Bureau of Mines Boulder City Experimental Station, Ore Dressing Pilot Plant
(Building No. 600)
Date Street North of U.S. Highway 93
Boulder City
Clark County
Nevada

HABS No. NV-35-F

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Buildings Survey
National Park Service
Western Region
Department of the Interior
San Francisco, California 94107

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HISTORIC AMERICAN BUILDINGS SURVEY

BUREAU OF MINES BOULDER CITY EXPERIMENTAL STATION (Date Street Complex) ORE DRESSING PILOT PLANT BUILDING (Building No. 600)

HABS No. NV-35-F

Location: Date Street Complex, bordered by U.S. Highway 93 Truck Route, and Elm and Date streets
Boulder City, Clark County, Nevada

Building 600 is located in the west central portion of the complex. Building 700 is to the south, and Building 500 is to the northeast.

Boulder City, Nev., 7.5' Topographic Quadrangle, U.S.G.S., 1958, Photorevised 1983, Universal Transverse Mercator Coordinates: 11.694470.3983300 (approximate center of building)

Present Owner: U.S. Department of the Interior, Bureau of Reclamation

Present Use: Abandoned

Significance: Building 600, as part of the Date Street Complex, was a component of the Bureau of Mines Electrometallurgical Research Facility located in Boulder City. As such, it is within the designated Boulder City Historic District. One of five buildings considered to be eligible that is to be demolished, this building retains considerable integrity despite the removal of a conveyor belt structure and the addition of an elevator. In a report of a survey of the Date Street Complex, Christine Pfaff (1992:4) of the Bureau of Reclamation determined Building 600 to be a contributing element to the district because it was constructed during the period of significance (1931-1945) for the District, contributed to the functioning of the Research Facility, and is significant as a part of the complex under National Register Criterion a. Thus, Building 600 is considered a contributing element to the District.

The significance of the Boulder City Historic District is tied to the Boulder Canyon Project (Hoover Dam) and to the history of American City Planning. This was the first community constructed following the federal New Towns model, as well as the "first fully-developed experience in new town planning as promoted by the Community Planning Movement, a movement which is recognized as the force which most influenced contemporary community planning practices" (Woodward et al. 1983:8.1).

HISTORICAL INFORMATION

A. Physical History

Date of erection: Building 600 was built in 1941 as part of the electrolytic manganese pilot plant complex. It is a steel-framed building with corrugated sheet metal siding. The complex consisted of a Coarse Crushing Plant to the west, connecting to the Pilot Mill Concentrator, or Ore Dressing Pilot Plant (Building 600), by conveyor; to the north, also connected by conveyors, was the Hydrometallurgical Pilot Plant; and to the east was the Electrolytic Manganese Pilot Plant (Building 500). According to a 1952 report (Metallurgical Division 1952:5) of the Boulder City station, changes were made to the Pilot-Mill Concentrator in 1951. These included the addition of an elevator and possibly a tank on the south elevation. A c. 1949 aerial photograph (NV-35-2; from list of Bureau of Mines plan drawings - Mang. Concentrator P. P. Elevator Housing Framing Plan & Elevations 1951:X-300-1338) shows a possible two-story structure near the southeast corner of the building. It has a south sloping shed roof and a window on the second level. A 1953 aerial photograph (NV-35-3) shows the presence of the elevator and a large metal tank, approximately 32 feet in diameter, that is just west of the south entrance. The two-story addition is not in evidence. Remodeling conducted between 1958 and 1963 resulted in new uses for the building including beryllium and yttrium testing, and glass fabrication. Costs for this building were $149,465, including equipment, in 1941 for the original construction, and 176,000, plus equipment, for the changes in 1951 (Metallurgical Division 1952:5).

Discussion of building use: As part of the Manganese Pilot Plant complex, Building 600 contained the machines to process the coarsely crushed ores conveyed from the Coarse Crusher to the west. These ores were from the Three Kids Mine, Fannie Ryan, and Boulder City Manganese (Clark County; Batty and Agey 1948; King and Trengove 1950), the Gibellini Mine (Eureka County), the Black Rock Mine (Lander County) and Pollard Canyon (Pershing County; Engel et al. 1955), as well as mines in Arkansas, Montana, New Mexico, and South Dakota. Originally, ores were conveyed from the *Crusher Building* to the *Ore Bin*, located on the west side of Building 600. The *Ball Mill* area, within the west end of the building proper, was just east of the *Ore Bin*. Although not specifically stated, this appears to have been the area where testing was done on dry-crushing and wet-grinding processes. This was a complete milling plant rated at 40 tons per day. After the ore was processed it was conveyed to the Hydrometallurgical Building (no longer present) to the north. In 1951 and 1952, the Bureau of Mines received funding for manganese beneficiation, specifically for testing the Artillery Peak, Arizona ores. Part of the funding was used for constructing a warehouse, but most was directed toward modernizing and improving the Ore-Dressing and Hydrometallurgical Pilot Plants. Building 600 had more ore bins added, cross-conveyors, special feeders for blending several ore samples, and other renovations increasing the efficiency of the work flow and the capacity to about 50 tons per day processed. The remainder of the funds were used to modernize and add equipment to the Hydrometallurgical Pilot Plant (Metallurgical Division 1952:6, 9, 13), which was dismantled in 1960, 1961, and 1965 ([Blue] 1966:29, 31). In 1960, the crusher and conveyor system also were dismantled. Between c. 1953 and 1965 (NV-35-3; NV-35-4), the central seven-story tower on Building 600 was reduced to four stories, and any other structures associated with the Manganese Pilot Plant complex were removed.

During the 1960s and on, work conducted in Building 600 was directed toward glass fabrication (for glass and quartz equipment), and beryllium and yttrium testing ([Blue] 1966:30, 35). However, by the late 1970s until the station closed Building 600 was used for storage purposes (Herb Wells, personal communication 30 November 2000).

B. Description of Building 600:

Although this building is oriented on a northeast/southwest axis, the description of the elevations will be addressed as north, south, east, and west.

Condition of fabric: This building has been essentially abandoned since 1984, unfortunately leaving it open to disturbance and damage by pigeons. The structure remains in fair to good condition with some broken windows in the upper levels, providing entry for the birds.

Description of exterior: This is a multi-level, steel-framed building that follows a simple rectangular plan. It measures 100 (north/south) by 37 (east/west) feet with three stories and an upper deck. The roofline consists of shed roofs at different levels. The primary roof slope is to the east, with a west sloping shed roof on a two-story segment on the west side of the building. The elevator addition and associated machine room roofs slope to the south. Roofing material is corrugated sheet metal. There are open eaves on the north and south elevations, with a slight overhang around the entire building. Wall cladding is corrugated sheet metal. Vent pipes are present on all elevations: two on the northwest are attached to the walls and one exits below the roofline to extend above it; the northeast elevation has one vent pipe that also exits just below the roofline; one is present on the southeast elevation, located just above the first level entry to the roof; there are two on the southwest elevation, one on the roof (southeast side) of the two-story section, and the other exits just below the roofline on the fourth story (northwest side). All of the windows are metal framed, 15-part divided-light with a central 6-part divided awning type light. The doors are metal with metal framing, and all have divided half-lights. The foundation and floors are concrete.

The primary elevation (front) faces south. There are ten windows on this elevation: two on the fourth level, three on the third, and the remainder on the second. One of the fourth level windows is on the central tower. Based upon two 1941 photographs, one showing the building under construction (Pfaff 1992:53) and the other entitled "Concentrator Plant" (NV-35-F-8), there were windows on the end on the lower three levels where the elevator now stands. The first level had an additional five windows, three of which are now visible by the patches on the wall. A set of tall, corrugated metal doors were located just east of the westernmost window on the level, which has since been removed. A single hollow metal door was near the center of the building below windows on the second and third levels, of which only the third level window remains. The fourth level windows are the same, but the tower had three additional windows in the upper levels. A set of double doors provides entry on this elevation. Each has half-glass (6-part divided-light, 2/2/2), and there is a metal lintel over the opening. These appear to have been where one of the first level windows once was located. To the east of these doors is the elevator, which has an exterior opening on the first level. A third historic photograph (Pfaff 1992:54), taken after the addition of

the elevator in 1951, shows the tank that was added at about the same time. Where visible, the fenestration appears to be original, which is corroborated by the 1953 aerial photograph (NV-35-3). By 1965 (NV-35-F-8), there were two windows on the first level, five on the second, three on the third, and two on the fourth.

The east elevation has windows on three levels on the primary mass. The two windows on the third level are symmetrically placed in the northwest half of the elevation. The other two levels each only have one window. The 1941 construction photograph, which shows the south and east elevations, provides a view of most of the original east elevation fenestration. There were three windows each on the second and third levels. Those on the first level were not visible due to the tanks located on that end of the building. No openings are present on the north, one-story addition.

There are windows on the four levels of the north elevation. Two are on the first and fourth, six are on the second, and three are on the third. The center window on the third level has an evaporative cooling unit in the awning. The east window on this level opens out to a metal platform. The central portion is filled-in. Its original purpose is unknown, although it likely was associated with the manganese processing system. Below this, on the second level, is a one-story addition. Using an existing metal girder and support post system with a Truscon deck and concrete floor (Building 600, Ramp Details, Span from N. Wall to Conc. Retaining Wall, 1961:X-300-1343), this 1961 addition measures 19 (north/south) by 11 (east/west) feet. It has corrugated metal siding, an east sloping corrugated metal shed roof, and double metal doors, each with wire half-glass (divided-light, 1/1). There is a 2½-foot distance between the ground level and the opening. A metal and wood ramp placed to the east of the addition appears to be the means of entry. The other half of the concrete ramp leads to a double and single door entry, both of which are wire half-glass type doors. The double doors are approximately 3 feet above the ramp surface, providing a loading entrance. The single door to the west is at the top of a set of concrete stairs. A 1951 plan (Manganese Conc. - Pilot Plant, Concrete Ret. Walls N. & E. of Mill Bldg, 1951:X-300-1337) of the retaining walls on the north and east elevations shows that this ramp originally held two conveyors and a *Cyclotherm Steam Generator*. On the ground level, there are two evaporative cooling units just west of the concrete ramp. A door cut into the metal siding is near the west end. This level is accessed by concrete steps with a metal rail near the center of the elevation. A second evaporative cooling unit is present on the third level at the west end of the building.

The west elevation has windows on the fourth and second levels. The three fourth level windows are symmetrically placed, with the center on what remains of the seven-level central tower. Under the northwest window on this level are two evaporative cooling units. The northwest window on the second level is painted over, whereas the other at the southeast end has been covered by sheet metal, except for one pane from the second row. In the center of the elevation, on the first level, is a set of double metal doors that are similar to those on the south elevation.

Next to the building on the south end of the east elevation is an 8-foot diameter concrete pad with a 3-foot high corrugated metal wall measuring about 7 feet in diameter. Two historic photographs (Pfaff 1992:53; NV-35-3) indicate that this was one of five open tanks located on the east side of the building. A retaining wall on the west, north, and east sides of the building was constructed in

1951 (Concrete Ret. Walls N. & E. of Mill Bldg. 1951:X-300-1337). The east wall heights varied from 4½ to 8½ feet. An examination of the wall suggests that concrete was added, possible to increase its height as a retaining wall. The varied height suggests that the slope of the hill dictated the height of the retaining wall. The north wall height is 10 feet at the east end and 8 feet at the west end, with a foot above ground level. The west segment was 7 feet, although the current height is approximately 5 feet due to the addition of an approximately 2-foot high concrete pad to the west quarter of the "yard." All segments of the retaining wall are 8 inches wide. Among the notes for the retaining walls was information regarding the strength of the concrete, which was to be "2500 lb." A metal railing was placed in the center of the wall along its length. The floor elevation varied more than 2 feet from the west to the east on the drawing.

Beside (east) the metal stair descending into the yard is a poured concrete block with form marks. This block, which is approximately 9 feet wide by 7 feet high by 9 feet deep, is noted on the plan as the base of a *Concentrate Bin.* However, a c. 1951 photograph (Pfaff 1992:56) of the north elevation shows a water softener with a 72,000-gallon capacity in the location of the block and attached to the building approximately where a vertical pipe between the second and third level windows is currently located. A building on the ramp is not the same as the one there now. It had a steeper roof slope, no exterior opening on the north elevation, and an exhaust pipe on the roof near the center of the west side. It also appears to have been where the current sets of doors are located.

Poured concrete pads are on the south, north, and west elevations. Those close to the building on the west and south elevations are in front of the entrances and around the elevator on the south elevation. The concrete on the north elevation is north of the retaining wall with an entry onto the ramp. West of the building are two circular (approximately 14 feet in diameter) concrete "silos" that appear to be remnants of the Manganese Pilot Plant complex, along with other concrete surfacing and pads that were part of the buildings and conveyor systems.

Description of interior: The earliest available interior plan drawing of this building dates from c. 1953 (NV-35-F-9); however, only the first level room designations are provided. Noted are the floor areas for the levels (first - 4,350 square feet, second - 2,900 square feet, third - 3,500 square feet, and fourth - 1,710 square feet) for a total area of 12,460 square feet. Measurements for the two rooms noted in the plan are included, as well. As noted above, the *Ore Bin* area was removed between 1953 and 1965. Original building entries noted on this plan indicate that the one on the west elevation was in the northwest corner. There were two entries on the south elevation, with a single door entry beside the double door one. The east elevation also had a single door that is now gone. The elevator and machine room are present. Besides the *Ore Bin*, there are two other named rooms, the *Ball Mill* (west end of the building) and a *Sample Room* (on the north wall in the center). The remaining area is open.

Renovations made to the building during the major period of remodeling and removal (1957-1965), include remodeling the second and third floors into modern laboratories and the installation of new sump facilities in 1959, completion of the beryllium laboratories in 1960, installation of new electrical circuits in 1961, and completion of a pilot plant type laboratory for yttrium research and

installation of new laboratories on the first level in 1962. Although not specifically noted, it was during this period that the tower section was partially removed. A dolomite kiln and adjoining structure located behind (direction unknown) were removed in 1958, at the time "cleanup remodeling" on the building began ([Blue] 1966:29-30).

Using remnant "furniture" and room location, it is possible to ascertain the probable function of many of the rooms as they appear today. All of the floors are painted and sealed concrete. The mezzanines are metal and metal grate. Most of the rooms have wall studs, but where walls remain they are plywood. With the exception of the restroom and laboratory/office complex on the third floor, there are no lowered ceilings. Lighting consists of hanging fluorescent baffles in the offices and laboratories with hanging incandescent lights in the hallways and open areas. Laboratory furniture is all that remains with most of it on the first level. This is comprised of cabinets with drawers and surface work space, sometimes a sink, and access to gas lines, and fume hood work areas. The hoods are steel angle frames. Interior windows appear to be present in the first and third level rooms. Extant interior doors are wood in wood framing. All have inset panels (one or more) and unless otherwise noted, they are half-glass (4-light, 2/2) over inset panel. All of the stairs are stringer with metal grate treads.

On the west end of Building 600 on the first level is the *Ball Mill* room. An electrical bank is on the north wall, with a built-in work area on the west wall just north of the doors. Along the south wall is a half-ton overhead traveling lift. A stairway leads to the second level metal grate mezzanine on the east wall. A wider than normal door (third-glass, single-light, over two inset panels) near the southeast corner leads into the remainder of the first level, which is approached by a set of stairs.

Most of the first level is approximately 3½ feet lower than the west end. In the center section is a hallway on the south with stairs leading into the west end and up to the second level on the west end. The north side has three first level laboratories with entries on the south wall. All are on raised concrete slabs ranging from 16 inches on the west end to 8 inches on the east above the main floor surface. The first two rooms, from the west, contain cabinets and work surfaces. The door to the west lab is plain wood, whereas the door to the middle laboratory is a third-glass. The third laboratory, on the east end, has three fume hoods on the west wall, and a cabinet on the north wall. The door (a third-glass) retains the name *GLASS LAB*. On the north side is an enclosed utility corridor. At one time there were entries from the three laboratories into this corridor. None of the walls remain, but there is a space on the east wall of the third laboratory suggesting a large window was there at one time. On the east end of the building is an open area just inside the entrance with a built-in wood bench on the west wall. A door in the northwest corner goes into the utility corridor. A door near the center of the east wall goes into another laboratory area, also with only wood studs remaining. To the east of the entrance is a sump pit covered with a steel coverplate. There are two concrete slabs to the west of the pit, which has a concrete retaining wall. The first level entrance to the elevator is on the south wall to the east of the entrance. The floor of the first level slopes down to the sump area.

On the second level the west end is open to the first level with a mezzanine on the east wall. A set of stairs lead down to it from the southeast corner of the east wall. A half-glass door (divided-light, 1/1, over inset panel) opens into the main part of the second level. Most of the level is open with evidence of a laboratory area on the east wall. There are two rooms offset to the west that probably were used as office space. Entry was from the southwest corner of the west room, the southeast corner and on the east wall of the east room, with a wide entry space connecting the two rooms in the center of the shared wall. Neither of these rooms retains a door. An open space is between the north wall of the rooms and the north wall of the building. In the northeast corner are the exterior doors, a water heater on a raised concrete housekeeping pad, and the entry to the addition. The addition contains only metal shelving, possibly for storage purposes. It is accessed by a metal-framed, metal half-glass (divided-light) door. In the center of the open area are four steel beams. The southeast corner has a laboratory area and a restroom. A 5½-foot partition is on the north end of the laboratory area. The restroom has only a toilet with no walls, ceiling, or door, only wood studs. Just outside the restroom entry is the access to the elevator. A set of stairs to the third level is on the south wall near the east end. A set of stairs on the west end also goes to the third level, above a set that lead to the first level.

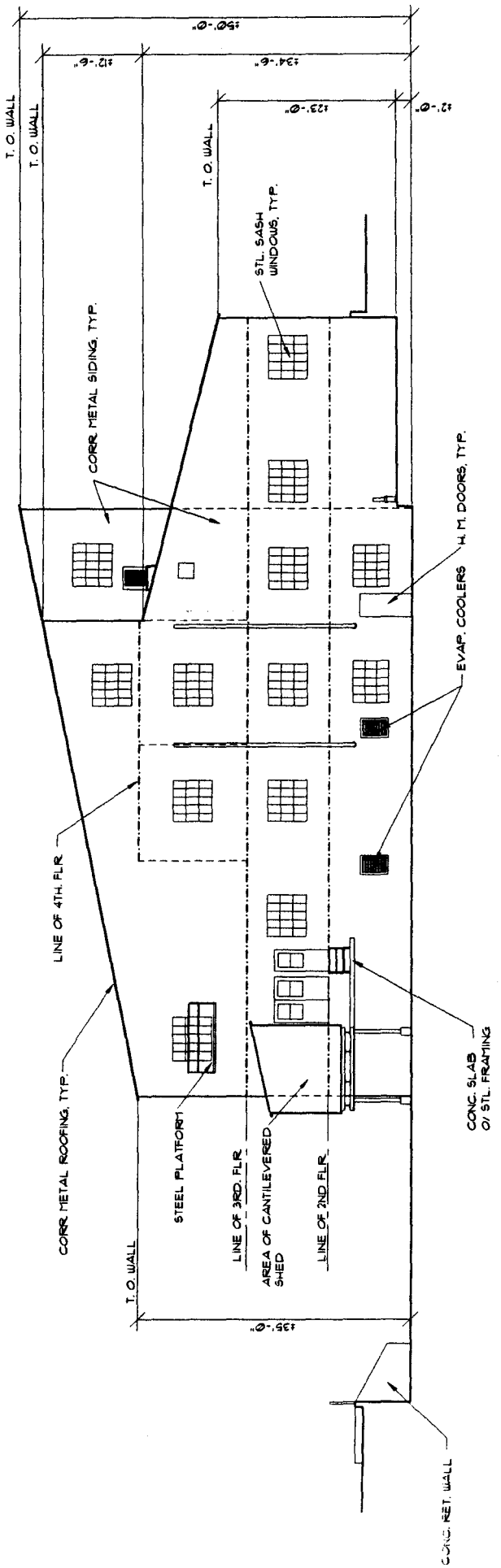
The west end of the building remains open with no mezzanine on the third level. The remainder of the third level has two offices and two laboratories occupying most of the floor and a restroom in the southeast corner. The office/laboratory area has 14-foot high ceilings, except for the east office, which has a finished ceiling measuring 8½ feet high. The two laboratories are the same size, with an open area between the west wall of the west laboratory and the interior east wall to the open west end. The west laboratory door is in the southwest corner, whereas the east laboratory door is in the center of the south wall. These doors are both half-glass (4-light). The west office space is the largest room on the level. It encompasses the north end of the area west of the west laboratory, as well as a segment north of the west laboratory. There are two doors, one at the juncture of the south wall of the office with the west wall of the laboratory, and the other from the northwest corner of the laboratory. Both doors are third-glass. A window on the south wall near the southwest corner is a wood-framed horizontal slider. This office has a door opening into the west end of the building. It, too, is a third-glass and is located in the northwest corner of the office. Just south of this, also on the west wall, is a 15-part divided-light with a central 6-part divided awning. The east office is entered by a door in the northeast corner of the east laboratory and from the south corner of the east wall. The laboratory door is a third-glass, but the exterior door is of plain wood with no lights. A 4-light (2/2) double casement is on the south wall just to the west of the door. The room is the same length as the laboratory. An open space north of the offices is the length of both laboratories. The restroom, which is larger than the one on the second level, has interior plywood walls and ceiling with corrugated metal siding on the outside of the west and north walls. These walls are painted. Inside the restroom are a sink, toilet, and shower. The door, on the north wall, is wood with a single-light. On the south wall in the east corner is the elevator access. Along the wall are three sets of stairs, the center leading to the fourth level.

The fourth level consists of a two-level steel and deck mezzanine over the laboratory and office area with pipe rail sleeves. The lower level is accessed by stairs from the third level. A steel ladder providing access to the upper level is near the southwest corner of the west laboratory on the third

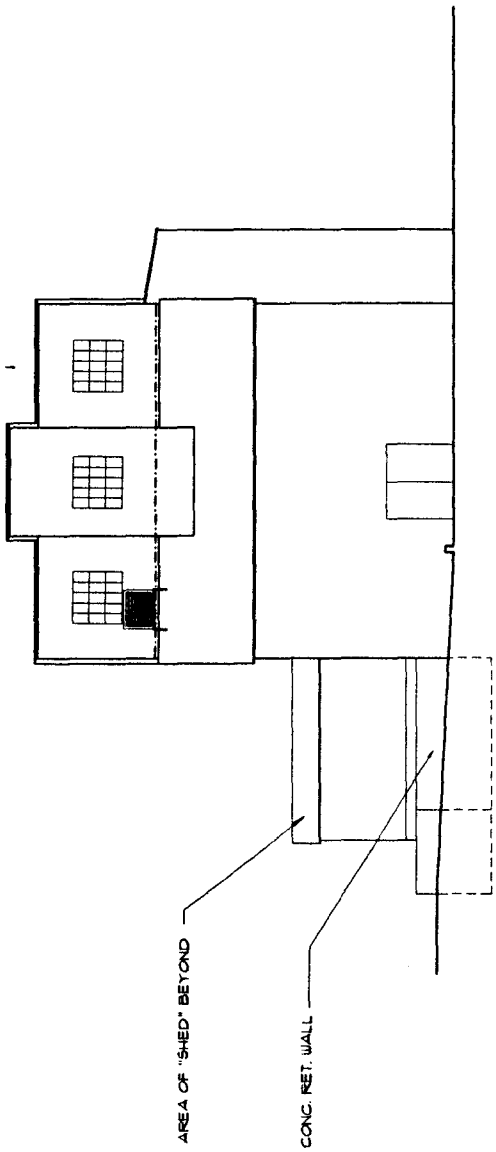
level. The remainder of the fourth level is open, except for the roof that is over the west part of the building. The stairs from the third level are on the southeast corner of the mezzanine. A roof patch shows where the tower height continued.

Additional Documentation:

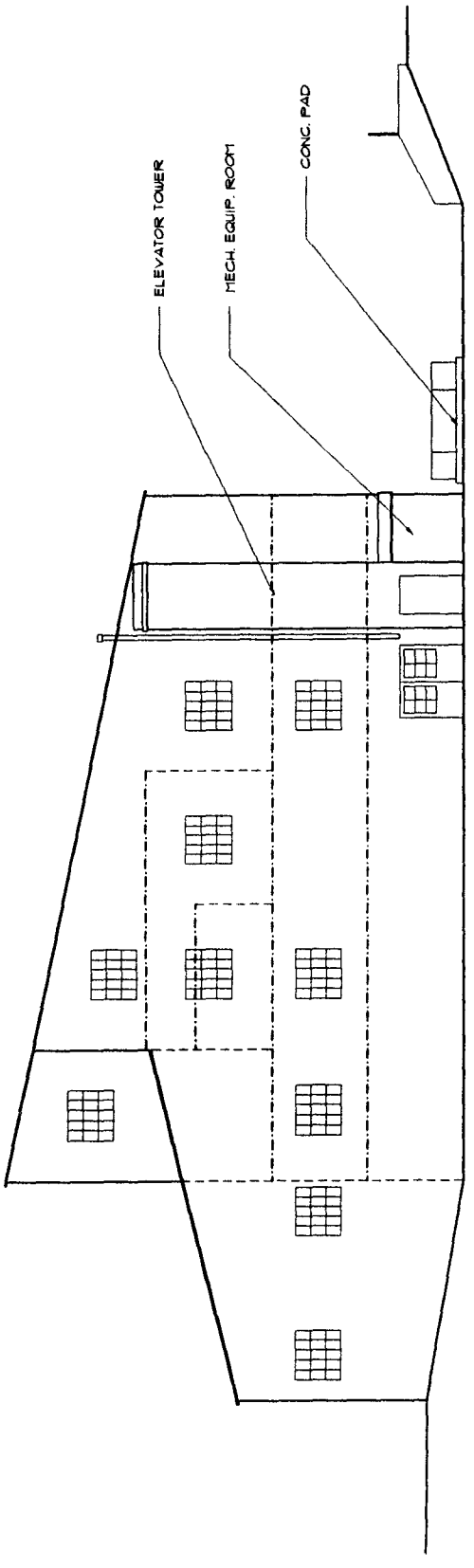
Building Elevations and Floor Plans (Attachment 1: 9 pages)



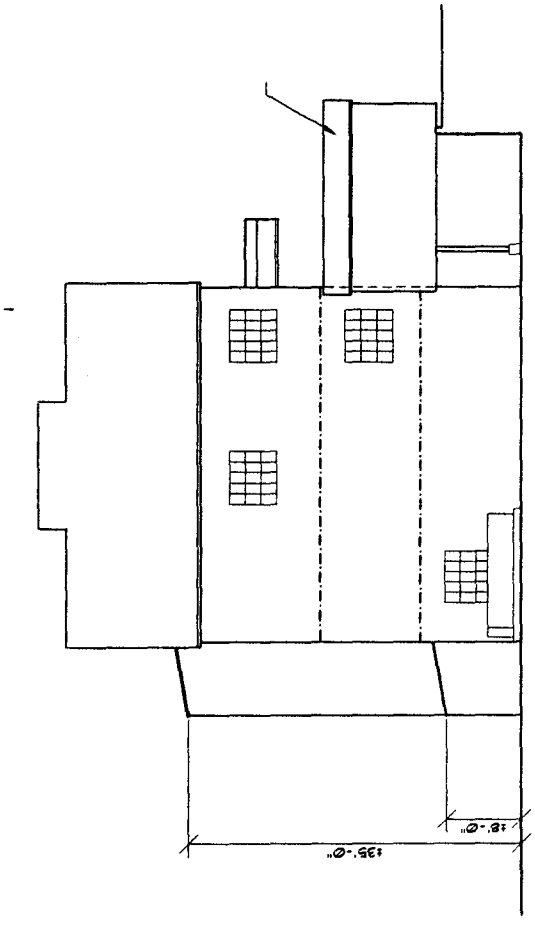
BUILDING 600
NORTH DEMOLITION ELEVATION
SCALE: 1"=20'-0"



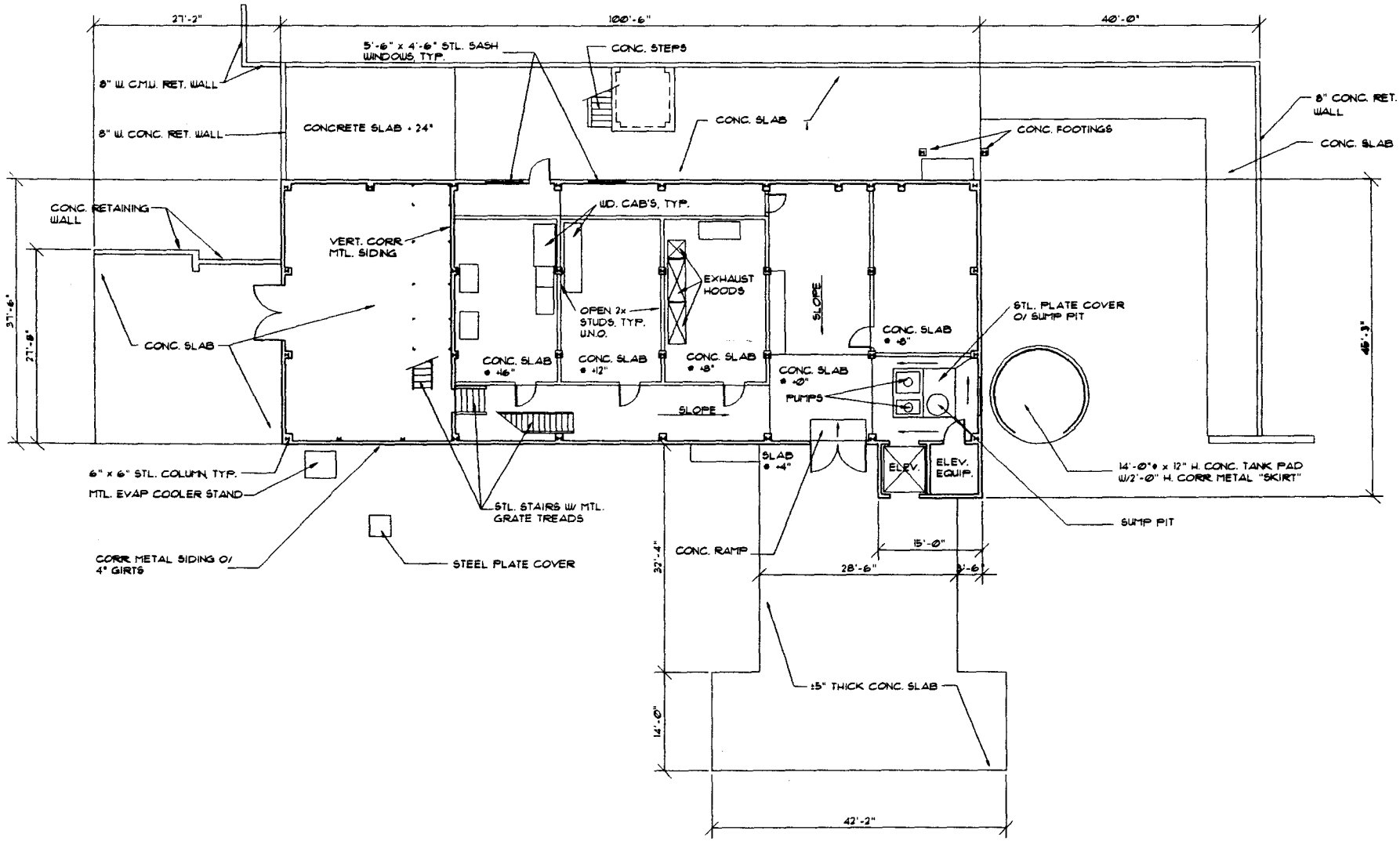
BUILDING 600
WEST DEMOLITION ELEVATION
SCALE : 1"=20'-0"



BUILDING 600
SOUTH DEMOLITION ELEVATION
SCALE : 1"=10'-0"



BUILDING 600
EAST DEMOLITION ELEVATION
SCALE: 1"=20'-0"



BUILDING 600
FIRST FLOOR DEMOLITION PLAN

SCALE : 1" = 20'-0"

BUREAU OF MINES BOULDER CITY EXPERIMENTAL STATION,
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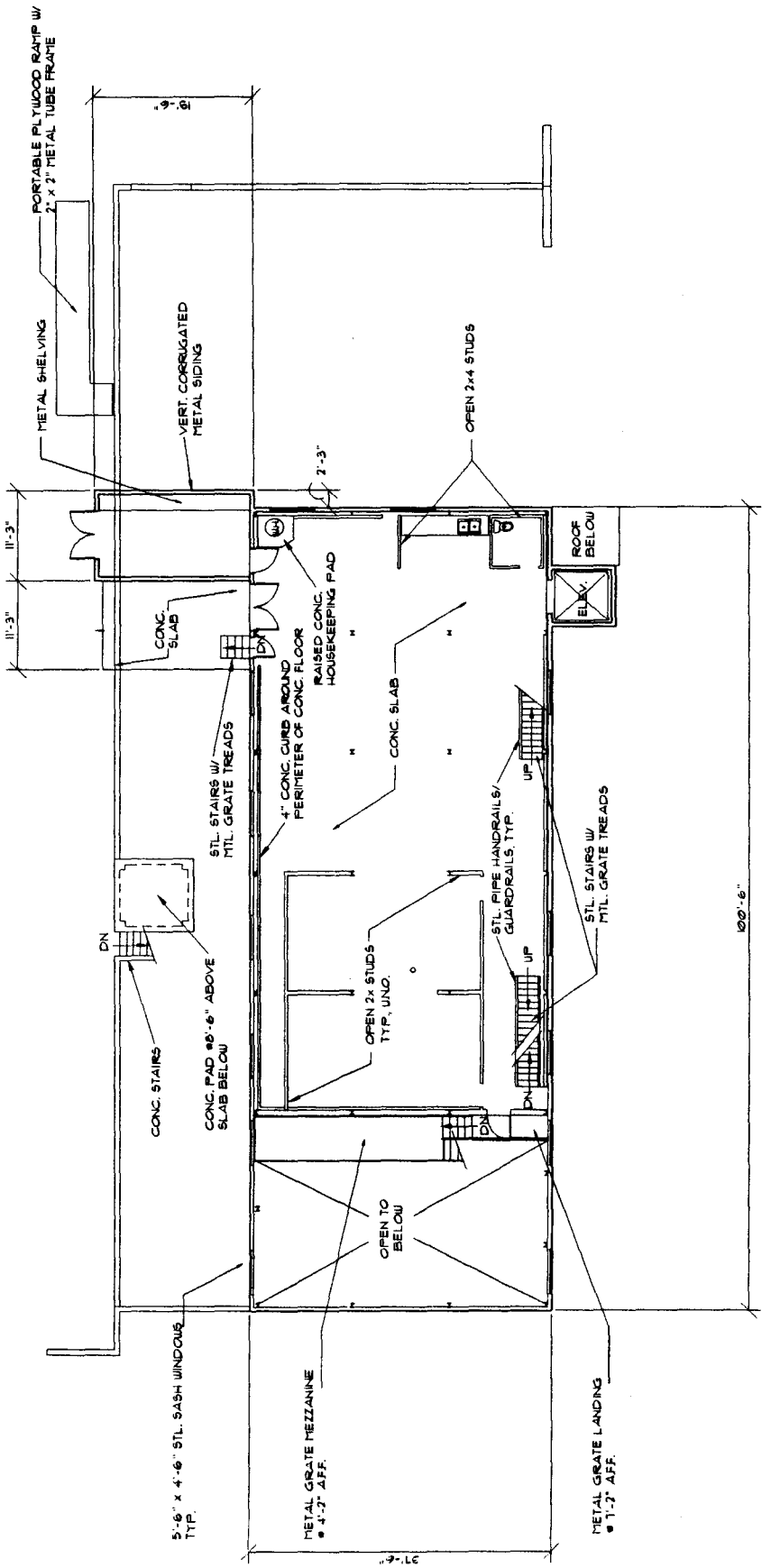
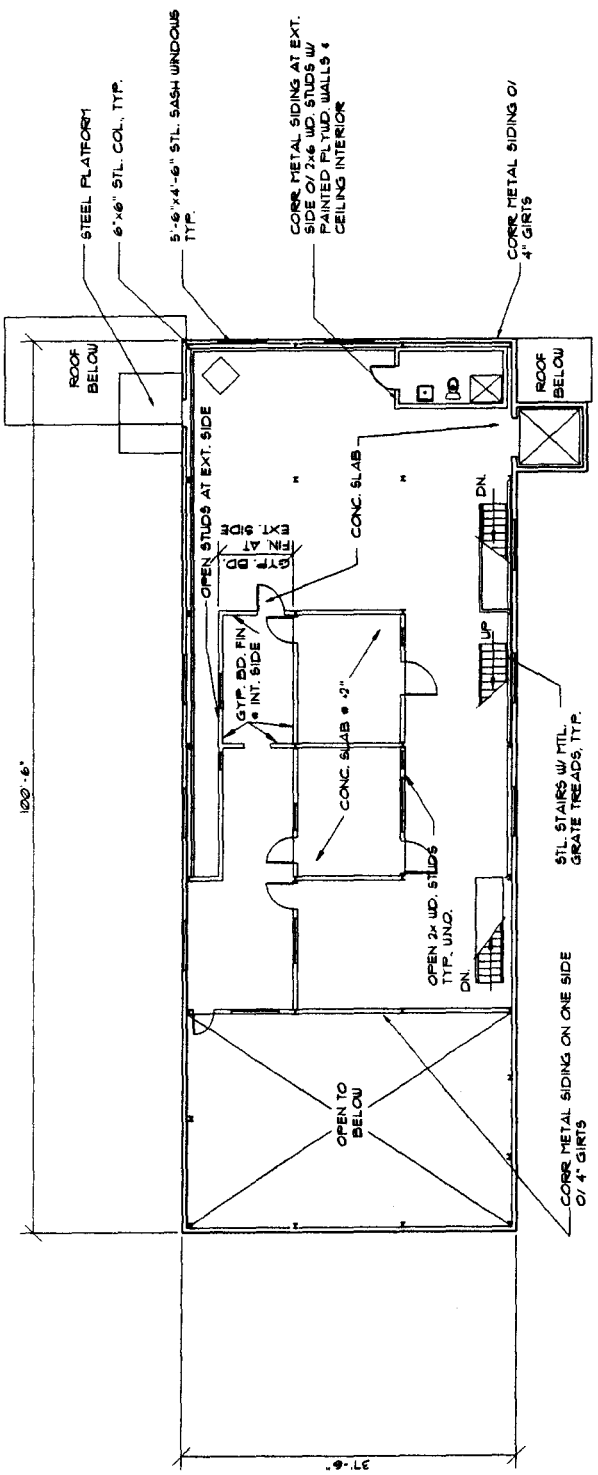
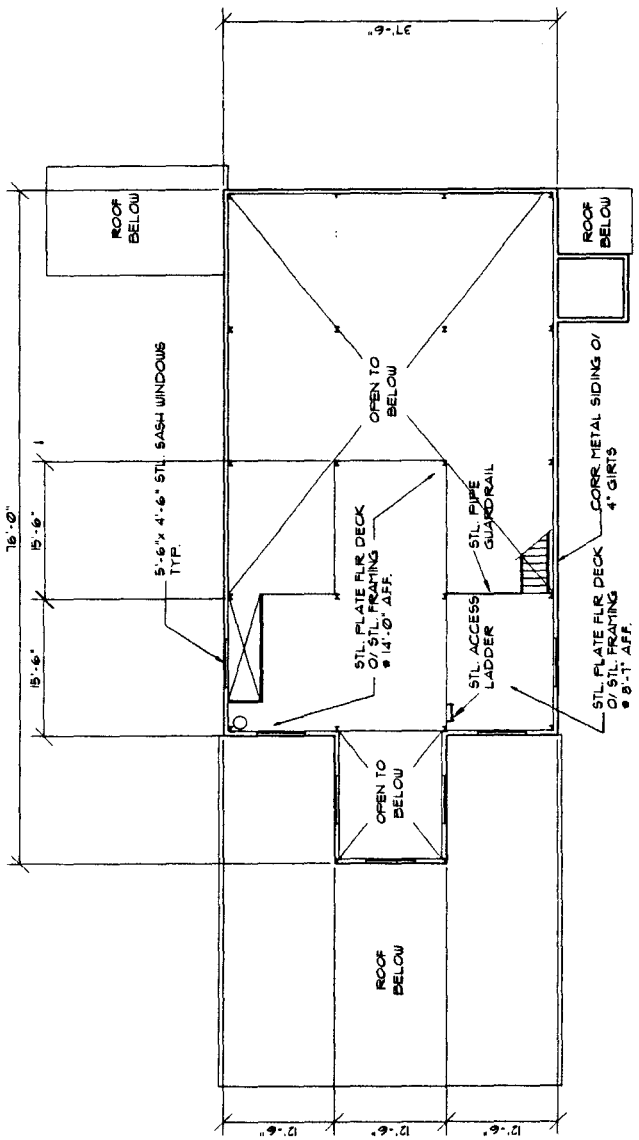


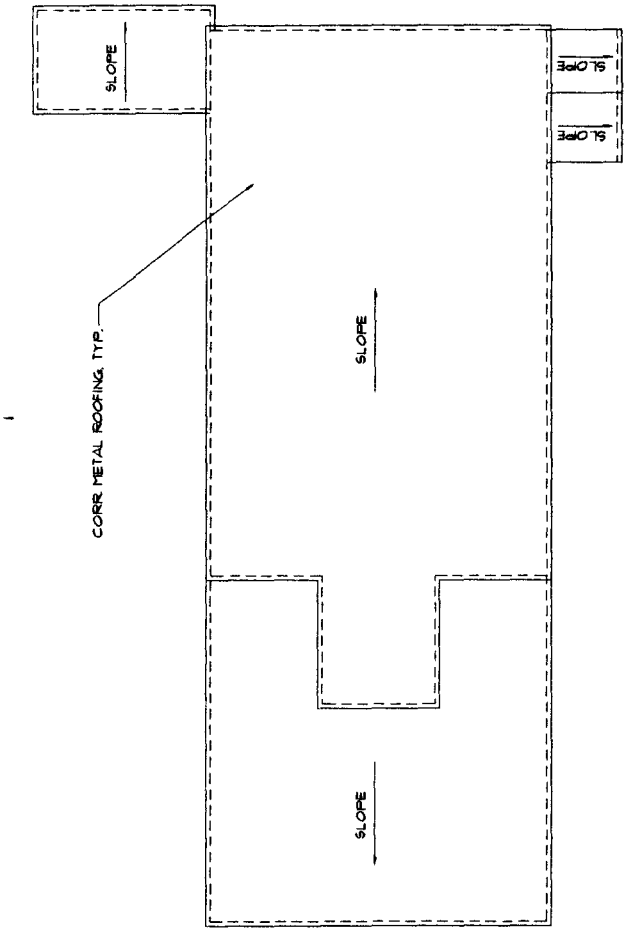
BUILDING 600
SECOND FLOOR DEMOLITION PLAN
SCALE : 1"=10'-0"



BUILDING 600
THIRD FLOOR DEMOLITION PLAN
SCALE: 1"=20'-0"

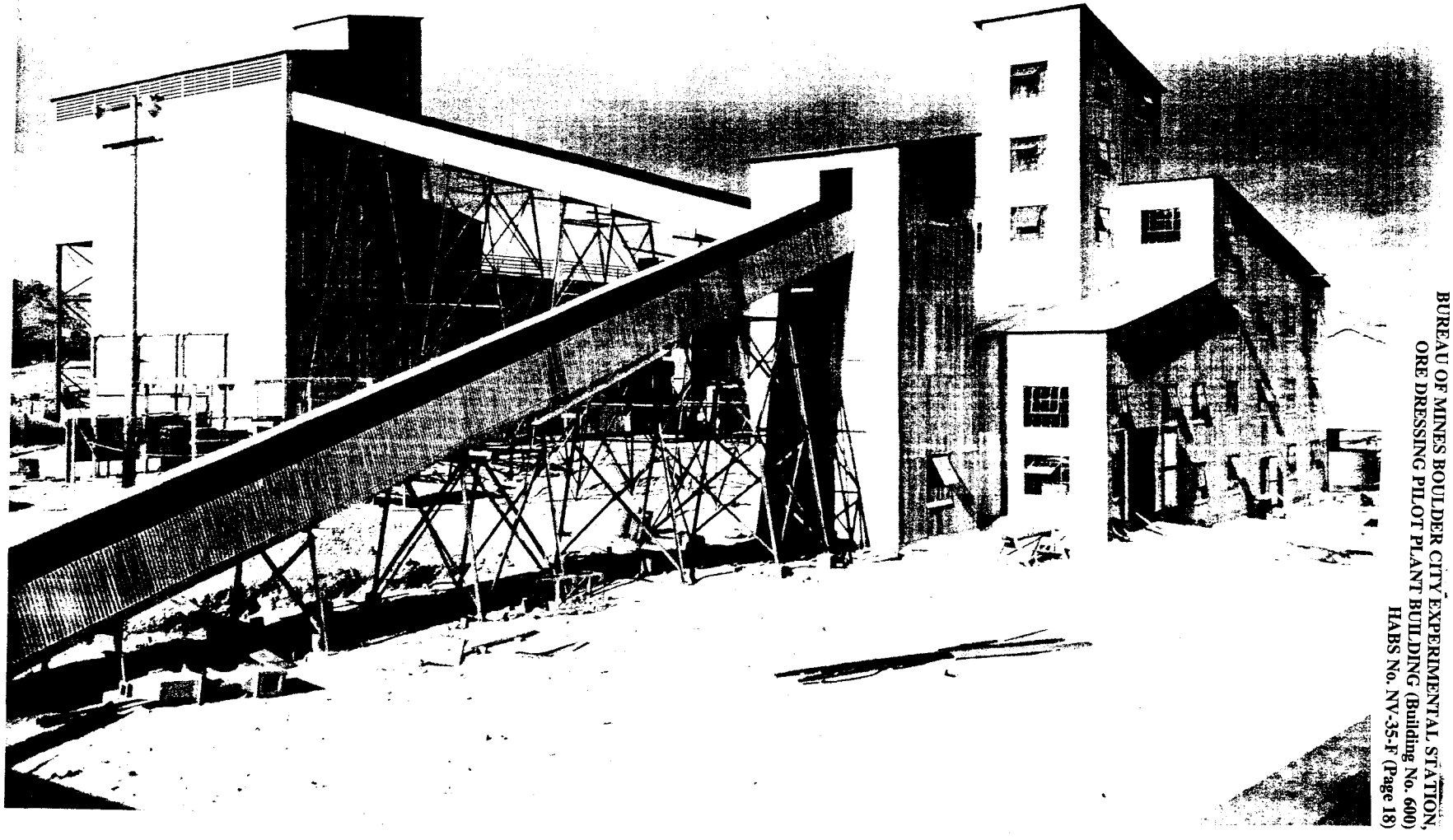


BUILDING 600
FOURTH FLOOR DEMOLITION PLAN
SCALE: 1"=20'-0"



BUILDING 600
ROOF DEMOLITION PLAN
SCALE: 1"=20'-0"

Photocopy of photograph (c. 1941, entitled "Figure 2. The Concentrator Plant," original print in U.S. Bureau of Mines Collection, Boulder City Museum and Historical Association, Boulder City, Nevada). Photographer unknown.
VIEW OF THE CONCENTRATOR PLANT, LOOKING NORTHEAST, HYDROMETALLURGICAL BUILDING TO NORTH, ELECTRIC SHOP AND CHANGE ROOM IN BACKGROUND



BUREAU OF MINES BOULDER CITY EXPERIMENTAL STATION, ORE DRESSING PILOT PLANT BUILDING (Building No. 600)
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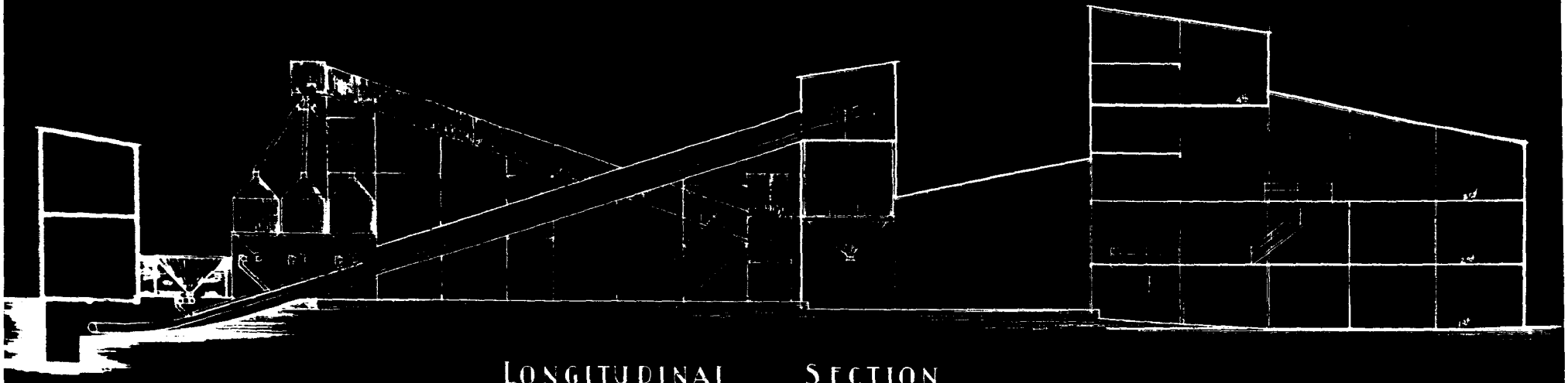
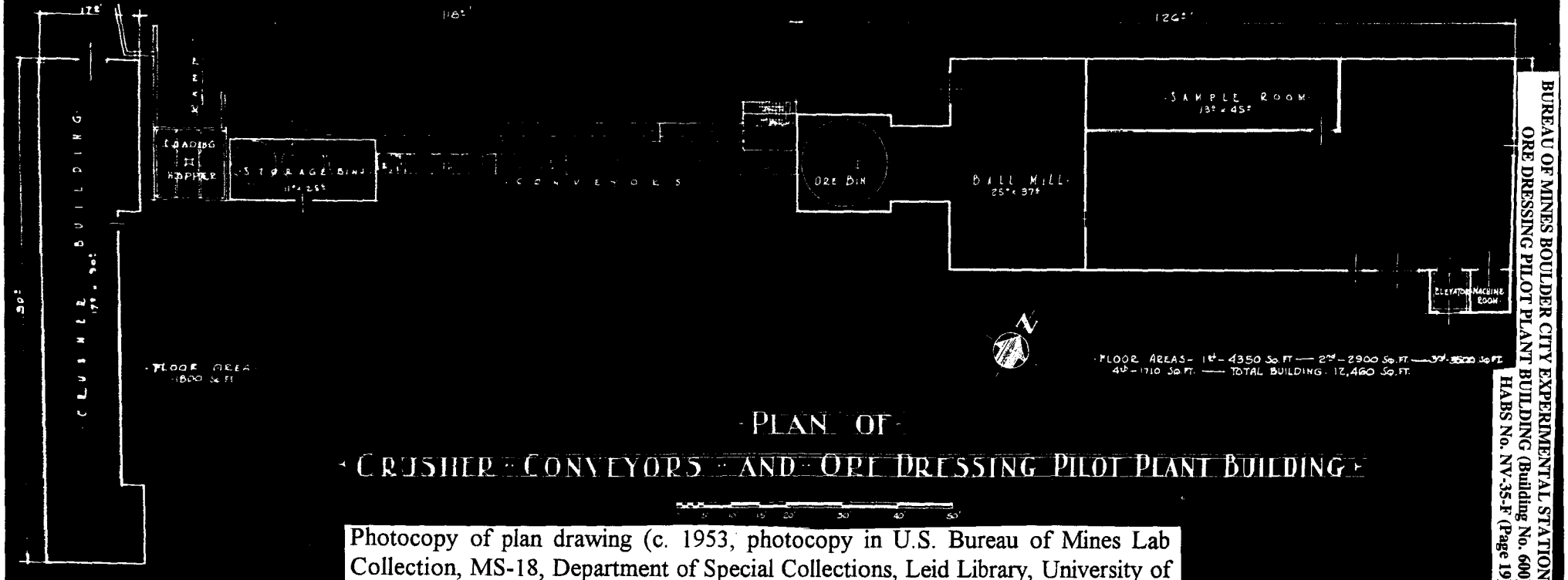
Figure 2. The Concentrator Plant.



LONGITUDINAL SECTION



PLAN OF CRUSHER CONVEYORS AND ORE DRESSING PILOT PLANT BUILDING

Photocopy of plan drawing (c. 1953, photocopy in U.S. Bureau of Mines Lab Collection, MS-18, Department of Special Collections, Leid Library, University of Nevada, Las Vegas). PLAN OF CRUSHER, CONVEYORS AND ORE DRESSING PILOT PLANT BUILDING

BUREAU OF MINES BOULDER CITY EXPERIMENTAL STATION, ORE DRESSING PILOT PLANT BUILDING (Building No. 600) HABS No. NV-35-F (Page 19)

C-873-BC