	electrical insulator
	948	3 d 6	1	drop shaft hanger
	921	3 d 6	1	pinion drive gear
	932	3 d 6	1	two piece clamp on collar

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	930	3 d 6	1	drop shaft hanger
	918	3 d 6	1	roller bearing and mount
	909	3 d 6	1	liner
	911	3 f	2	broom bristle
	936	4 a 2 d	1	rail wheel
	946	4 a 2 d	1	rail wheel
	933	5 g 2 b	1	ore bag
	935	5 l 2	1	metal scrap
	927	5 l 2	300	metal shear trimming
	952	8 c 1	1	wire
	939	8 c 1	1	wire
	923	8 c 3	1	threaded shaft with slot
	914	8 c 3	1	shaft
	910	8 c 3	1	shaft
	955	8 c 3	1	shaft with keylock
	916	8 c 3	1	shaft
	924	8 c 3	1	threaded shaft with slot
	944	8 c 3	1	split ring pipe hanger insert
	925	8 c 5	1	unidentified 5
	937	8 d	1	unidentified 7
	945	8 d	1	water pump
	931	8 d	1	tubular boiler
	907	8 d	1	unidentified 3
	905	8 d	2	water pump washer plate
	926	8 d	1	unidentified 4
	915	8 r	1	rubber hose
	991	1 a 4	1	glove
	984	3 b 2 a 8	1	nut
	972	3 b 2 a 8	1	nut
	961	3 c 1	1	T pipe
	985	3 c 1	1	pipe 1 1/4"
	996	3 c 1	1	pipe 1 1/4"
	990	3 c 1	1	T pipe and 90-degree elbow fitting
	1009	3 c 1	1	pipe 1/4"
	975	3 c 4	1	clip valve
	977	3 c 4	1	gate valve



UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	987	3 c 5	1	90-degree elbow fitting
	957	3 c 5	1	pipe flange
	958	3 c 5	1	pipe flange
	959	3 c 5	1	reducing coupling fitting
	960	3 c 5	1	coupling fitting
	968	3 c 5	1	pipe flange
	969	3 c 5	1	90-degree elbow fitting and hex bushing
	970	3 c 5	2	hex bushing
	998	3 c 5	1	T fitting
	983	3 c 5	1	hex bushing and pipe 3/4"
	988	3 c 5	1	hex bushing
	989	3 c 5	1	hex bushing and pipe
	997	3 c 5	1	hex bushing
	1000	3 c 5	1	coupling fitting
	1006	3 c 5	1	T fitting
	994	3 c 6	3	pipe strap hanger
	1004	3 c 6	1	pipe strap hanger
	1010	3 d 1	1	electrical wire
	1001	3 d 6	1	one piece set screw collar
	980	3 d 6	1	roller bearing mount
	963	3 d 6	1	pinion gear
	964	3 d 6	1	pinion gear
	995	3 d 6	1	one piece set screw collar
	1008	3 d 6	1	sleeve bearing
	1002	3 d 6	1	sleeve bearing
	1005	3 d 6	1	one piece set screw collar
	999	3 d 6	1	one piece set screw collar
	1007	3 d 6	1	sleeve bearing
	1003	3 d 6	1	sleeve bearing
	992	3 f 2	1	radiator coil
	986	3 f 2	1	pressure reducer
	965	4 a 2 d	1	rail wheel
	981	5 d	1	oil lubricator
	1303	5 i 2	1	burlap bag
	979	5 k	1	swage
	982	8 c 3	1	split ring pipe hanger with insert

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	976	8 c 3	1	split ring pipe hanger with insert
	971	8 c 3	1	threaded shaft
	967	8 c 3	1	threaded shaft
	978	8 c 3	1	split ring pipe hanger with insert
	973	8 d	1	wheel with slots and shaft
	962	8 d	1	unidentified 29
	993	8 d	1	metal disk
	974	8 d	1 chassis	pelton wheel pump and KC1182
	966	8 g	1	pelton wheel pump and Byron chassis
34	1052	1 a 4	1	glove
	1085	3 b 1 c	1	wood siding
	1043	3 b 2 a 8	1	U bolt
	1095	3 b 2 a 8	1	nut
	1042	3 b 2 a 8 a	1	machine bolt
	1096	3 b 2 c	1	grooved stock
	1055	3 c 1	1	T pipe
	1098	3 c 1	1	pipe 2 1/2"
	1079	3 c 1	1	pipe 1/8
	1058	3 c 1	1	T pipe
	1057	3 c 1	1	pipe 2"
	1100	3 c 1	1	T pipe
	1086	3 c 1	1	pipe 3/4"
	1099	3 c 1	1	pipe 3/4"
	1062	3 c 4	1	clip valve
	1069	3 c 4	1	pipe valve
	1064	3 c 5	1	90-degree elbow fitting
	1068	3 c 5	1	hex bushing
	1063	3 c 5	1	reducing coupling fitting
	1047	3 c 5	1	U fitting
	1094	3 c 5	1	water pipe plug
	1083	3 c 5	1	female adapter
	1056	3 c 5	1	pipe flange
	1059	3 c 5	1	90-degree elbow fitting
	1077	3 c 5	1	Y fitting
	1046	3 c 6	2	pipe strap hanger
	1053	3 c 6	1	hose clamp

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1061	3 c 6	1	stub end
	1090	3 d 1	1	electrical wire
	1089	3 d 1	1	electrical wire
	1050	3 d 6	1	gear
	1049	3 d 6	1	gear
	1051	3 d 6	1	gear
	1054	3 d 6	2	sleeve bearing
	1060	3 d 6	2	chain guide teeth
	1065	3 d 6	1	one piece set screw collar
	1071	3 d 6	2	chain guide teeth
	1078	3 d 6	1	chain guide teeth
	1080	3 d 6	1	chain guide teeth
	1082	3 d 6	1	unidentified 33
	1048	3 d 6	1	one piece set screw collar
	1101	3 d 6	1	chain
	1092	3 d 6	1	chain guide teeth
	1076	3 f 2	1	radiator
	1072	4 a 2 d	1	rail wheel
	1087	5 g 2 b	1	ore bag
	1044	5 g 2 b	1	james simplex vibrator
	1045	5 g 2 b	1	james simplex vibrator
	1067	5 g 2 b	2	ore bag
	1081	5 l 2	1	metal scrap
	1088	5 l 2	1	metal scrap
	1097	5 l 2	1	metal scrap
	1091	8 c 1	1	wire
	1041	8 c 3	1	crown gear
	1075	8 c 3	1	shaft
	1040	8 c 3	1	shaft
	1066	8 d	1	unidentified 32
	1074	8 d	1	pelton wheel pump
	1093	8 d	1	gould's water pump
	1073	8 l	1	textile
	1070	8 o	1	rope
	1084	8 r	1	rubber scrap
	1240	1 a 4	1	glove

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1251	1 a 4	1	glove
	1276	1 a 4	1	glove
	1297	1 a 4	1	glove
	1298	1 g 2 c 3	1	cigarette wrapper
	1301	1 j	1	match box
	1260	3 b 2 a 8	1	nut
	1261	3 b 2 a 8	1	U bolt
	1269	3 b 2 a 8 a	1	machine bolt
	1286	3 b 2 a 8 a	1	machine bolt
	1279	3 b 2 a 8 a	1	machine bolt and nut
	1289	3 b 2 a 8 a	1	machine bolt and washer
	1281	3 b 2 b	1	strap hinge
	1262	3 b 2 c	2	unidentified #7
	1293	3 c 1	1	pipe 1/2"
	1258	3 c 1	1	water pipe
	1268	3 c 1	1	pipe 1/2"
	1300	3 c 1	1	pipe 1/4"
	1236	3 c 5	1	T fitting
	1243	3 c 6	1	pipe strap hanger with twist
	1248	3 d 1	1	electrical wire
	1256	3 d 1	1	electrical wire
	1241	3 d 1	1	electrical wire
	1239	3 d 2	1	fuse
	1246	3 d 6	1	roller bearing mount
	1242	3 d 6	1	chain guide teeth
	1291	3 d 6	1	chain guide teeth
	1273	3 d 6	1	two piece clamp on collar
	1254	3 d 6	1	chain guide teeth
	1230	3 d 6	2	gear
	1290	3 d 6	1	chain
	1280	3 d 6	1	chain guide teeth
	1263	3 d 6	2	chain guide teeth
	1264	3 d 6	1	chain guide teeth
	1271	3 d 6	1	chain guide teeth
	1302	3 f	1	fire extinguisher canister
	1278	3 f 2	1	radiator
	1266	3 f 2	1	radiator coil

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1287	3 f 2	1	radiator bracket
	1252	3 f 2	1	radiator coil
	1253	3 f 2	1	radiator
	1294	4 a 2	1	auto spring
	1250	4 a 2	1	shaft and rail wheel
	1244	4 a 2	1	shaft and rail wheel
	1247	4 a 2	1	auto spring
	1275	4 a 2 d	1	rail wheel
	1272	5 g 2 b	1	ore bag
	1274	5 g 2 b	1	ore bag
	1234	5 l 1	1	one half round sheeting
	1237	5 l 2	1	metal scrap
	1283	5 l 2	1	metal scrap
	1282	5 l 2	1	metal scrap
	1245	5 l 2	1	metal scrap
	1249	5 l 2	1	metal scrap
	1277	5 l 2	1	metal scrap
	1259	5 j 2	1	55 gallon drum
	1299	5 j 2	1	crate
	1235	8 c 2 a	1	can
	1267	8 c 2 a	1	can
	1284	8 c 3	1	unidentified 48
	1233	8 c 3	1	shaft
	1231	8 c 3	2	sheave
	1295	8 c 3	1	shaft
	1232	8 c 3	1	shaft
	1288	8 c 4	1	U beam
	1292	8 c 5	1	unidentified 49
	1238	8 d	2	machinery leg
	1265	8 d	1	metal disk
	1255	8 l	1	textile
	1270	8 r	1	rubber hose
	1296	8 r	1	rubber scrap
	1257	8 r	1	rubber hose
	1630	3 b 2 a 8	1	U bolt
	1642	3 b 2 a 8 a	1	machine bolt

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1617	3 b 2 a 1 1	2	washer
	1628	3 c 1	1	pipe 1/2" and 90-degree elbow fitting
	1610	3 c 1	1	pipe 10"
	1611	3 c 1	1	pipe 1/2"
	1636	3 c 1	1	pipe
	1625	3 c 5	1	hex bushing
	1639	3 c 5	1	coupling fitting
	1629	3 c 5	1	weld neck flange
	1637	3 c 5	1	pipe flange
	1626	3 c 6	1	pipe strap hanger
	1612	3 d 6	1	gear
	1623	3 d 6	1	pinion gear
	1619	3 d 6	1	gear
	1618	3 d 6	1	gear
	1614	3 d 6	1	pulley/gear covering
	1621	3 d 6	1	pinion drive gear and shaft
	1608	3 d 6	2	pinion gear
	1638	3 d 6	1	pinion gear
	1613	3 f 2	1	pressure tank
	1631	5 g 2 b	1	beltwheel mount
	1627	5 g 2 b	1	beltwheel
	1616	5 j 2	1	55 gallon drum
	1609	5 j 2	2	burlap bag
	1615	8 c 1	2	wire
	1641	8 c 1	1	wire
	1622	8 c 3	1	sheave
	1624	8 c 3	1	iron block
	1632	8 c 3	1	sheave frame
	1633	8 c 3	1	unidentified 69
	1634	8 c 3	1	sheave frame
	1640	8 c 3	9	sheave
	1620	8 d	1	Fairbanks Morse engine casing
	1643	8 d	1	unidentified 70
	1635	8 d	1	unidentified 70



UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
37				
	1031	3 c 1	1	pipe 3"
	1021	3 c 4	1	clip valve
	1022	3 c 4	1	clip valve
	1012	3 c 4	1	gate valve bonnet and stem
	1036	3 c 5	2	8 fitting
	1033	3 c 5	1	coupling fitting
	1030	3 c 5	1	reducing coupling fitting
	1016	3 c 5	1	T fitting
	1020	3 c 5	1	90-degree elbow fitting
	1029	3 c 6	2	pipe strap hanger
	1018	3 d 6	1	one piece set screw collar
	1039	3 f 1	1	furnace door
	1026	5 g 2 b	1	james simplex vibrator
	1035	5 g 2 b	1	vibrator door
	1027	5 g 2 b	9	james simplex vibrator
	1023	5 g 2 b	1	vibrator spring bracket
	1014	5 g 2 b	1	vibrator spring bracket 2
	1017	5 g 2 b	1	vibrator spring bracket
	1037	5 j 2	1	55 gallon drum
	1034	5 j 2	1	55 gallon drum contents
	1032	5 j 2	1	55 gallon drums contents
	1025	5 j 2	1	crate strapping
	1019	5 j 2	1	55 gallon drum
	1038	8 c 3	1	unidentified 30
	1028	8 c 3	1	split ring pipe hanger with insert
	1015	8 c 3	1	shaft
	1011	8 d	1	tubular boiler
	1024	8 d	1	compression spring
	1013	8 d	1	engine part 1
38				
	1171	3 b 2 a	1	single tank lug
	1118	3 b 2 a	1	single tank lug
	1176	3 b 2 a 4	1	eye pin
	1150	3 b 2 a 8 a	1	machine bolt and washer
	1152	3 b 2 a 8 a	1	machine bolt
	1104	3 b 2 a 1	1	washer 1 on metal plate

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1102	3 b 2 d	1	round plate
	1304	3 c 1	1	U pipe
	1285	3 c 1	1	pipe 2 1/2"
	1140	3 c 1	1	pipe 2 1/2" and cap
	1174	3 c 1	1	pipe 2 1/2"
	1106	3 c 1	1	pipe 1"
	1151	3 c 1	1	pipe 1/4"
	1146	3 c 1	1	pipe 1"
	1125	3 c 1	1	pipe 2"
	1122	3 c 1	1	pipe 1"
	1120	3 c 1	1	pipe 2 3/4"
	1154	3 c 4	1	clip valve bonnet and stem
	1139	3 c 4	1	clip valve and pipe 3/4"
	1131	3 c 4	1	gate valve bonnet
	1117	3 c 4	1	gate valve bonnet and stem
	1305	3 c 5	1.0	90-degree elbow fitting
	1160	3 c 5	7	coupling fitting
	1137	3 c 5	1	T fitting
	1138	3 c 5	1	hex bushing, female adapter and pipe 3"
	1143	3 c 5	1	T fitting
	1144	3 c 5	1	coupling fitting
	1126	3 c 5	1	female adapter
	1136	3 c 5	1	T fitting
	1155	3 c 5	1	90-degree elbow fitting
	1145	3 c 5	1	female adapter
	1159	3 c 5	1	90-degree elbow fitting
	1161	3 c 5	1	8 fitting
	1162	3 c 5	1	reducing coupling fitting
	1163	3 c 5	1	hex bushing
	1115	3 c 5	1	triangular fitting
	1165	3 c 5	1	female adapter
	1169	3 c 5	1	U fitting
	1172	3 c 5	1	female adapter
	1112	3 c 5	1	coupling fitting
	1111	3 c 5	1	coupling fitting
	1132	3 c 6	1	pipe strap hanger
	1153	3 d 6	1	sleeve bearing
	1149	3 d 6	1	one piece set screw collar

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1147	3 d 6	1	one piece set screw collar
	1175	3 d 6	1	pulley
	1156	3 d 6	1	one piece set screw collar
	1306	3 d 6	1	one piece set screw collar
	1116	3 d 6	1	pulley
	1124	3 d 6	1	two piece clamp on collar
	1130	3 d 6	1	one piece set screw collar
	1121	3 d 6	1	pulley
	1108	3 d 6	1	unidentified 34
	1109	3 f 2	1	pressure reducer 1
	1114	3 f 2	1	pressure reducer 2
	1103	5 g 1	1	rock drill shaft
	1158	5 g 2 b	1	ore bag
	1123	5 g 2 b	1	ore bag
	1168	5 g 2 b	1	ore bag
	1133	5 f 2	1	metal scrap
	1173	5 j 2	1	55 gallon drum
	1157	5 j 2	1	55 gallon drum
	1166	5 j 2	1	55 gallon drum
	1134	5 j 2	1	55 gallon drum
	1142	5 j 2	1	55 gallon drum
	1127	5 j 2	1	55 gallon drum
	1148	8 c 3	1	shaft
	1164	8 c 3	1	shaft
	1135	8 c 3	1	unidentified 43
	1107	8 c 5	1	unidentified 147
	1167	8 c 5	1	unidentified 46
	1129	8 d	1	unidentified 38
	1105	8 d	1	unidentified 146
	1113	8 d	1	unidentified 35
	1170	8 d	1	unidentified 46
	1128	8 d	1	unidentified 38
	1110	8 d	1	unidentified 148
	1119	8 d	1	unidentified 37
	1142	8 l	1	textile
	1211	1 a 4	1	glove

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1180	3 b 2 a	1	tumbuckle
	1223	3 b 2 a 1	1	washer
	1190	3 b 2 a 1 1	4	washer
	1195	3 c 1	1	pipe 1/4"
	1183	3 c 1	1	T pipe
	1185	3 c 1	1	pipe 1/4"
	1224	3 c 1	1	pipe 2 1/2"
	1192	3 c 1	1	T pipe
	1181	3 c 4	1	gate valve bonnet and stem
	1230	3 c 4	1	gate valve and pipe
	1216	3 c 4	1	gate valve body
	1203	3 c 4	1	valve stem and gate
	1179	3 c 5	1	T fitting
	1182	3 c 5	1	female adapter
	1184	3 c 5	1	T fitting
	1188	3 c 5	1	90-degree elbow fitting
	1178	3 c 5	1	90-degree elbow fitting
	1226	3 c 5	1	coupling fitting
	1177	3 c 5	3	pipe flange and pipe
	1227	3 c 5	1	cross fitting
	1213	3 c 5	1	T fitting
	1225	3 c 6	1	pipe strap hanger
	1228	3 d 6	1	two piece clamp on collar
	1229	3 d 6	1	drop shaft hanger
	1191	3 d 6	1	one piece set screw collar
	1186	3 d 6	1	shaft and pinion gear
	1214	4 a 2	1	clutch plate
	1212	5 g 2 b	1	ore bag
	1204	5 g 2 b	1	ore bag
	1208	5 g 2 b	2	ore bag
	1197	5 g 2 b	1	ore bag
	1205	5 g 2 b	1	ore bag
	1219	5 g 2 b	1	ore bag
	1206	5 g 2 b	1	ore bag
	1193	5 g 2 b	1	ore bag
	1194	5 g 2 b	1	ore bag
	1203	5 j 2	1	barrel stave

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1207	5 j 2	1	55 gallon drum
	1217	8 c 3	1	sheave frame
	1210	8 c 3	1	caster
	1222	8 c 3	1	threaded shaft
	1187	8 c 3	1	gin block
	1201	8 c 3	1	unidentified 44
	1200	8 c 3	1	gin block
	1199	8 d	1	drum
	1198	8 d	1	unidentified 42
	1209	8 d	1	unidentified 45
	1196	8 d	1	compression spring
	1215	8 d	1	unidentified 45
	1221	8 d	2	engine part 1
	1189	8 d	1	unidentified 40
	1218	8 f	2	document
40	1311	1 a 4	1	glove
	1355	3 b 2 a 1	1	washer
	1325	3 b 2 d 1	1	arm bracket
	1323	3 c 1	1	pipe with blind flange
	1318	3 c 1	1	pipe 2 1/2"
	1336	3 c 1	1	pipe 2"
	1340	3 c 1	1	pipe 2 1/2" with flanged ends
	1354	3 c 1	1	pipe 1 1/4"
	1353	3 c 1	1	pipe 2"
	1351	3 c 1	1	pipe 1" and electrical cord
	1329	3 c 1	1	pipe 2" with stub end
	1343	3 c 1	1	pipe 1/2" and pipe strap hanger
	1309	3 c 4	1	gate valve gate
	1348	3 c 4	1	gate valve body
	1328	3 c 4	1	gate valve body
	1307	3 c 5	1	T fitting
	1308	3 c 5	1	T fitting
	1317	3 c 5	1	Y fitting
	1330	3 c 5	1	T fitting
	1337	3 c 5	1	T fitting

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1345	3 c 5	1	coupling fitting
	1312	3 c 6	1	pipe strap hanger
	1338	3 d 6	1	one piece set screw collar with square end
	1331	3 d 6	1	post hanger
	1326	3 d 6	1	gear
	1346	3 d 6	1	chain guide teeth
	1321	3 d 6	1	solid journal box
	1335	3 f 2	1	radiator bracket
	1350	3 f 2	1	radiator bracket
	1349	4 a 2 d	1	rail wheel (2), shaft & one-piece set screw collar
	113	5 g 2 b	1	ore sorting blade
	1327	5 h 1	1	tool handle
	1352	5 i 2	1	metal scrap
	1347	5 j 2	1	crate cover
	1314	5 j 2	1	55 gallon drum
	1315	5 j 2	1	crate
	1342	8 c 3	1	threaded shaft
	1332	8 c 3	1	sheave frame
	1322	8 c 3	1	sheave and sheave frame
	1339	8 c 3	1	sheave frame
	1319	8 c 3	1	unidentified 56
	1320	8 c 3	1	sheave frame
	1313	8 c 3	2	unidentified 149
	1324	8 c 3	1	sheave frame
	1334	8 c 5	1	unidentified 59
	1333	8 d	1	unidentified 53
	1344	8 d	1	unidentified 32
	1316	8 d	1	chassis 2
	1310	8 d	1	unidentified 55
	1341	8 d	1	unidentified 54
	1593	3 b 2 a 8	1	nut
	1562	3 c 1	1	water pipe
	1561	3 c 1	1	pipe 10" with flange
	1554	3 c 1	1	pipe 1 1/4" and square flange
	1565	3 c 1	1	pipe 1/2"



UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1564	3 c 1	1	pipe 3/4"
	1545	3 c 1	1	pipe 3/4" and reservoir assembly
	1567	3 c 1	1	pipe 1/2"
	1581	3 c 1	1	pipe with flange
	1588	3 c 1	1	pipe 1 1/2"
	1584	3 c 1	1	pipe 3' and coupling fitting
	1595	3 c 1	1	pipe 1 1/4"
	1601	3 c 1	1	pipe 1"
	1598	3 c 1	1	pipe 4"
	1579	3 c 5	1	'T' fitting
	1583	3 c 6	1	reel
	1603	3 c 6	1	split ring pipe hanger
	1594	3 d 1	4	electrical wire
	1550	3 d 1	1	electrical wire
	1591	3 d 4	1	lightbulb base
	1551	3 d 5	1	electrical insulator with nail
	1587	3 d 5	2	electrical insulator
	1552	3 d 5	1	electrical insulator with nail
	1604	3 d 6	1	two piece clamp on collar
	1578	3 d 6	2	pinion gear
	1556	5 g 2 b	1	beltwheel
	1572	5 g 2 b	1	chassis 2
	1589	5 g 2 b	1	beltwheel and mount
	1592	5 g 2 b	1	beltwheel
	1560	5 g 2 b	1	chassis 2
	1586	5 g 2 b	1	beltwheel and shaft
	1585	5 g 2 b	1	beltwheel and mount
	1599	5 g 2 b	1	chassis 2
	1573	5 g 2 b	1	chassis 2
	1569	5 g 2 b	1	chassis 2
	1607	5 g 2 b	1	chassis 2
	1606	5 g 2 b	1	chassis 2
	1574	5 g 2 b	1	chassis 2
	1563	5 g 2 b	1	chassis 2
	1602	5 i 2	1	metal scrap
	1596	5 j 2	1	burlap bag
	1548	5 j 2	1	crate strapping

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1600	5 j 2	1	burlap bag
	1559	5 j 2	1	burlap bag
	1576	5 j 2	2	burlap bag
	1597	8 c 1	1	wire
	1549	8 c 1	2	wire
	1575	8 c 1	1	wire
	1555	8 c 1	1	wire
	1557	8 c 1	1	wire
	1582	8 c 1	1	wire
	1570	8 c 1	1	wire
	1547	8 c 1	1	wire
	1566	8 c 1	1	wire
	1568	8 c 3	1	unidentified 68
	1553	8 c 3	1	shaft
	1590	8 c 4	1	l. beam
	1558	8 d	1	chain guard
	1577	8 d	1	sprocket wheel
	1546	8 d	1	chain guard
	1571	8 d	1	chassis 3
	1580	8 d	1	sprocket wheel
	1605	8 g	1	carved wood
42	1406	3 b 2 a 4	1	eye pin
	1407	3 b 2 d	1	rectangular plate
	1398	3 c 1	1	pipe 1/2"
	1397	3 c 1	1	pipe 1/2"
	1400	3 c 1	1	pipe 2 1/3"
	1401	3 c 1	1	pipe 1 1/2"
	1404	3 c 1	1	pipe 2 1/2"
	1387	3 c 4	1	gate valve bonnet
	1441	3 c 5	1	T fitting
	1396	3 d 6	1	bevel gear
	1394	3 d 6	1	pulley
	1393	3 d 6	1	pulley
	1390	3 d 6	1	pulley, shaft, and one piece set screw collar
	1386	3 d 6	1	pulley and shaft
	1389	3 f 3	1	stove pipe

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1402	4 d	1	cable
	1399	4 d	1	cable
	1403	5 g 2 b	1	ore bag
	1443	5 j 2	1	burlap bag
	1405	5 k	1	bottom round swage
	1442	8 c 2 b	1	can end
	1392	8 c 4	1	I beam
	1391	8 d	1	wheel cover plate
	1388	8 d	1	triangular plate
	1395	8 d	1	unidentified 60
43	1435	3 b 2 a 8	1	bolt
	1440	3 b 2 a 8 a	2	machine bolt
	1416	3 b 2 d	1	rectangular brace
	1412	3 b 2 d	1	L brace
	1414	3 b 2 d	1	L brace
	1436	3 c 1	1	pipe 1/4"
	1429	3 c 1	1	pipe 2 1/4"
	1415	3 c 1	1	pipe 3/4"
	1430	3 c 1	1	pipe 2"
	1418	3 c 4	1	gate valve and pipe 1"
	1431	3 c 4	1	gate valve and pipe
	1433	3 c 4	1	clip valve
	1423	3 c 5	1	90-degree elbow fitting
	1417	3 c 5	1	90-degree elbow fitting
	1419	3 c 5	1	cross fitting
	1422	3 c 5	1	T fitting
	1421	3 c 5	1	coupling fitting
	1408	3 d 6	6	pulley
	1409	3 d 6	1	pulley and shaft
	1411	3 d 6	1	pinion gear with shaft
	1437	3 d 6	1	shim
	1432	3 d 6	1	one piece set screw collar
	1413	4 d	1	cable
	1426	5 g 2 b	1	trump weighing machine
	1410	5 g 2 b	5	concentrating table

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
44	1420	5 g 2 b	1	ore chute angled
	1424	5 g 2 b	1	ore bag
	1427	5 g 2 b	1	ore bag
	1438	5 j 2	1	crate
	1427	8 c 1	1	wire
	1434	8 c 3	1	shaft
	1439	8 c 5	1	unidentified 63
	1425	8 d	1	unidentified 62
45	1459	3 b 2 a 8	2	machine bolt
	1451	3 b 2 a 8 a	1	machine bolt
	1467	3 c 1	1	pipe 1 1/4"
	1489	3 c 1	1	pipe 2 1/2"
	1476	3 c 1	1	pipe 1 1/2" assemblage
	1471	3 c 1	1	pipe 2"
	1461	3 c 1	1	pipe 1 1/4", T fitting, and hex bushing
	1462	3 c 1	1	pipe 2 1/4"
	1463	3 c 1	1	pipe 1"
	1466	3 c 1	1	pipe 1 1/4"
	1486	3 c 1	1	pipe 2 1/4"
	1465	3 c 1	1	pipe 1 1/4" and gate valve
	1460	3 c 1	1	pipe 1"
	1487	3 c 1	1	pipe 1 1/4" and pointed fitting
	1474	3 c 1	1	pipe 1 1/2"
	1484	3 c 1	1	pipe 1 1/4" and hex bushing
	1449	3 c 1	1	U pipe
	1448	3 c 1	1	pipe 1/2" and 90-degree elbow fitting
	1444	3 c 1	2	h pipe
	1468	3 c 4	1	gate valve and pipe 1/4" with female adaptor
	1482	3 c 5	1	female adapter
	1485	3 c 5	2	90-degree elbow fitting
	1458	3 c 5	1	coupling fitting
	1469	3 c 5	1	female adapter
	1472	3 c 5	1	hex bushing
	1447	3 c 5	1	pipe cap
	1445	3 d 6	1	drop shaft hanger

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1473	4 a 2 d	1	rail wheel
	1478	4 a 2 d	1	rail wheel
	1488	4 d	1	cable
	1457	5 g 2 b	1	chassis 2
	1481	5 l 2	1	metal scrap
	1477	5 j 2	1	barrel remnant
	1452	5 j 2	4	burlap bag
	1464	5 j 2	1	burlap bag
	1454	5 j 2	1	crate strapping
	1455	5 j 2	1	burlap bag
	1475	8 c 1	1	wire
	1480	8 c 1	1	wire
	1450	8 c 1	2	wire
	1470	8 c 1	1	wire
	1446	8 c 5	1	unidentified 64
	1456	8 d	1	unidentified 65
	1453	8 d	1	engine end plate
	1479	8 d	1	wheel with slots hub
	1483	8 o 5	1	rope
45	1366	3 b 1 c 5	1	brick
	1365	3 b 2 a 8	1	nut
	1382	3 b 2 a 8	1	machine bolt
	1384	3 b 2 a 8 a	1	machine bolt
	1356	3 c 1	1	fire hose
	1357	3 c 1	1	U pipe
	1372	3 c 4	1	valve body and stem
	1379	3 c 5	1	pipe flange
	1381	3 c 5	1	weld neck flange
	1383	3 c 6	1	pipe strap hanger
	1374	3 d 6	1	solid journal box
	1358	3 d 6	2	pulley
	1373	3 d 6	1	pulley
	1368	4 a 2	2	sled/sledge runner
	1385	4 a 2 d	1	rail wheel
	1360	4 a 2 d	1	rail wheel and shaft
	1363	5 g 2 b	1	wire mesh

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1377	5 h 1 c	1	wrench
	1367	5 i 2	1	metal scrap
	1364	5 j 2	1	crate
	1369	5 j 2	3	barrel stave
	1370	5 j 2	1	barrel lid
	1375	8 c 3	2	threaded shaft and base
	1371	8 c 3	1	threaded shaft
	1376	8 c 3	3	threaded shaft
	1362	8 c 3 j	1	unidentified 52
	1378	8 c 4	2	unidentified 51
	1380	8 c 5	1	unidentified 50
	1361	8 d	1	simplex condensation meter
	1359	8 d	1	drum
46	1494	3 c 1	1	pipe 3/4"
	1503	3 c 1	1	pipe 1/2"
	1496	3 c 1	1	pipe 1"
	1515	3 c 1	1	pipe 4"
	1514	3 c 1	1	pipe 4"
	1513	3 c 1	1	pipe 4"
	1512	3 c 1	1	pipe 3/4"
	1511	3 c 1	1	pipe 3/4"
	1510	3 c 1	1	pipe 1/2"
	1509	3 c 1	1	pipe 3/8"
	1508	3 c 1	1	pipe 1/2"
	1507	3 c 1	1	pipe 1/4"
	1506	3 c 1	1	pipe 1/4"
	1517	3 c 1	2	pipe 1 1/2"
	1504	3 c 1	1	pipe 1/2"
	1518	3 c 1	6	pipe 1 1/2"
	1502	3 c 1	1	pipe 1/2"
	1501	3 c 1	1	pipe 3/8"
	1500	3 c 1	1	pipe 1/2"
	1499	3 c 1	1	pipe 3/4"
	1498	3 c 1	1	pipe 3/8"
	1497	3 c 1	1	pipe 1/2"
	1495	3 c 1	1	pipe 3/4"

UNIT	FS	FUNCTION CODE	N	IDENTIFICATION
	1493	3 c 1	1	pipe 3/4"
	1492	3 c 1	1	pipe 1/2"
	1491	3 c 1	1	pipe 1/2"
	1490	3 c 1	1	pipe 1"
	1505	3 c 1	1	pipe 1/2"
	1530	3 c 1	1	pipe 4"
	1543	3 c 1	1	pipe 1"
	1538	3 c 1	1	pipe 3/4"
	1536	3 c 1	1	pipe 1"
	1534	3 c 1	1	pipe 4"
	1533	3 c 1	1	pipe 4"
	1516	3 c 1	1	pipe 6" with tapered pipe fitting
	1531	3 c 1	1	pipe 3 3/4"
	1529	3 c 1	1	pipe 1"
	1521	3 c 1	3	pipe 1 1/2"
	1519	3 c 1	1	pipe 1 1/2"
	1526	3 c 1	1	pipe 1 1/4"
	1520	3 c 1	1	pipe 1 1/2" and 90-degree elbow fitting
	1525	3 c 1	1	pipe 1 1/2"
	1524	3 c 1	1	pipe 1 1/2"
	1523	3 c 1	1	pipe 1"
	1522	3 c 1	1	pipe 1 1/2"
	1527	3 c 1	1	pipe 11"
	1537	3 c 4	1	gate valve and pipe 3/4"
	1532	3 c 6	1	one piece pipe hanger with threaded rod
	1540	3 d 1	1	electrical wire
	1528	5 g 2 b	1	wire mesh
	1539	5 l 2	1	metal scrap
	1544	5 j 2	1	crate strapping
	1542	5 j 2	1	barrel end
	1541	8 c 1	1	wire
	1535	8 d	2	trapezoid side plates