

WS 107A-1 WEAPON SYSTEM

SILO FULL-SCALE MOCKUP

PHOTOGRAPH RECORD

15 May 1961

Volume I

Prepared by

GENERAL DYNAMICS | ASTRONAUTICS

GENERAL DYNAMICS CORPORATION

San Diego, California

## INTRODUCTION

The enclosed collection of photographs is a pictorial record of the Atlas Silo Mockup constructed at Astronautics in San Diego. This record is published and distributed to be used in the field as an aid in the resolution of interferences or discrepancies. It should also be useful as a reference by General Dynamics and Air Force personnel in the evaluation of proposed changes. The pictures are current and present a true representation of the existing design as of 1 May 1961. All known changes (LR's, ECP's, EO's, QA memos) which affected the Silo Mockup have been incorporated. During the building of this mockup, approximately 1,550 mockup discrepancy reports (MDR's) were written and resolved. During the spring of 1961, the peak period of MDR action, engineering teams from Bechtel, Kellogg, AMF and General Dynamics worked full time resolving the discrepancies.

The mockup objective has been the design standard for the Schilling AFB configuration and follow-on operational bases. All AGE external connections and space geometry has been accepted by Astronautics Inspection as being up-to-date and correct. This has entailed extensive review and correlation of facility drawings, Astronautics drawings and vendor drawings.

As major ECP's are developed and installed in the mockup, new pictures will be taken and the affected pages will be re-issued.

A recent major change, ECP 1041 (slug chill deletion) has already been incorporated in the attached photographs.

To facilitate use of this record by different construction groups, the pictures will be divided into two volumes as follows:

Volume I - Silo

Volume II - Launcher Platform (To be issued in future)

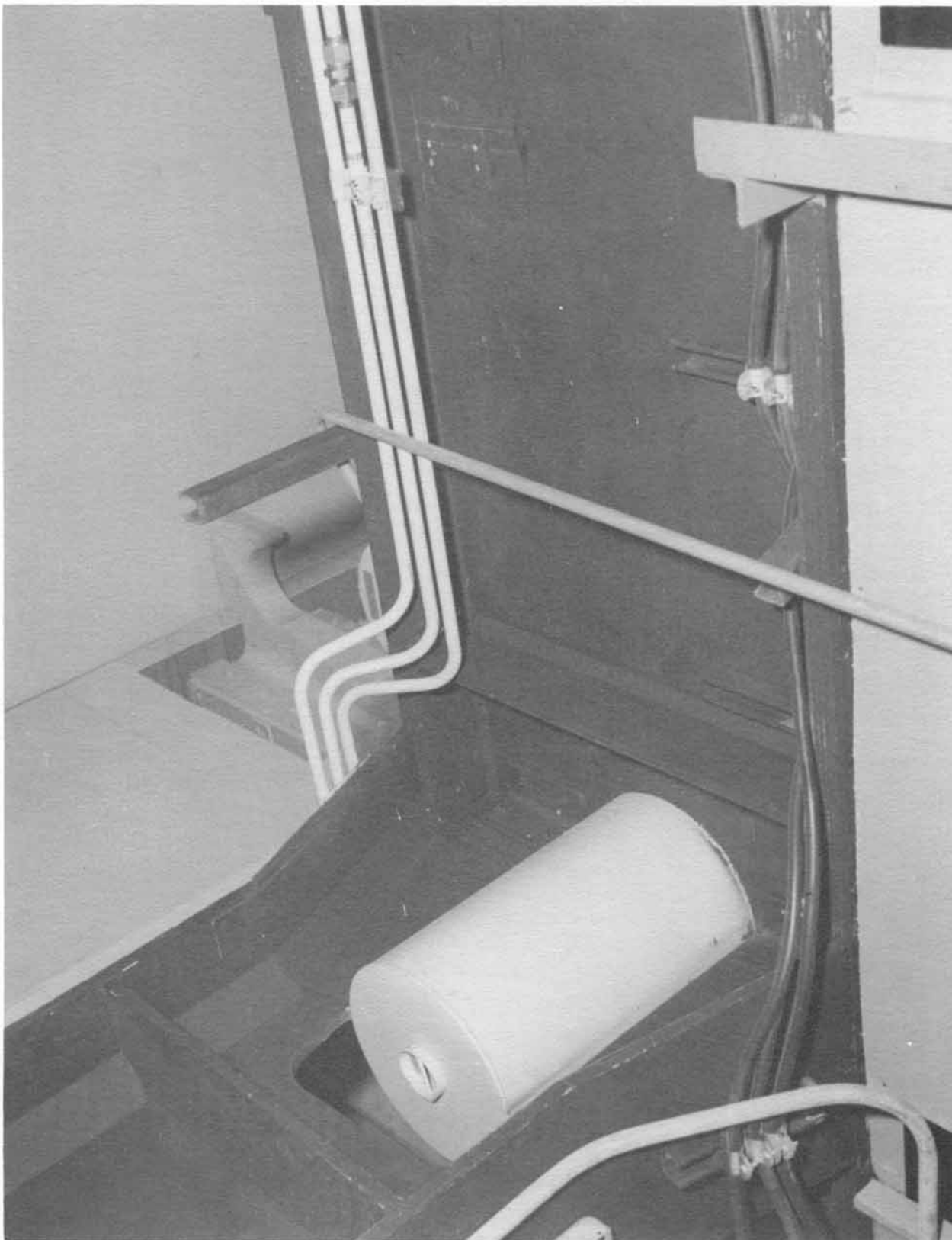
Each volume will be further subdivided by index pages for each level.



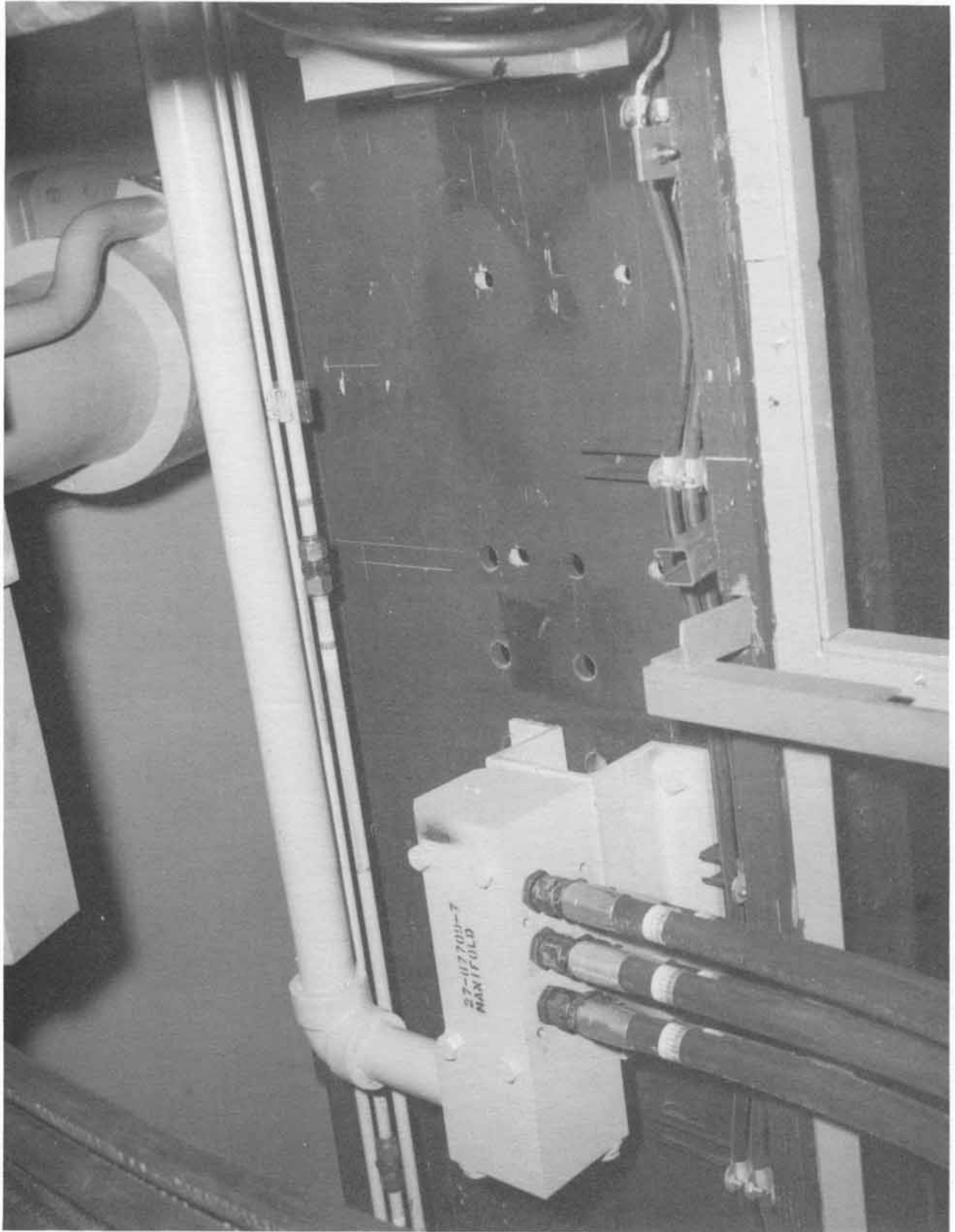


Sand settling tank at Column K (Neg. No. 61652A dated 1-5-61).

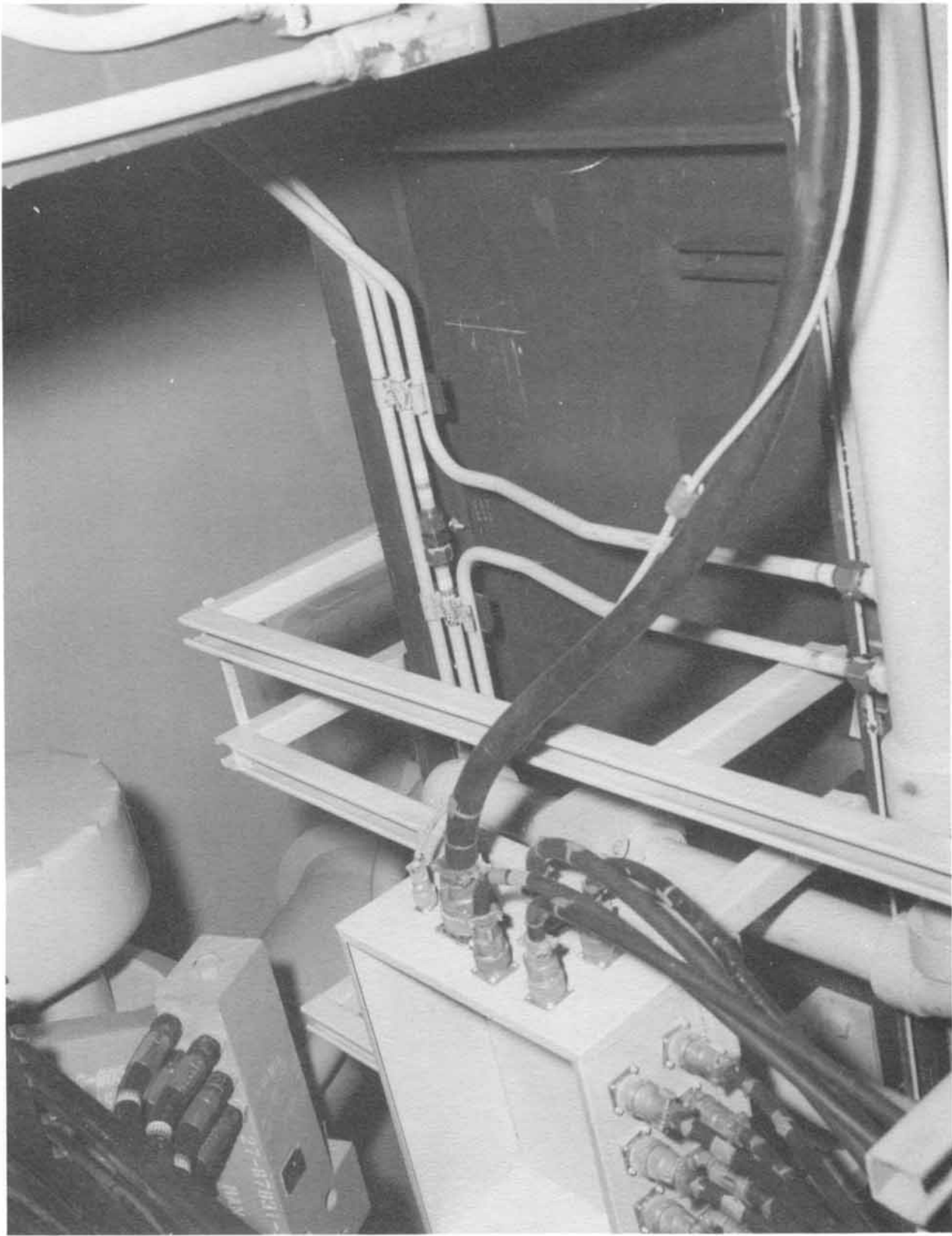




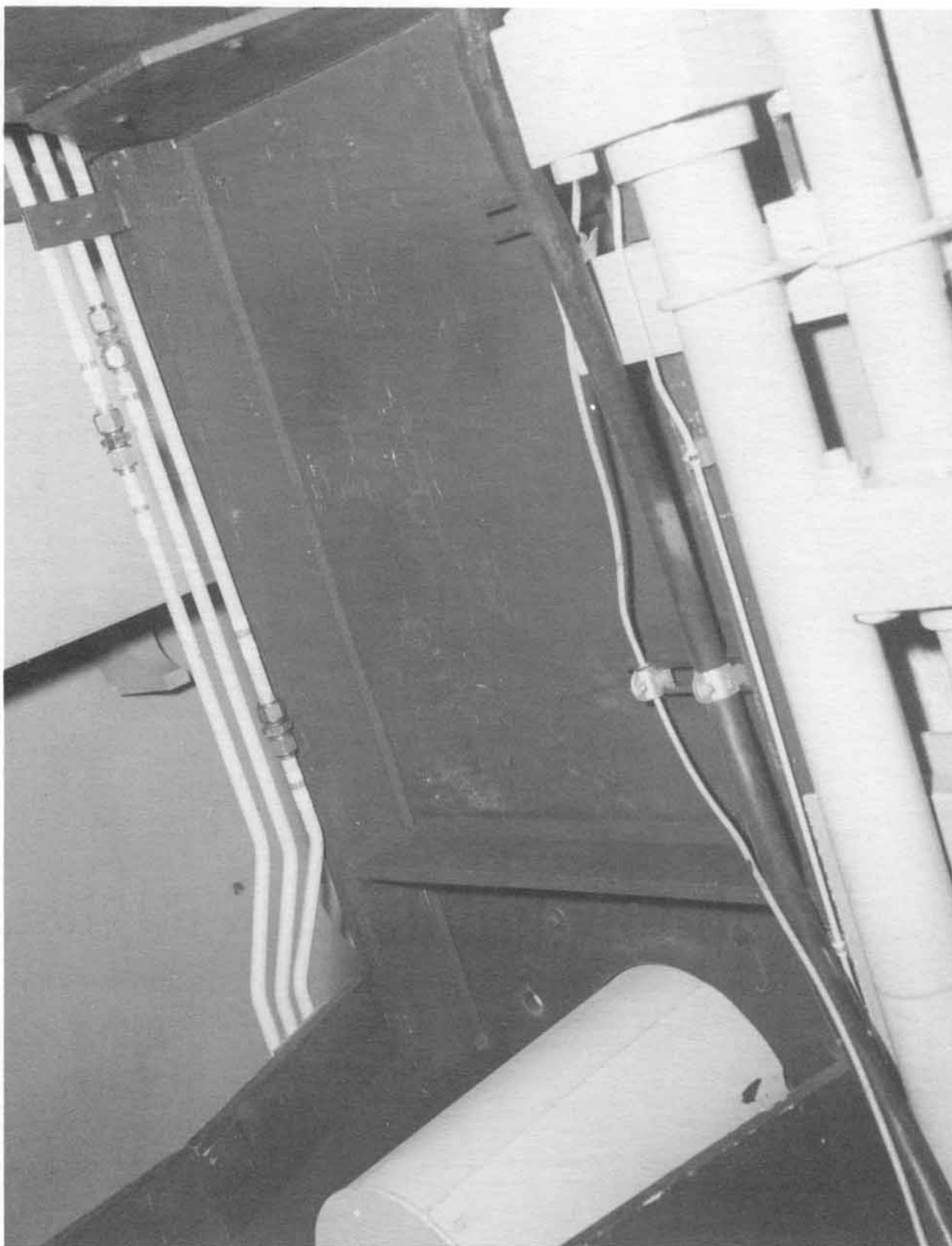
Hydraulic tubes above Column J (Neg. No. 66241A dated 3-23-61)



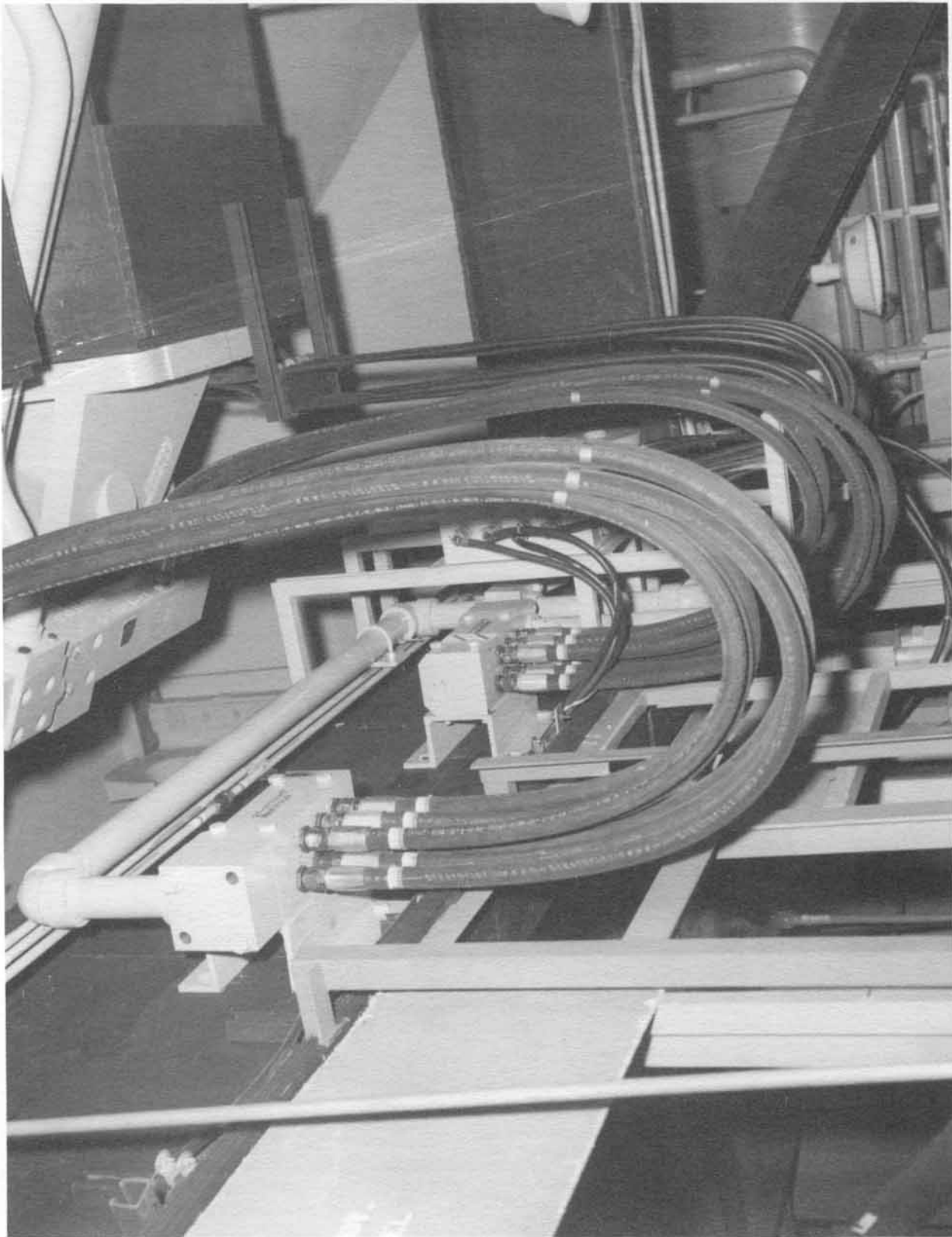
Hydraulic manifold for west door (Neg. No. 66242A dated 3-23-61).



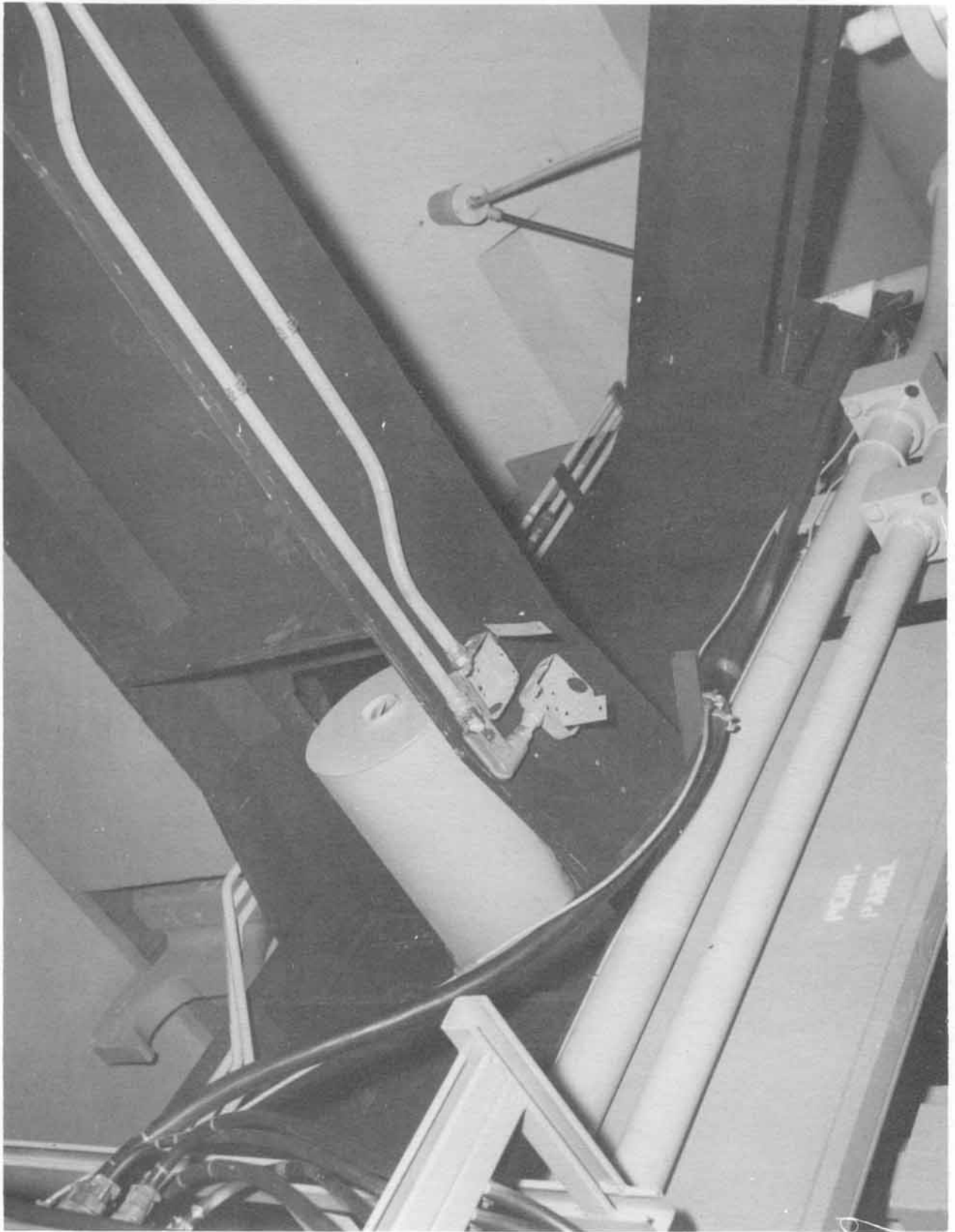
J Box and hydraulic tubes for west door (Neg. No. 66243A dated 3-23-61).



Area above Column K, Quad 3 (Neg. No. 66244A dated 3-23-61).

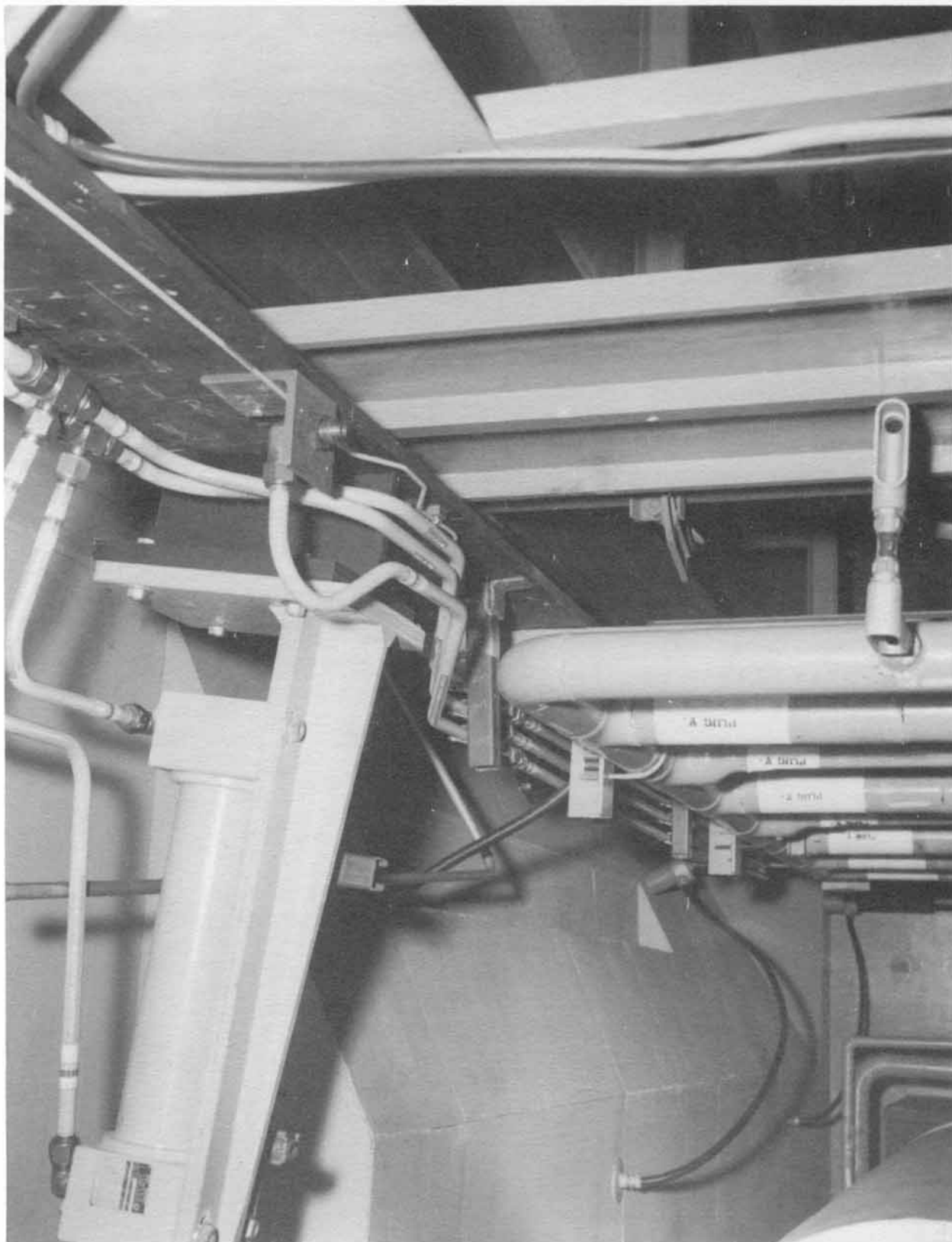


Hydraulic door manifolds, west side (Neg. No. 66245A dated 3-23-61).

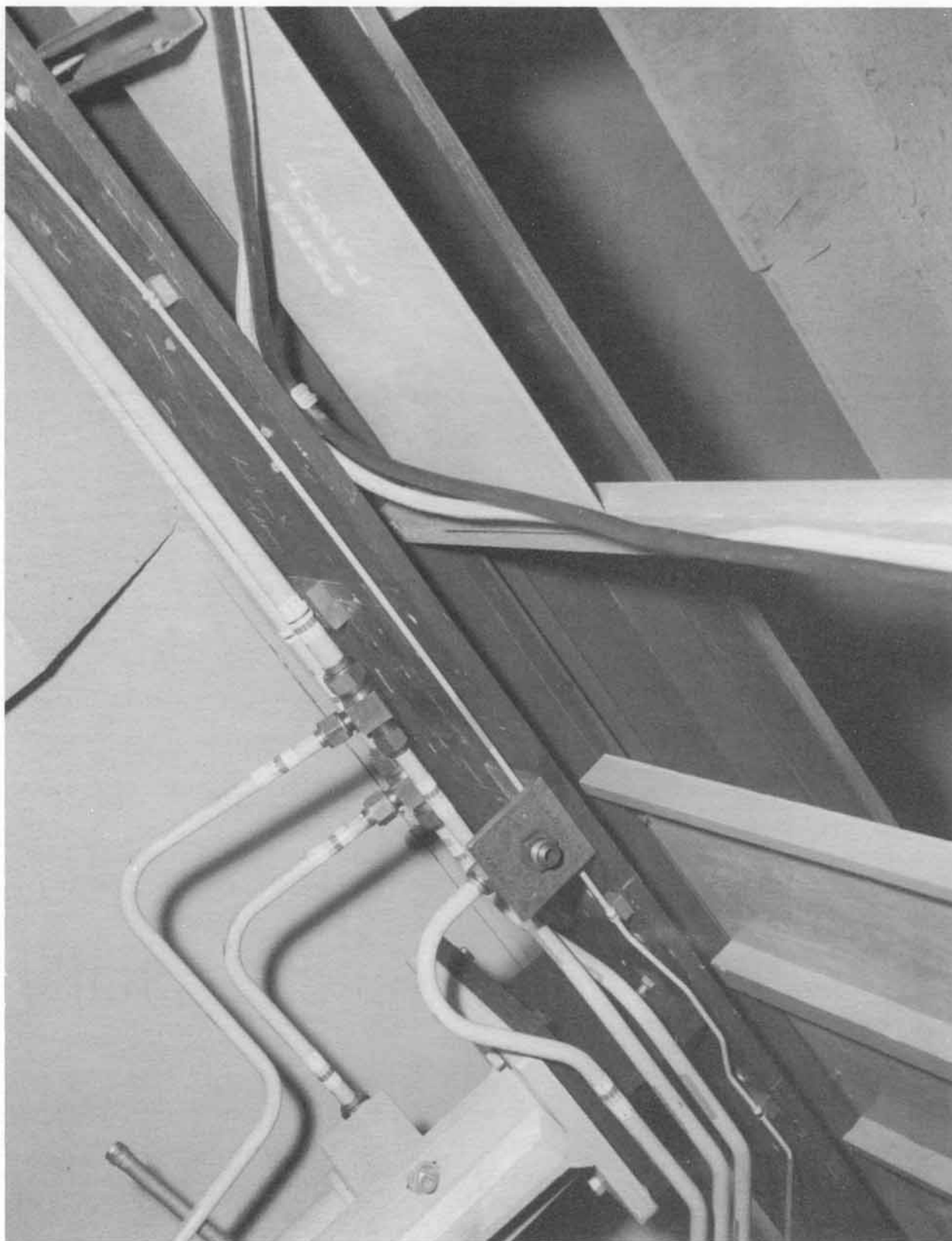


Hydraulic pipe assemblies above Column K (Neg. No. 66246A dated 3-23-61).





Horizontal crib lock, south side (Neg. No. 66247A dated 3-23-61).

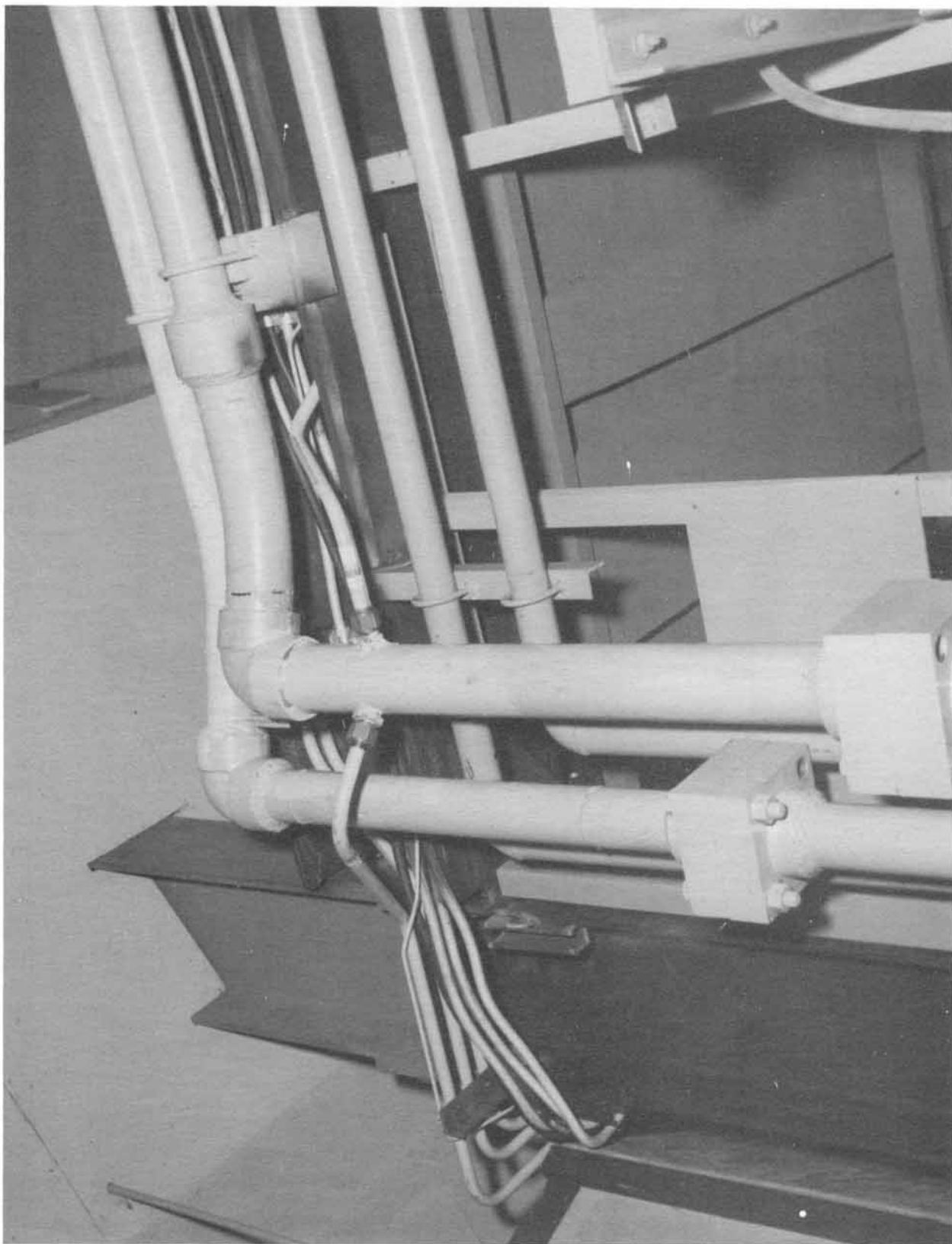


Hydraulic tubes, Quad 4 (Neg. No. 66248A dated 3-23-61).

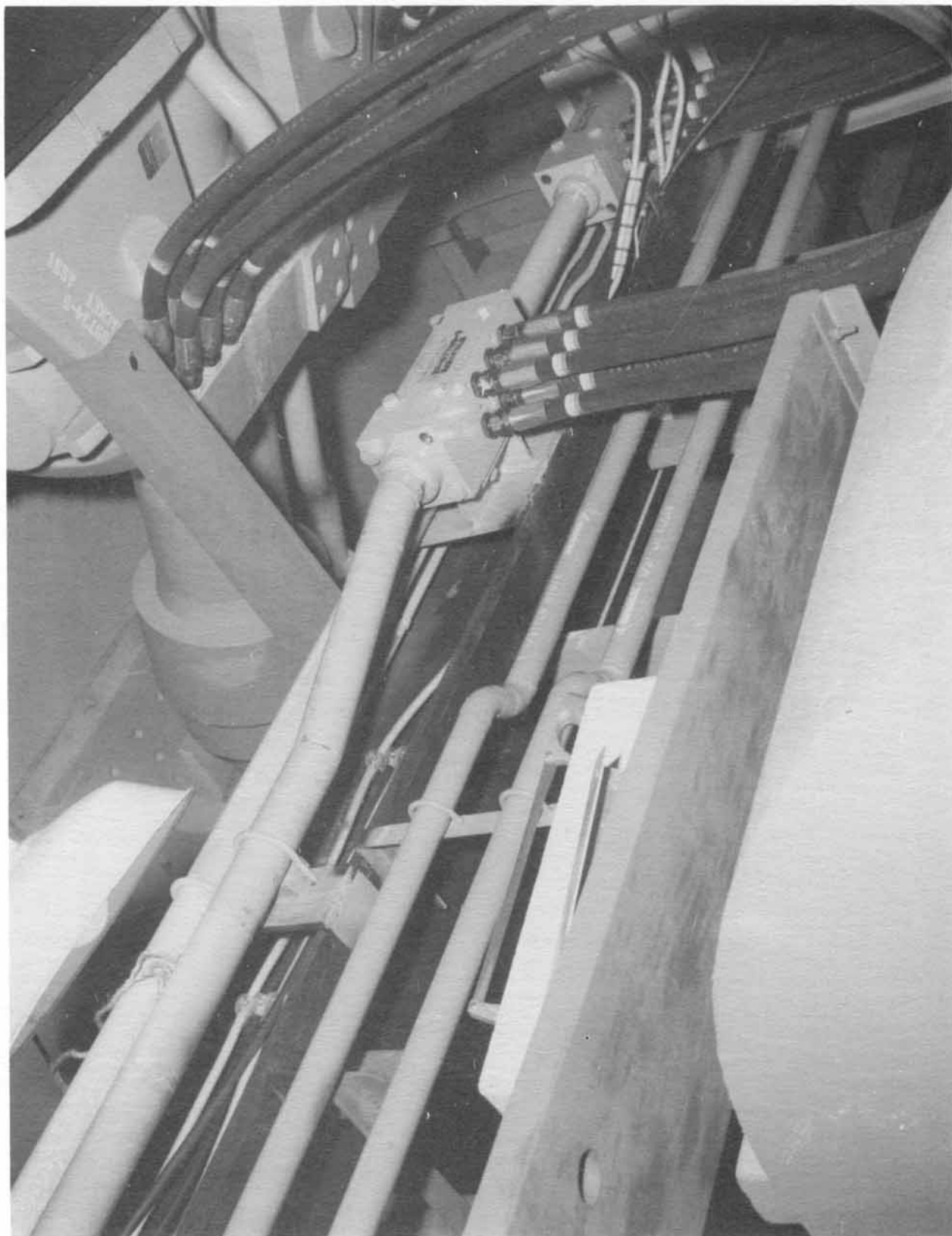




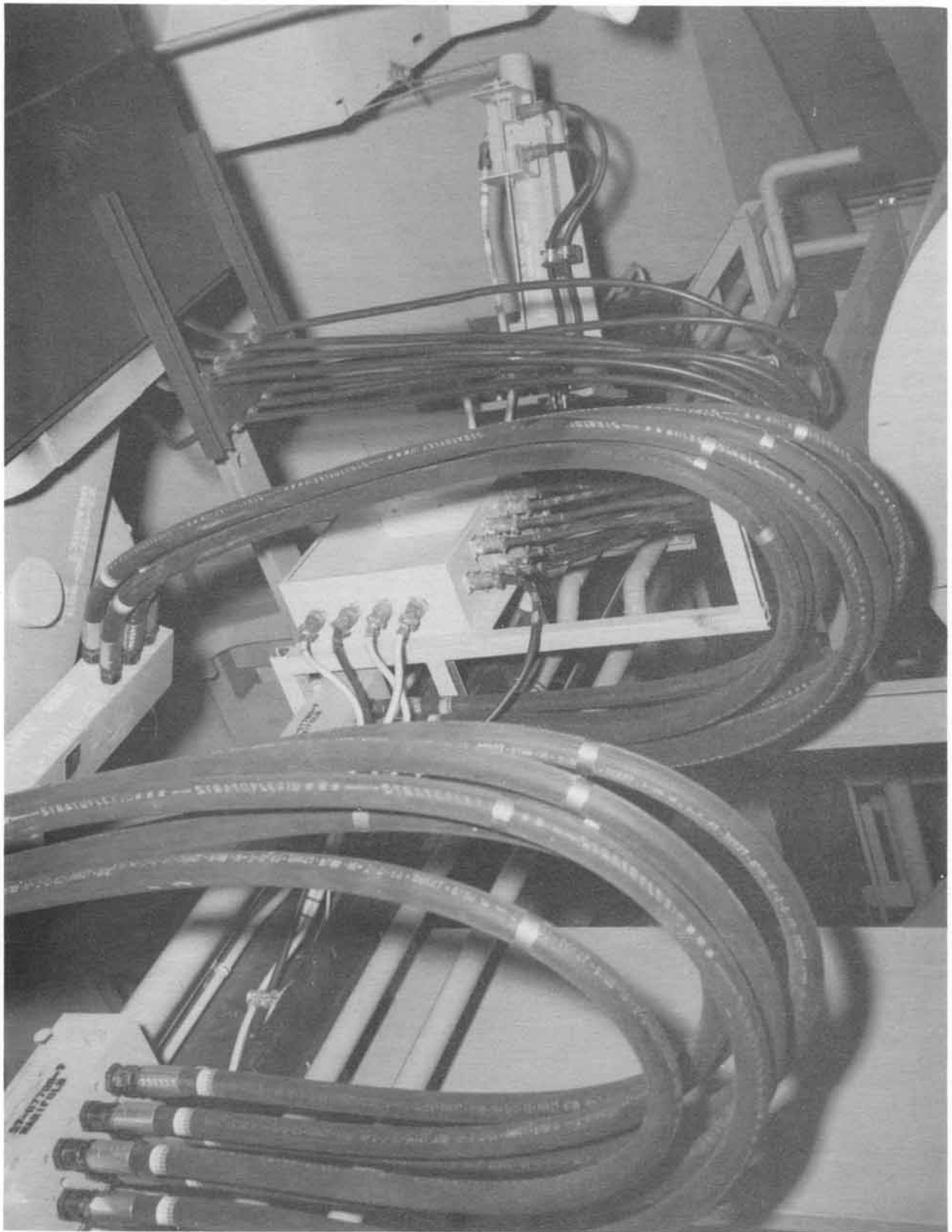
Hydraulic pipes and tubes, Quad 4 (Neg. No. 66249A dated 3-23-61).



Hydraulic pipes at Column B (Neg. No. 66250A dated 3-23-61).



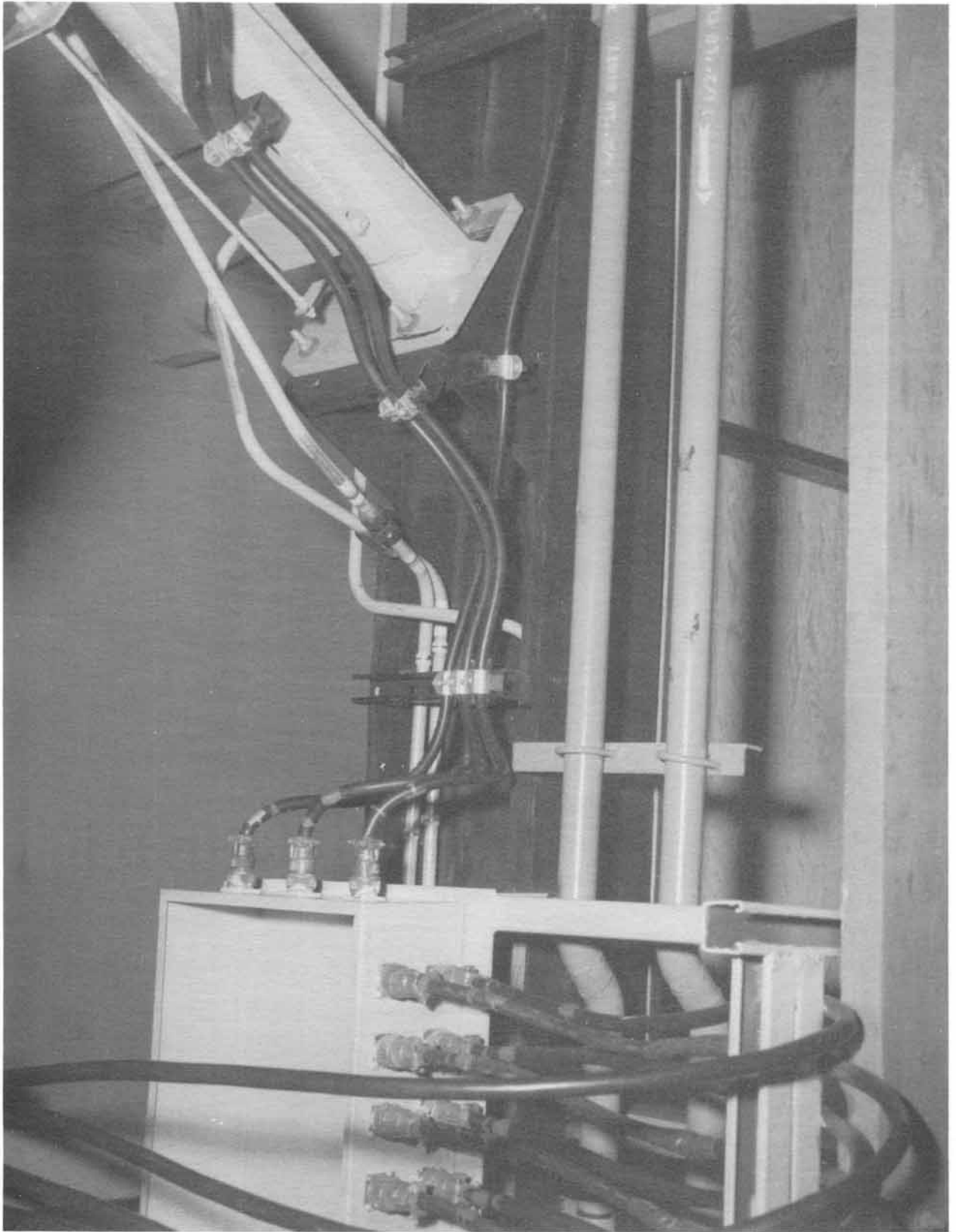
Hydraulic door manifolds, east side (Neg. No. 66251A dated 3-23-61).



Hydraulic hoses to east door (Neg. No. 66252A dated 3-23-61).

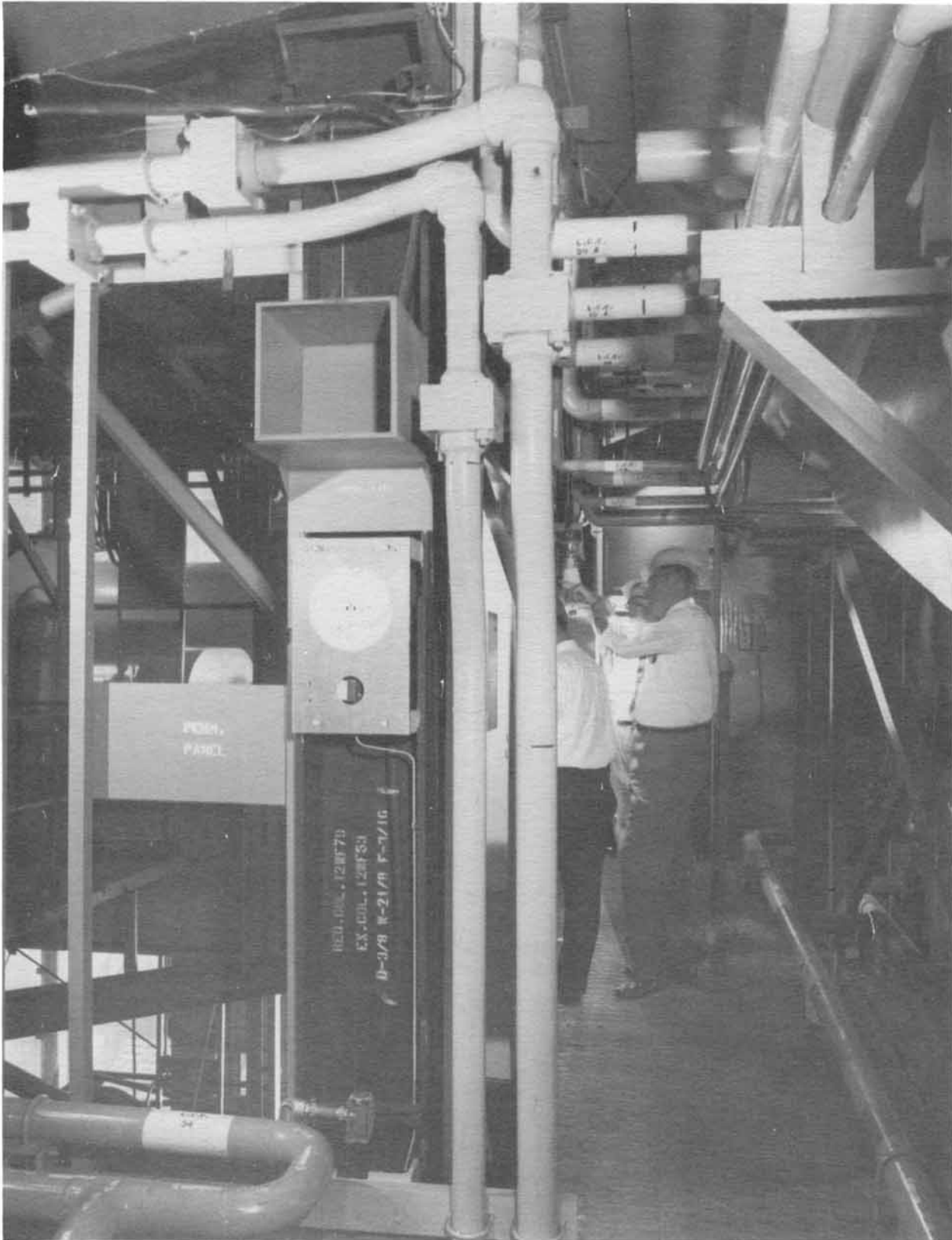


Horizontal crib lock at Column A (Neg. No. 66253A dated 3-23-61).

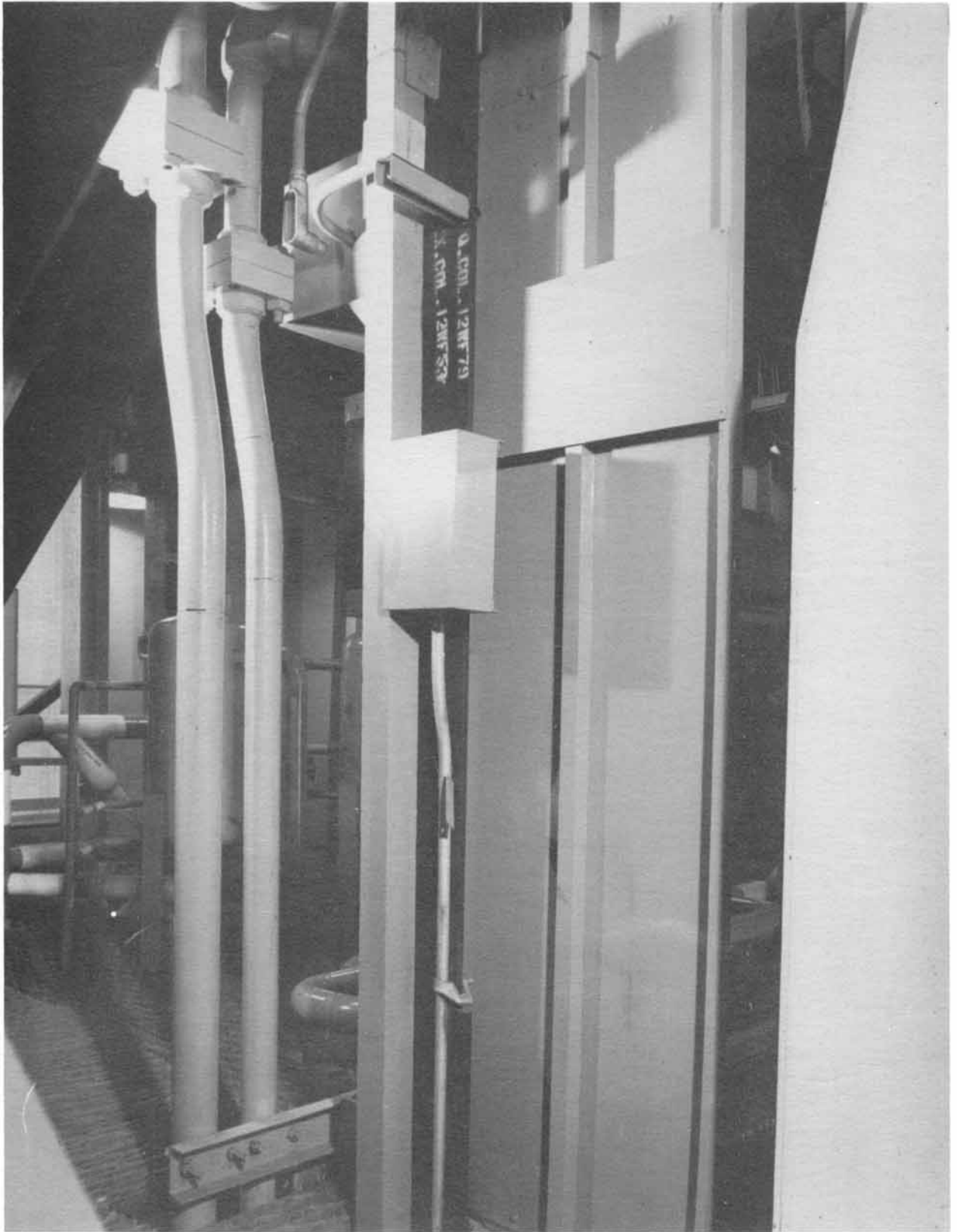


J Box and crib lock, Quad 1 (Neg. No. 66254A dated 3-23-61).



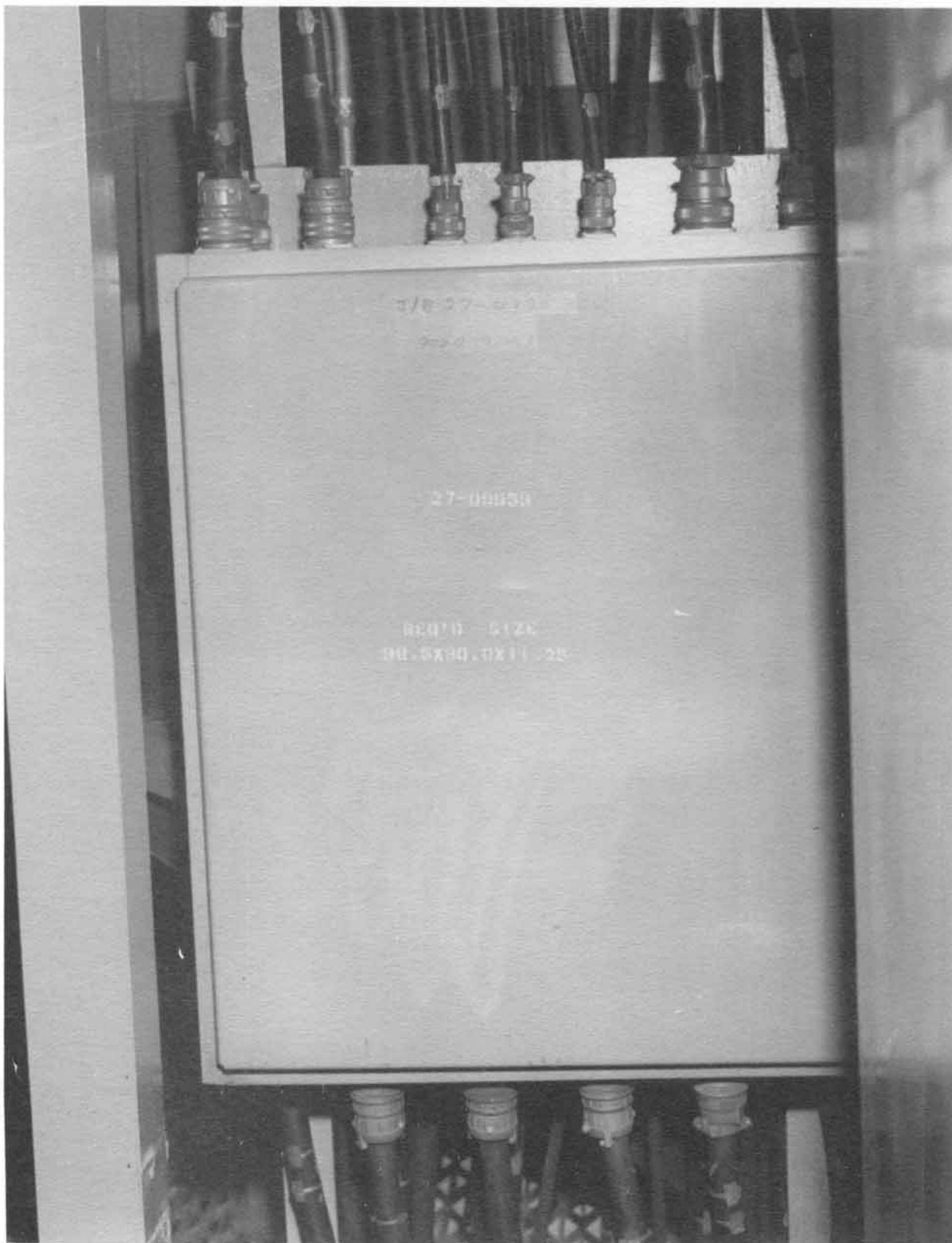


Hydraulic pipes at Column K from west (Neg. No. 66656A dated 4-3-61).

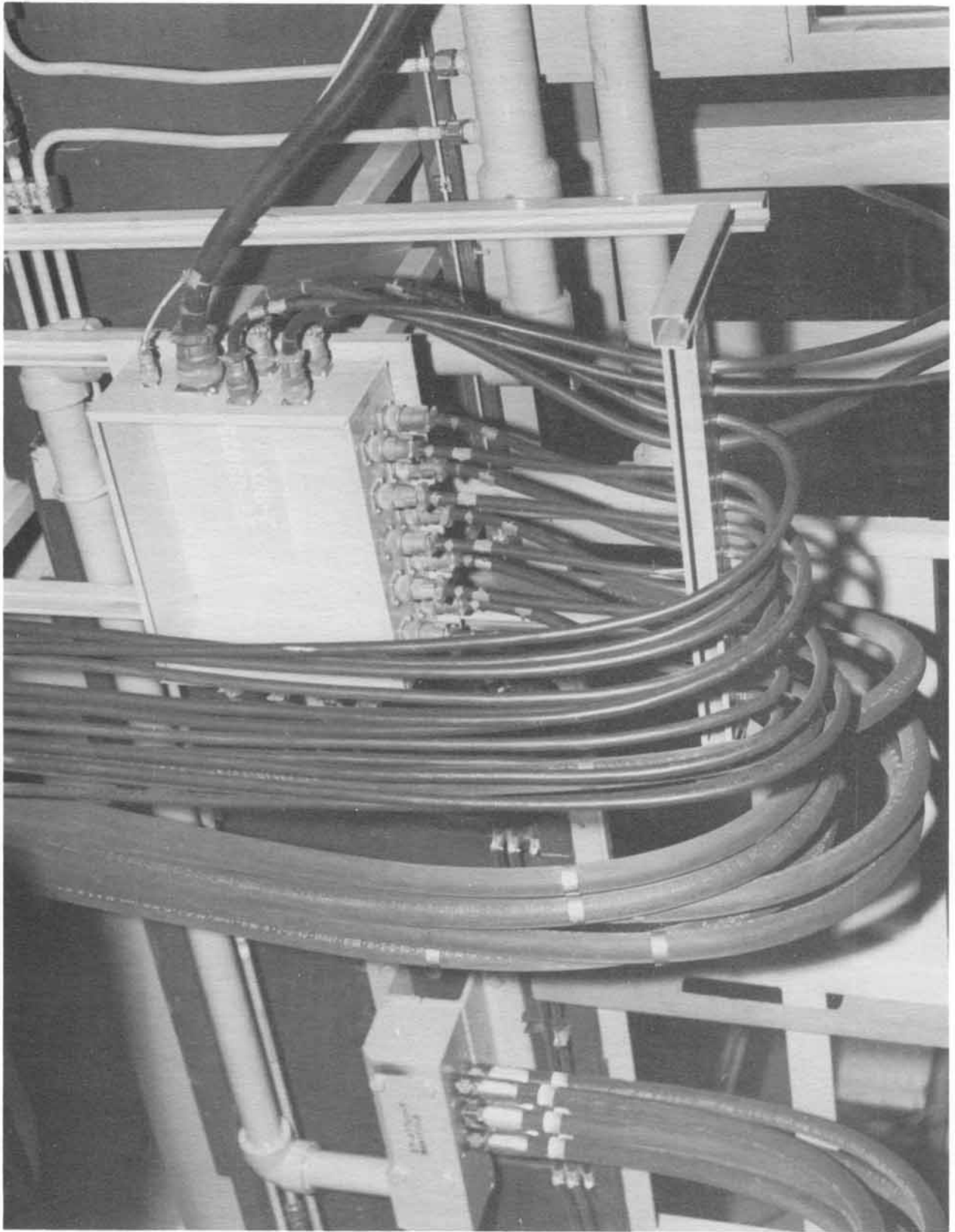


Hydraulic pipes at Column K from east (Neg. No. 66657A dated 4-3-61).

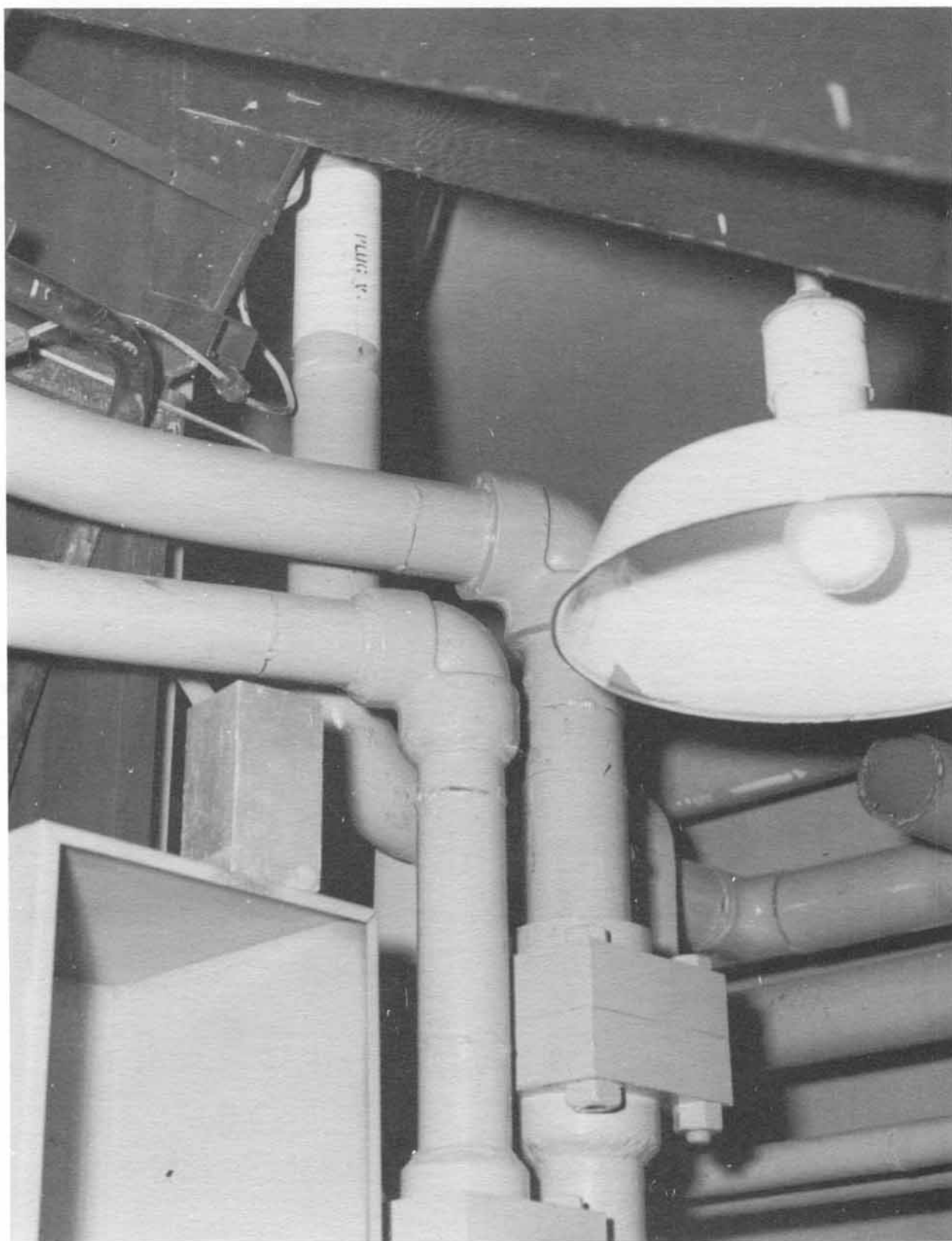




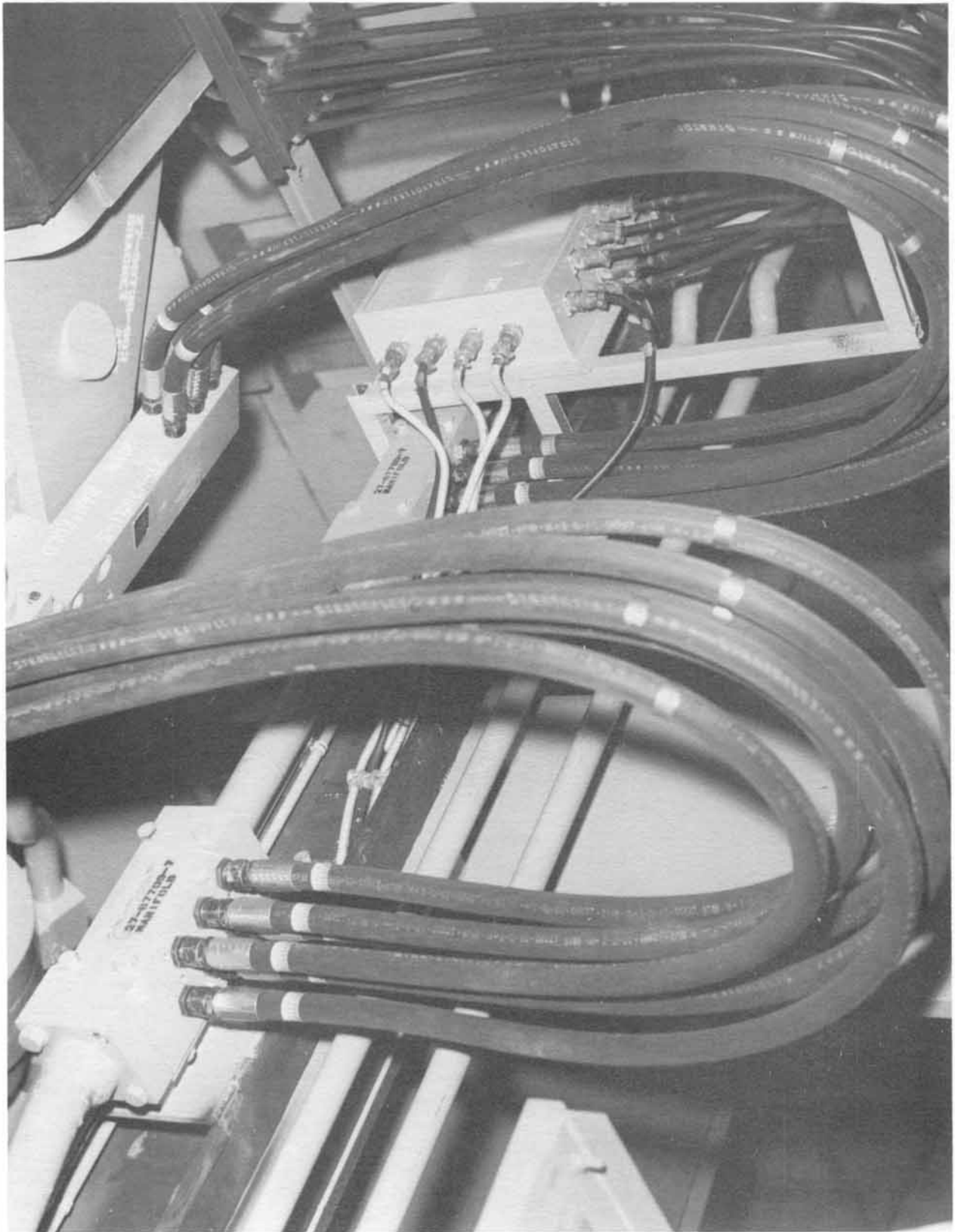
AMF J Box 27-09953 (Neg. No. 67320A dated 4-14-61).



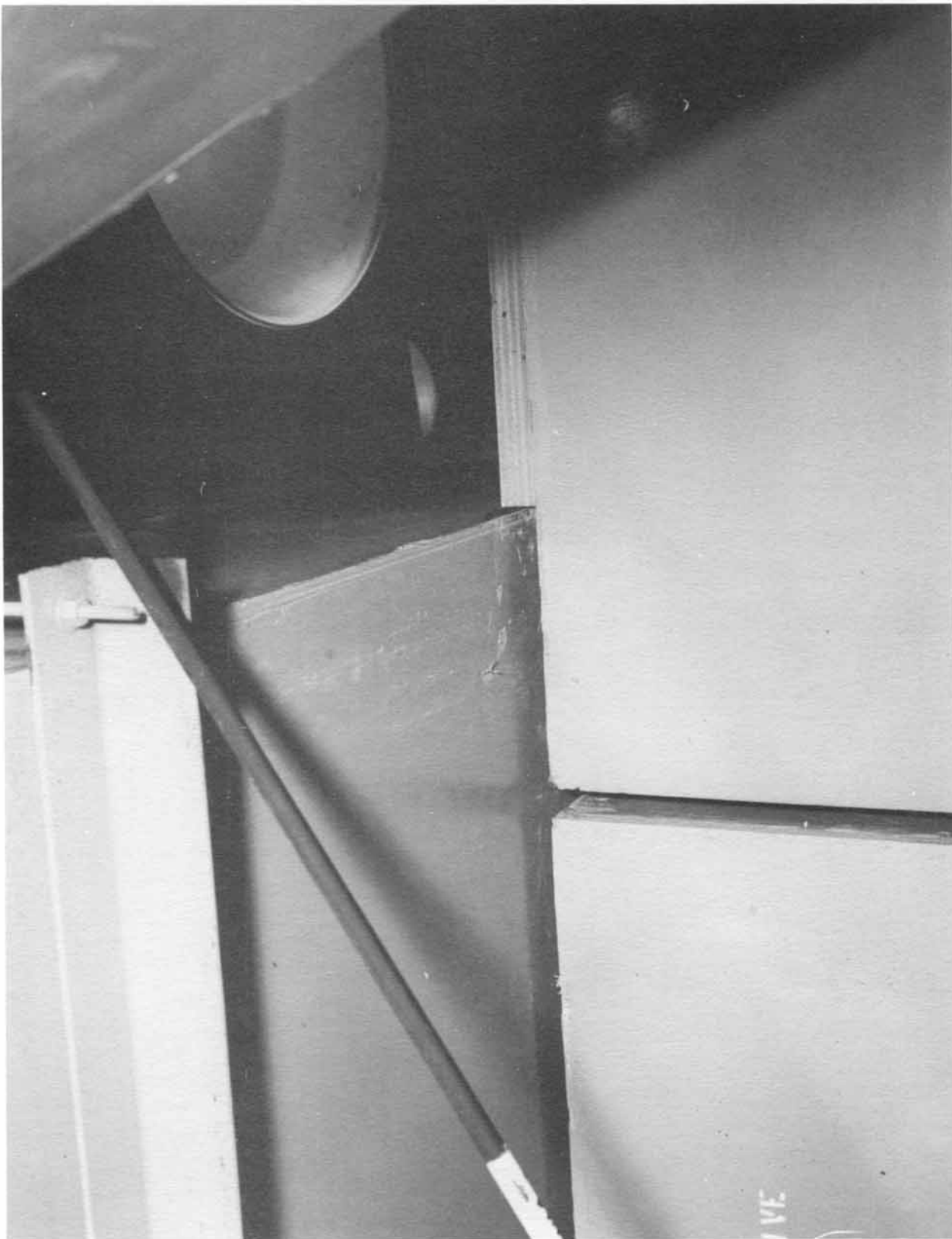
Door cylinder, J Box 27-09935, and brackets, west side  
(Neg. No. 67321A dated 4-14-61).



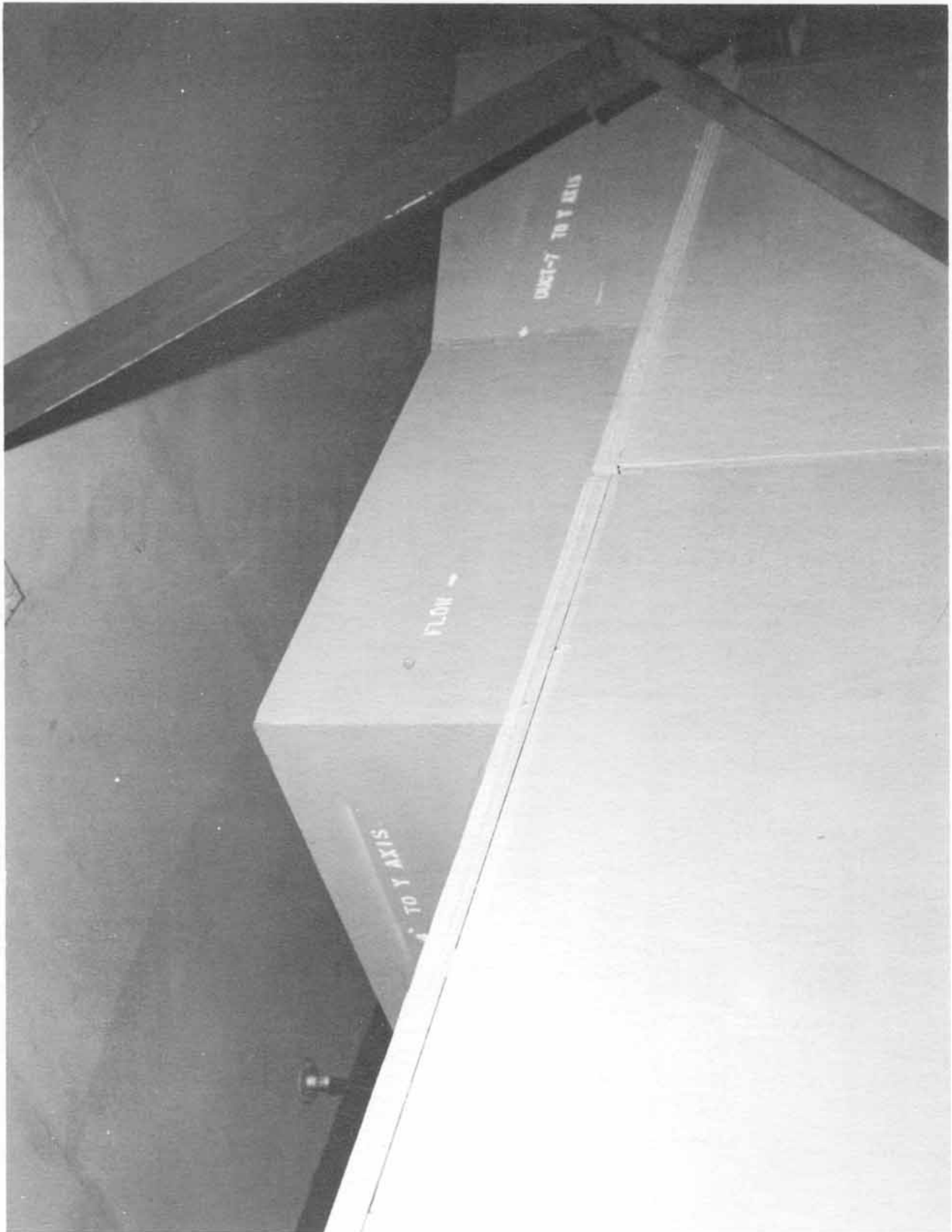
Column K hydraulic piping looking southeast (Neg. No. 67322A dated 4-14-61).



Door cylinder J Box 27-09936, east side (Neg. No. 67323A dated 6-14-61).

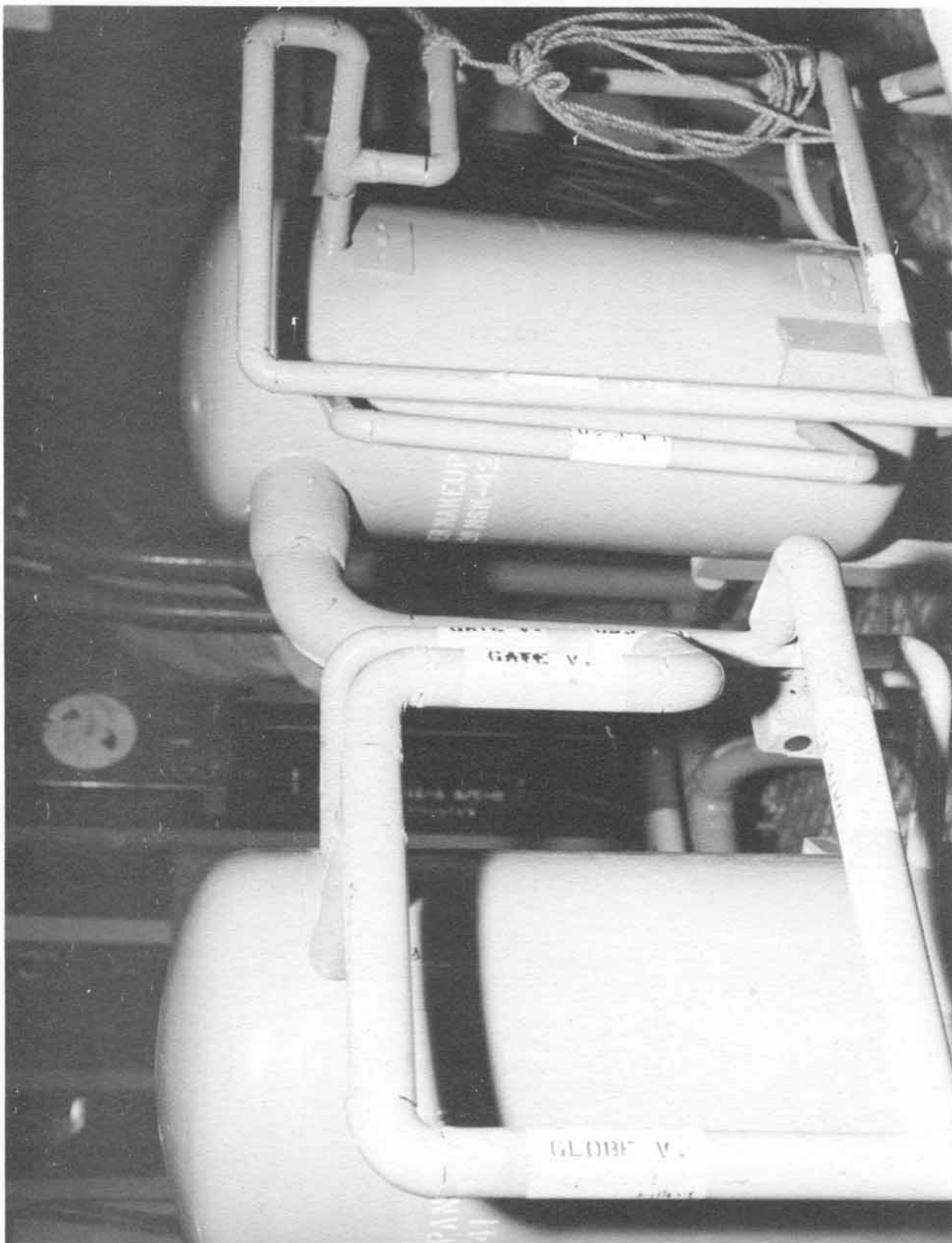


L/ P Drive, motor control center, showing proximity of high voltage and alternating current duct (Neg. No. 67552A dated 4-19-61).

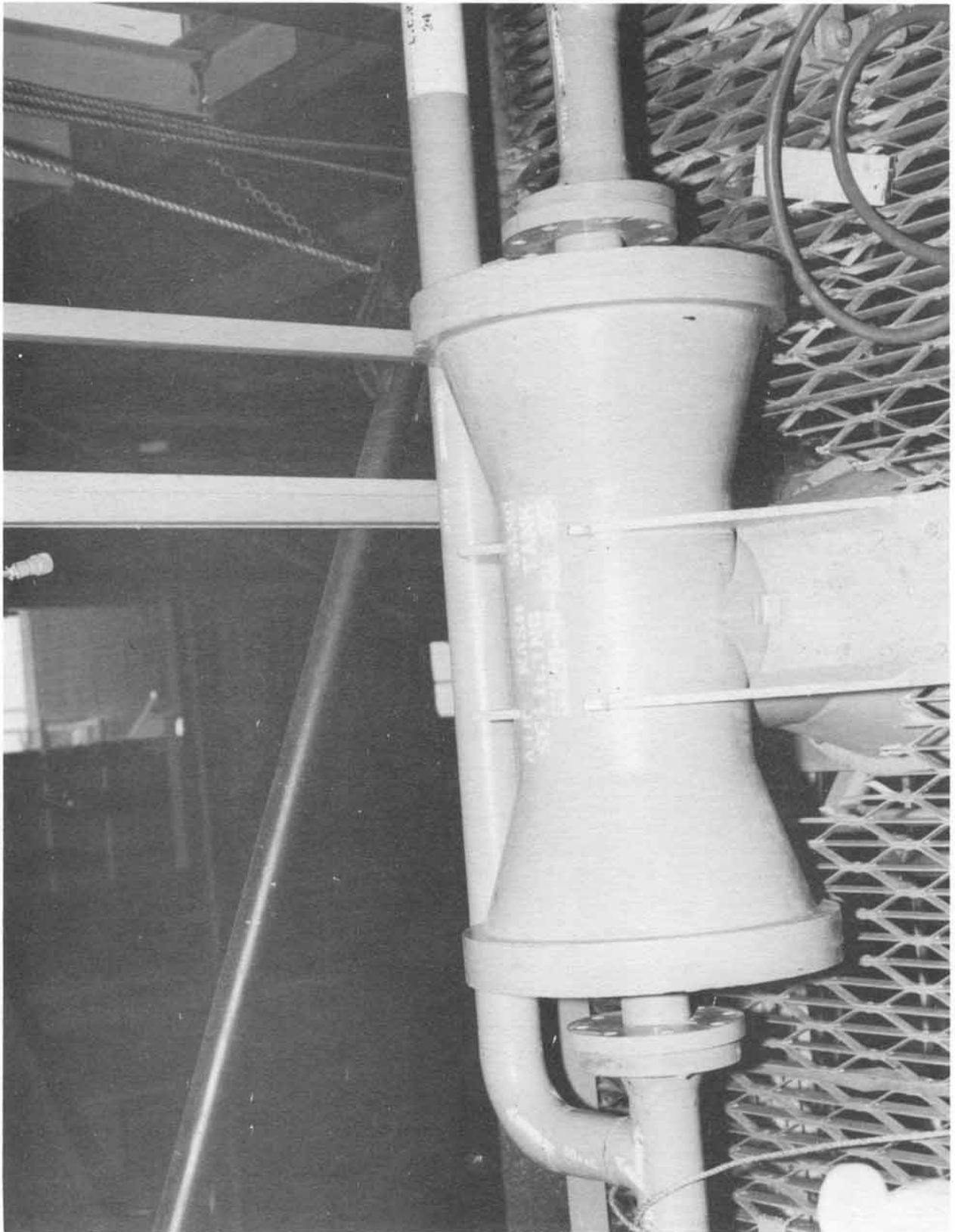


Launch platform drive--MCC looking inboard at Q-2 motor control cab and h-v and a-c duct (Neg. No. 67553A dated 4-19-61).



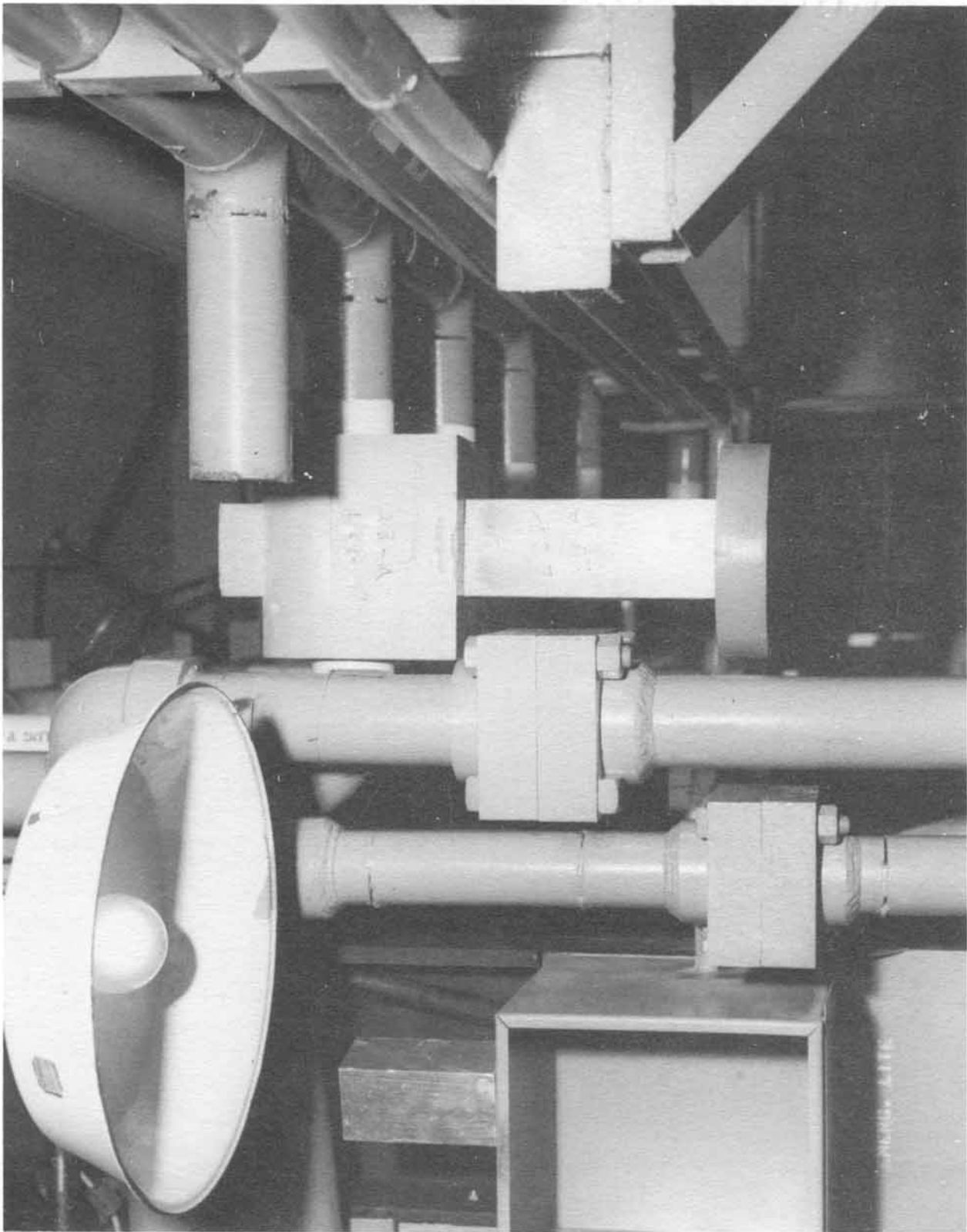


Chilled water and makeup tanks, Q-3, looking toward missile shaftway (Neg. No. 67554A dated 4-19-61).



View looking east toward missile shaftway of sand settling tank and its interconnections (Neg. No. 67555A dated 4-19-61).

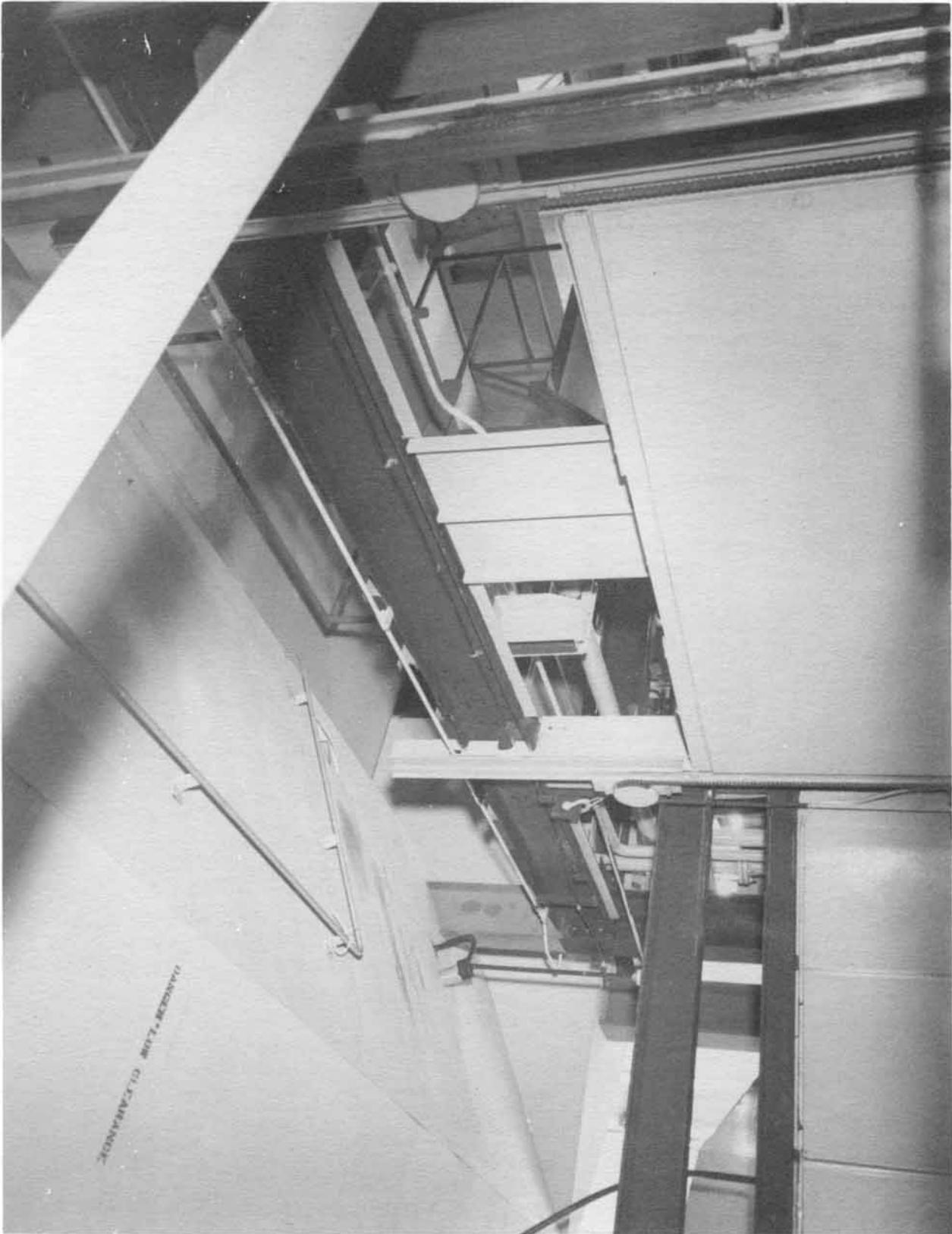




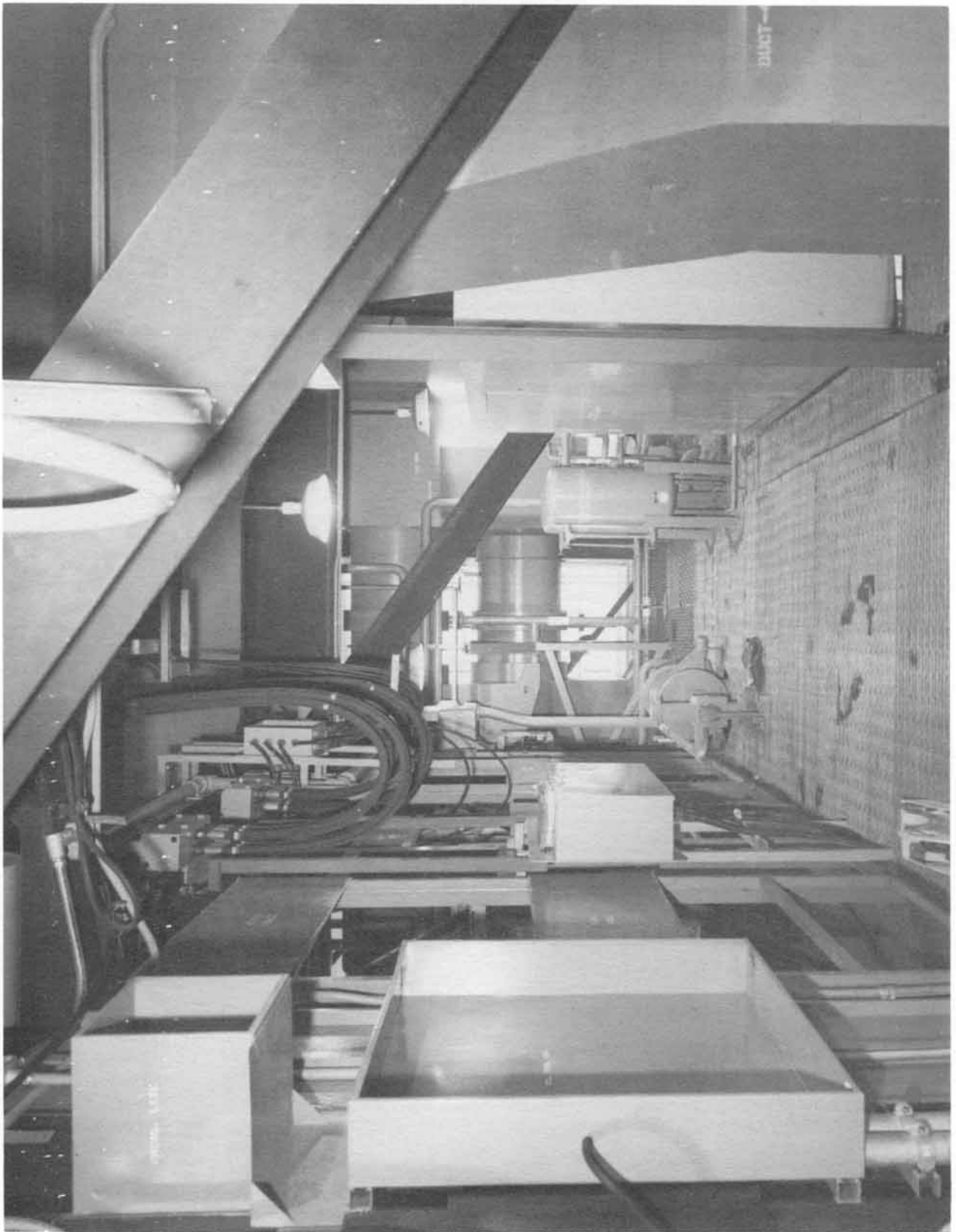
This photo shows close tolerances of Column K penthouse steel. Density of facility and AGE hydraulic system at southwest corner of enclosure (Neg. No. 67556A dated 4-19-61).



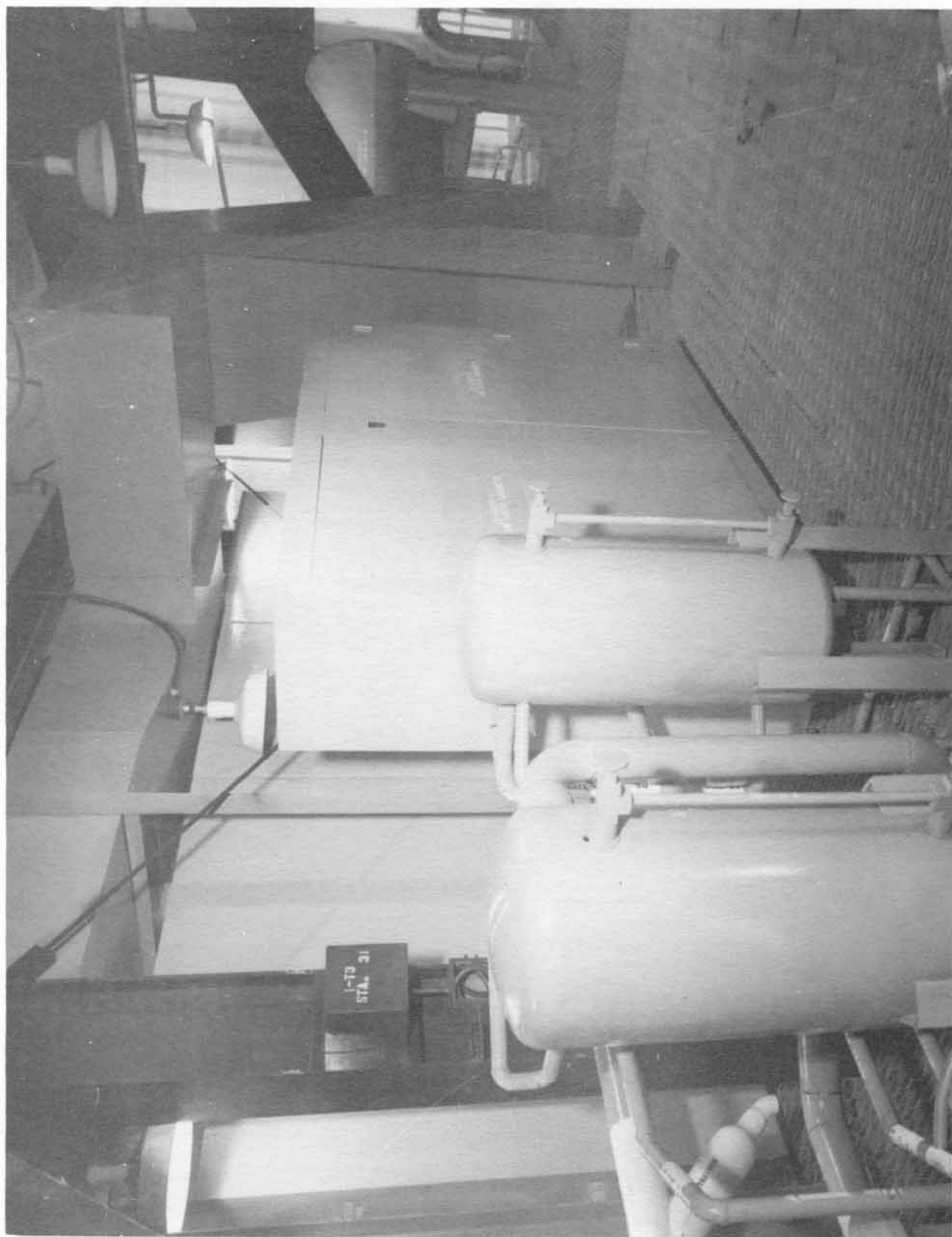
At Column J looking south launch platform up lock strikers (Neg. No. 68008A dated 4-26-61).



Penthouse beam Column J to A-1 (Neg. No. 68009A dated 4-26-61).



At Column G looking south (Neg. No. 68010A dated 4-26-61).

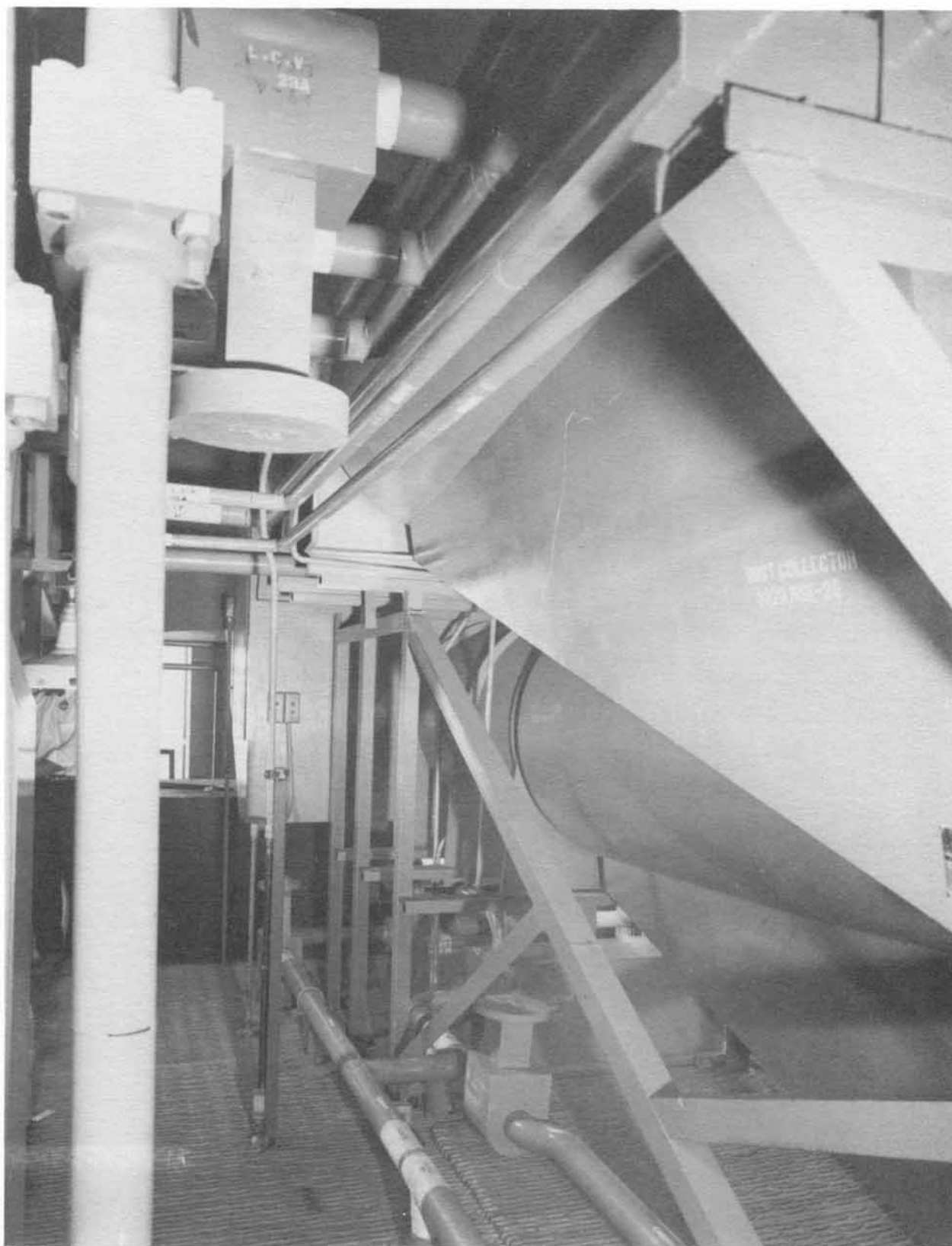


At Column K looking northwest--AMF logic cabinet (Neg. No. 68011A dated 4-26-61).

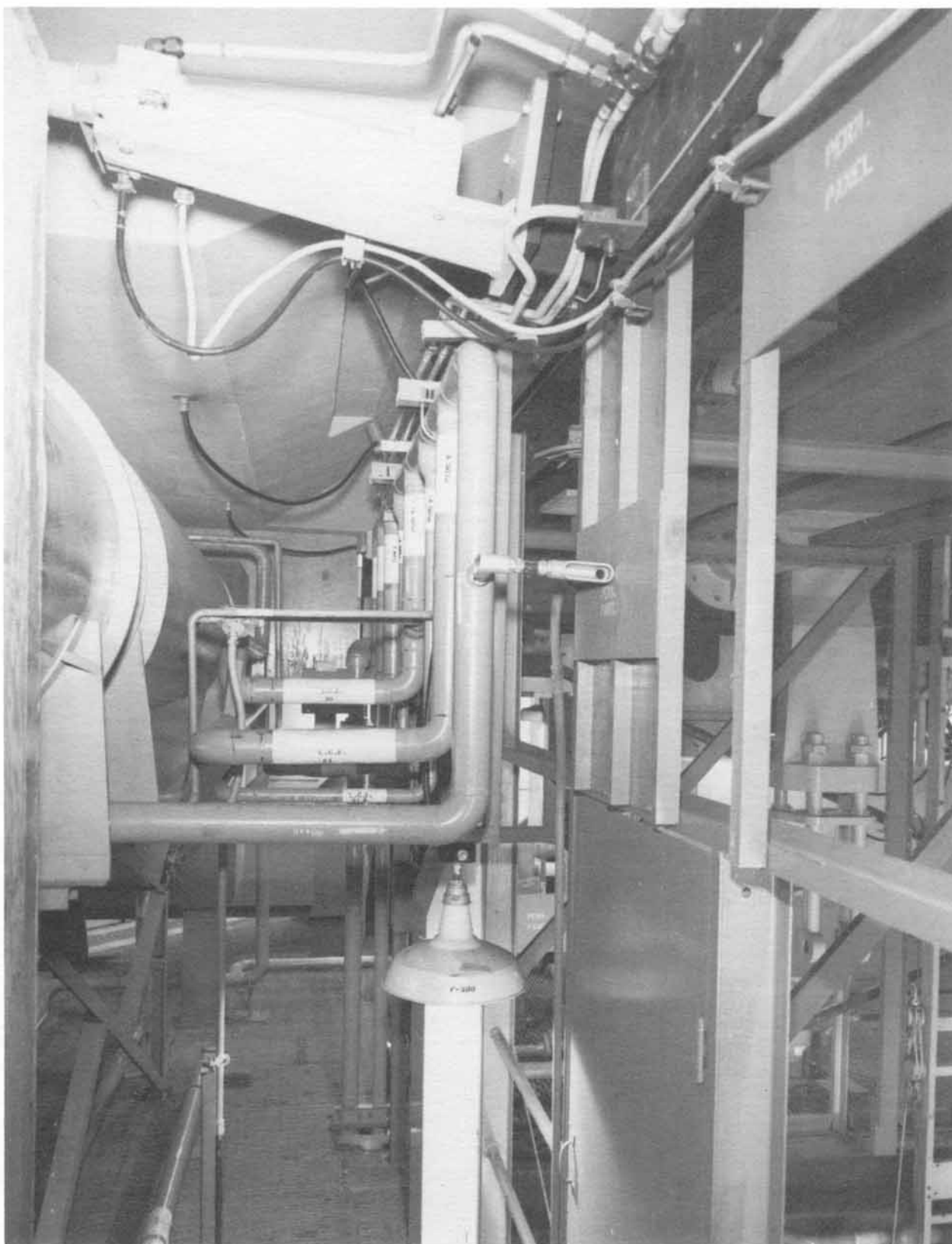




At Column K looking north--local control station (Neg. No. 68012A dated 4-26-61).



View of piping at Column K, looking east (Neg. No. 68013A dated 4-26-61).



View of piping at Column B-1, looking west (Neg. No. 68014A dated 4-26-61).





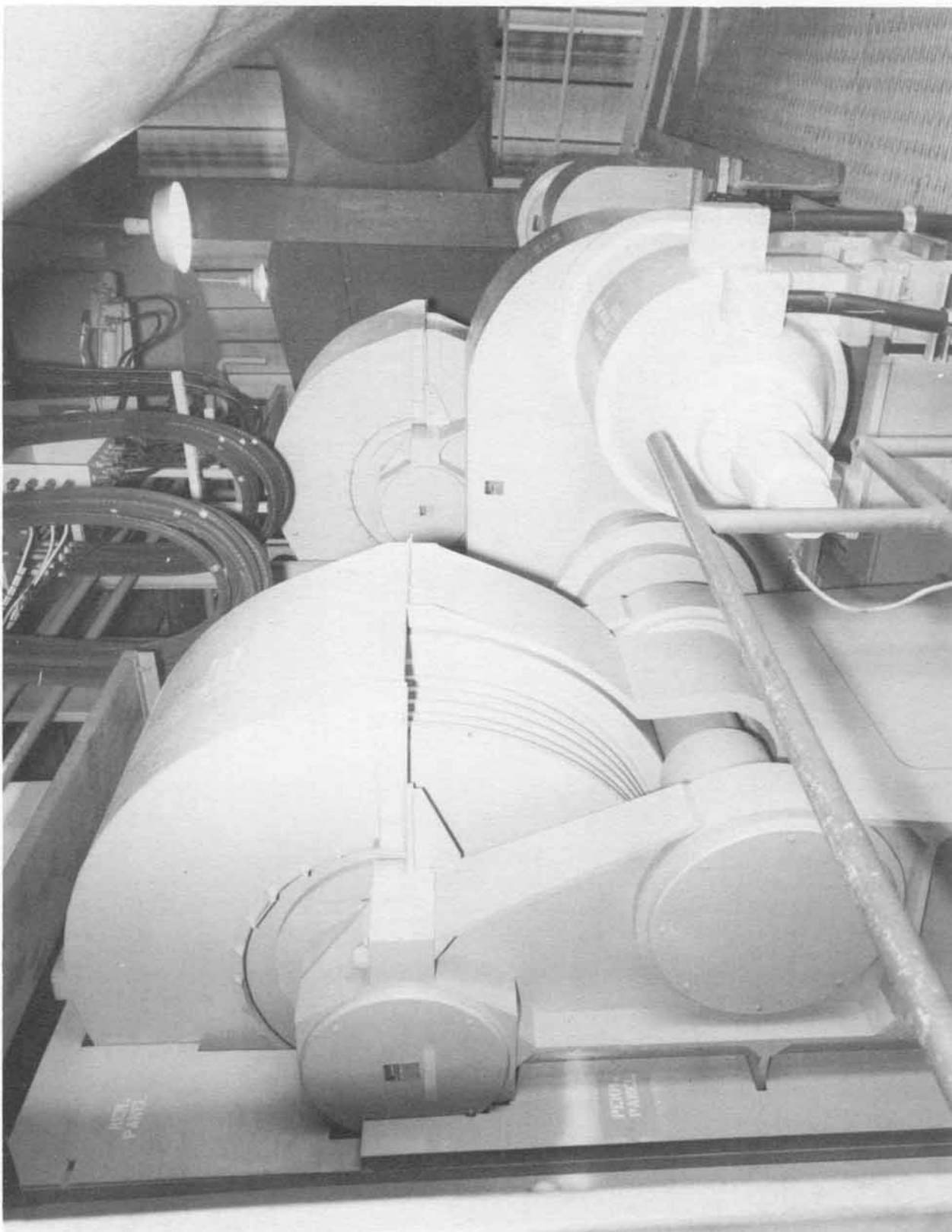
View of work safety platform at Column K to B-1, looking north (Neg. No. 68015A dated 4-26-61).



Drive mechanism at Column J to K, looking east (Neg. No. 68016A dated 4-26-61).

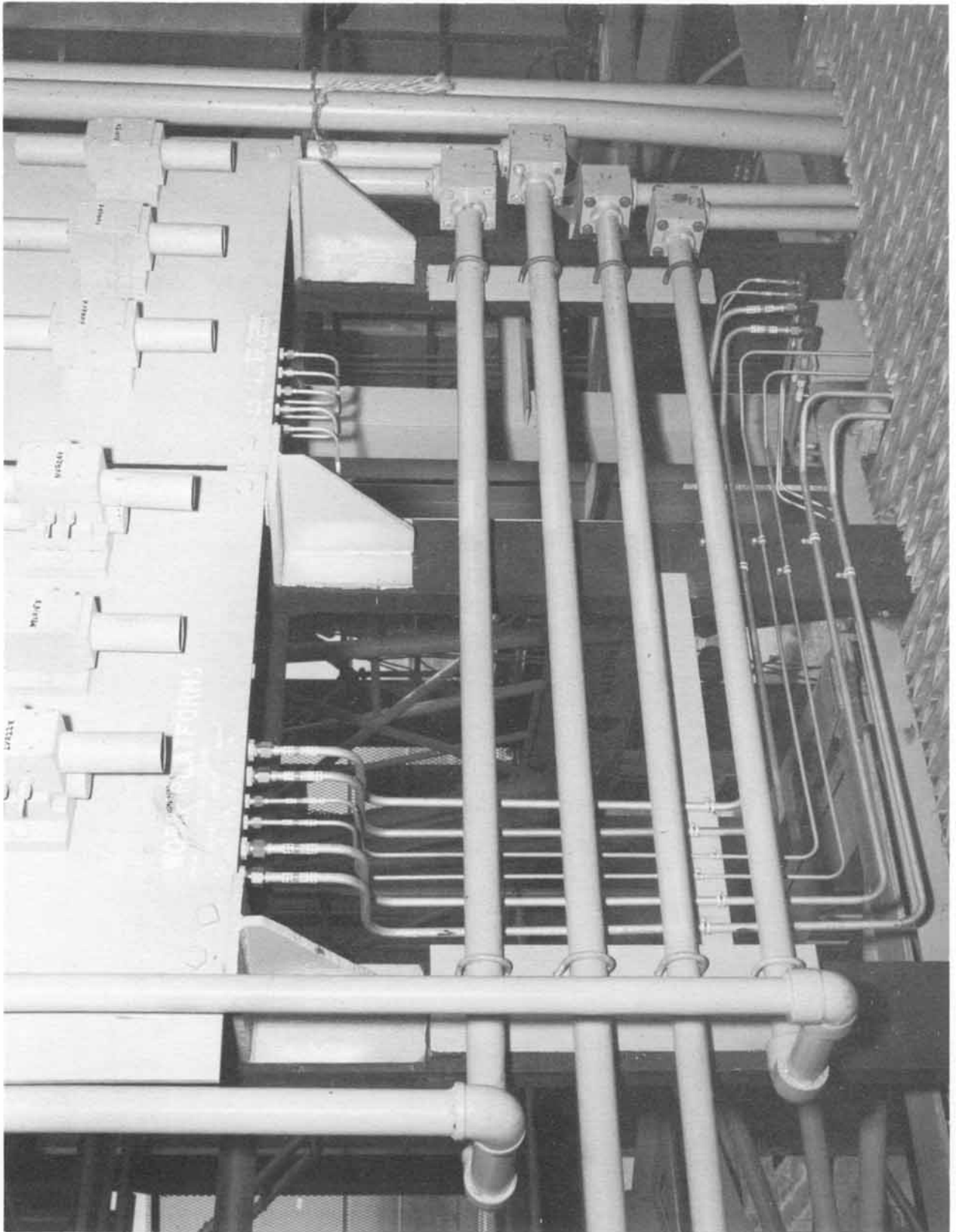


Tension equalizer at Column A-1, looking southwest (Neg. No. 68017A dated 4-26-61).



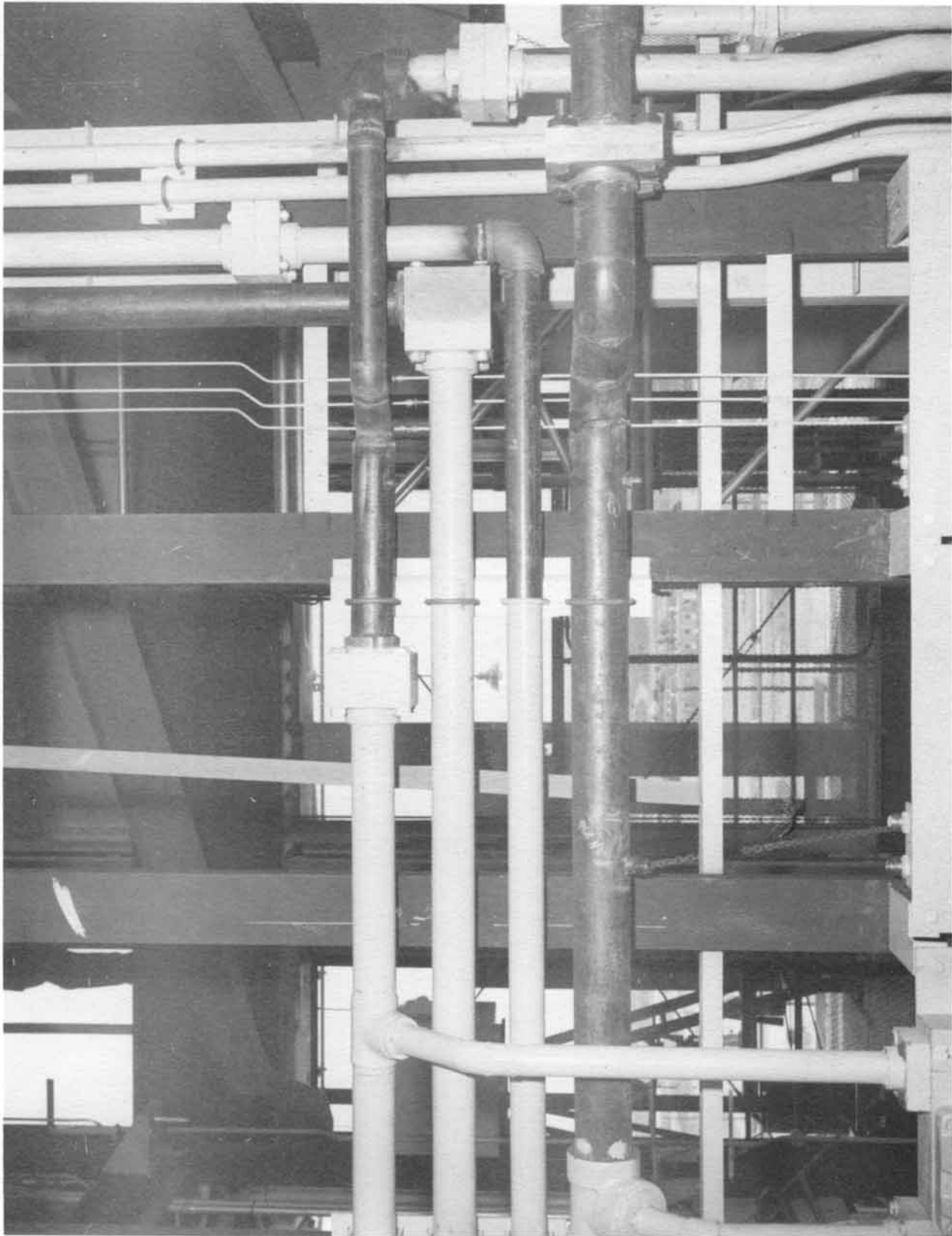
Drive mechanism at Column B, looking northwest (Neg. No. 68018A dated 4-26-61).



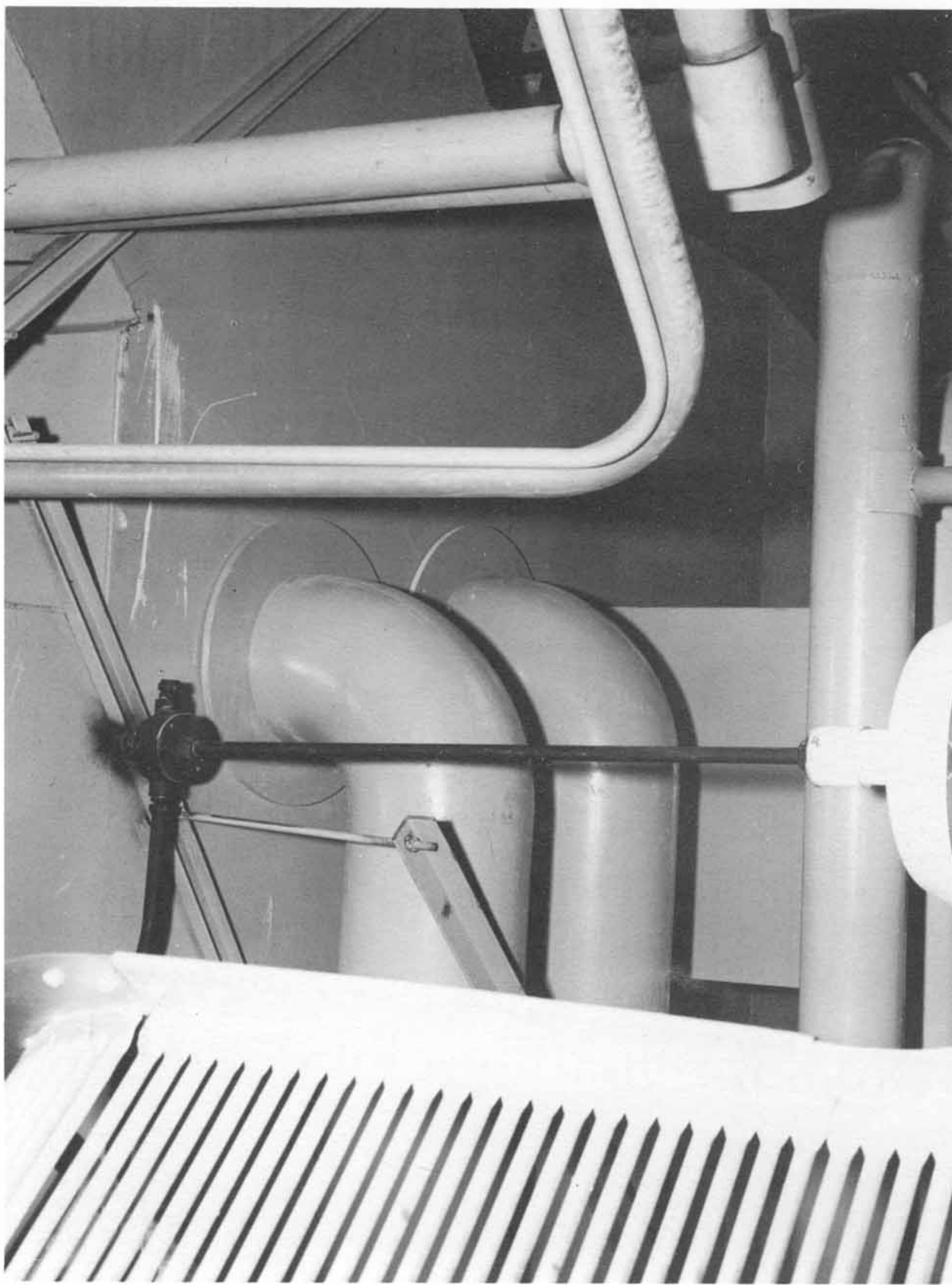


Silo Mockup work platform Level 2 (Neg. No. 53290A dated 8-8-60).

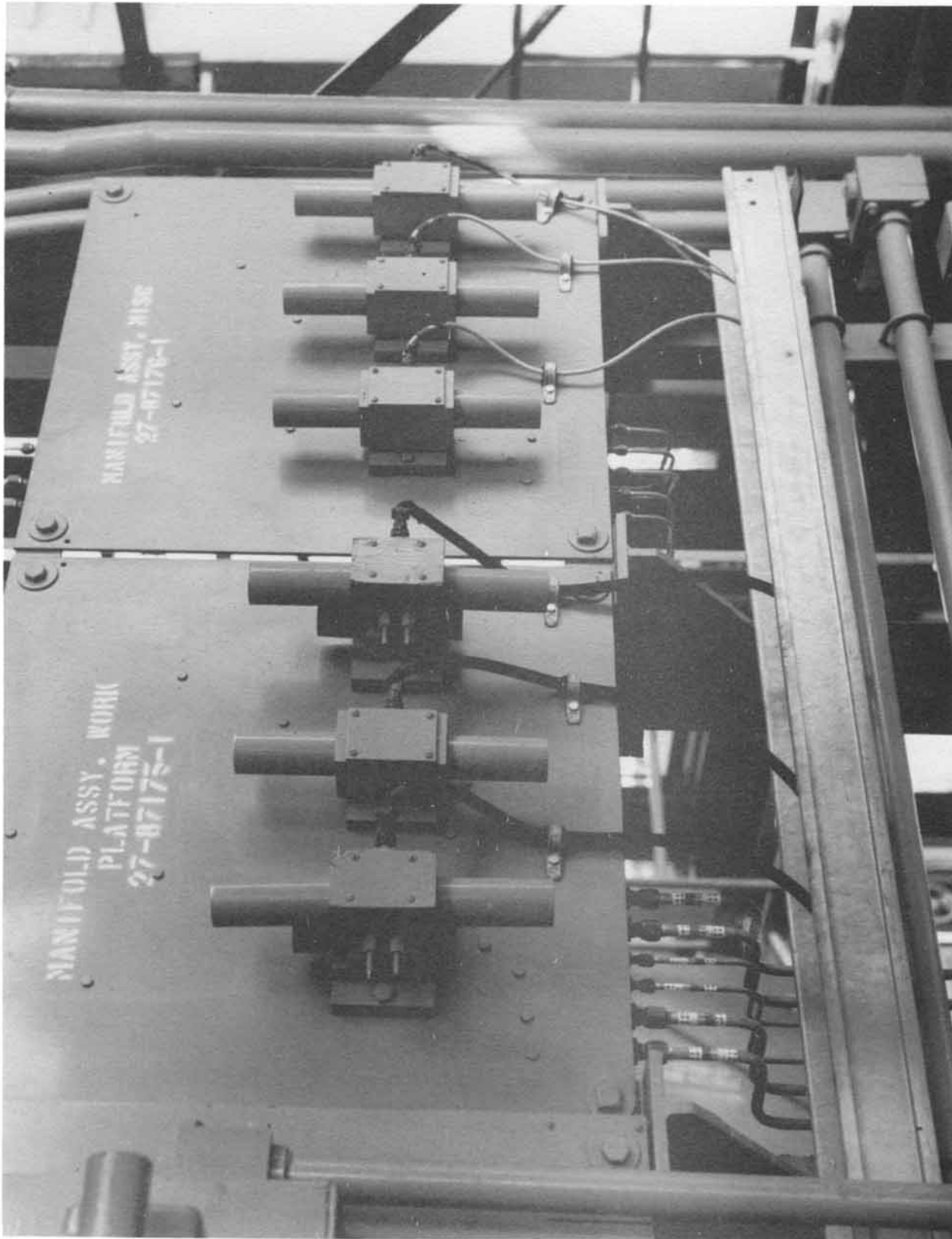




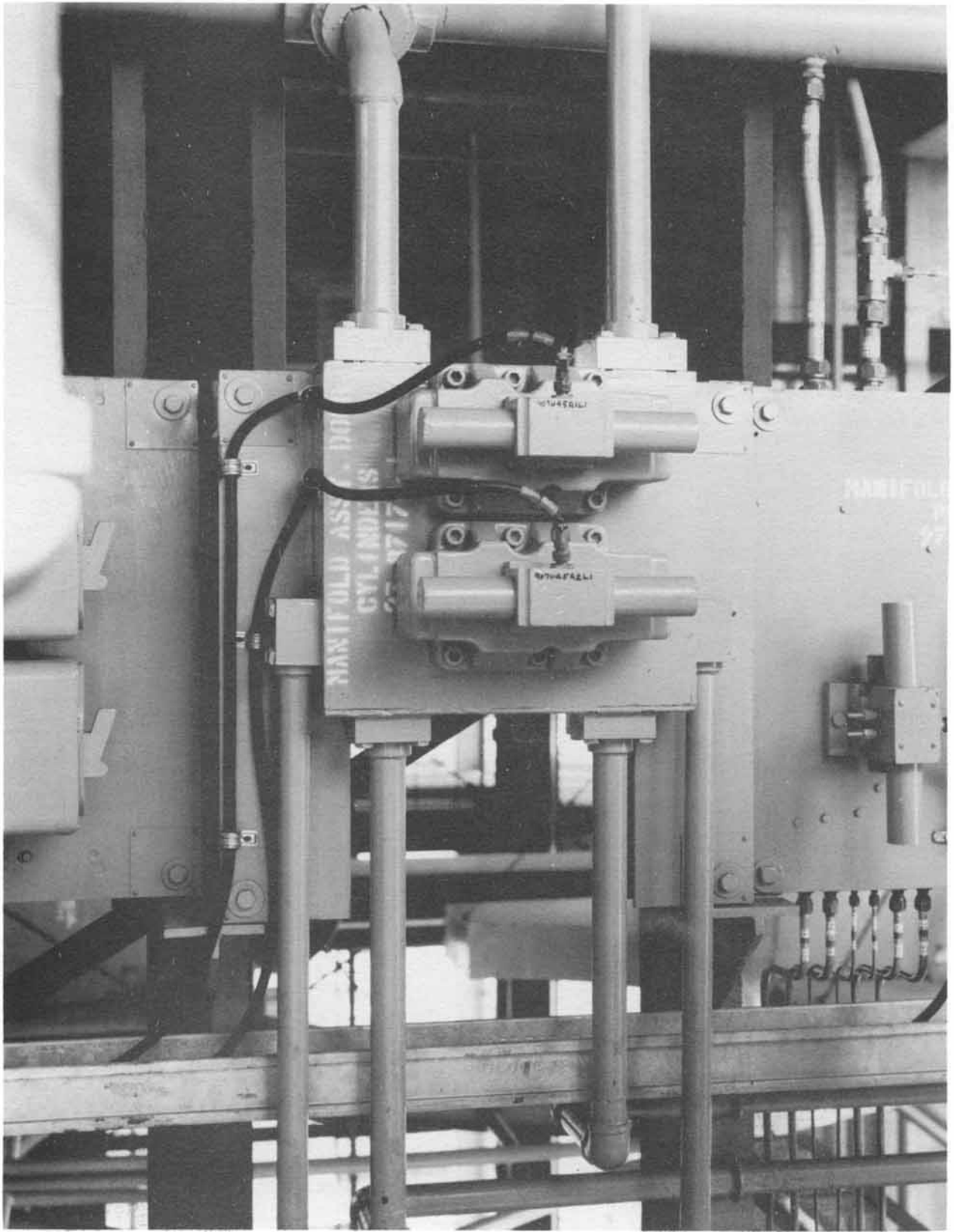
Hydraulic control piping on Level 2 (Neg. No. 53291A dated 8-8-60).



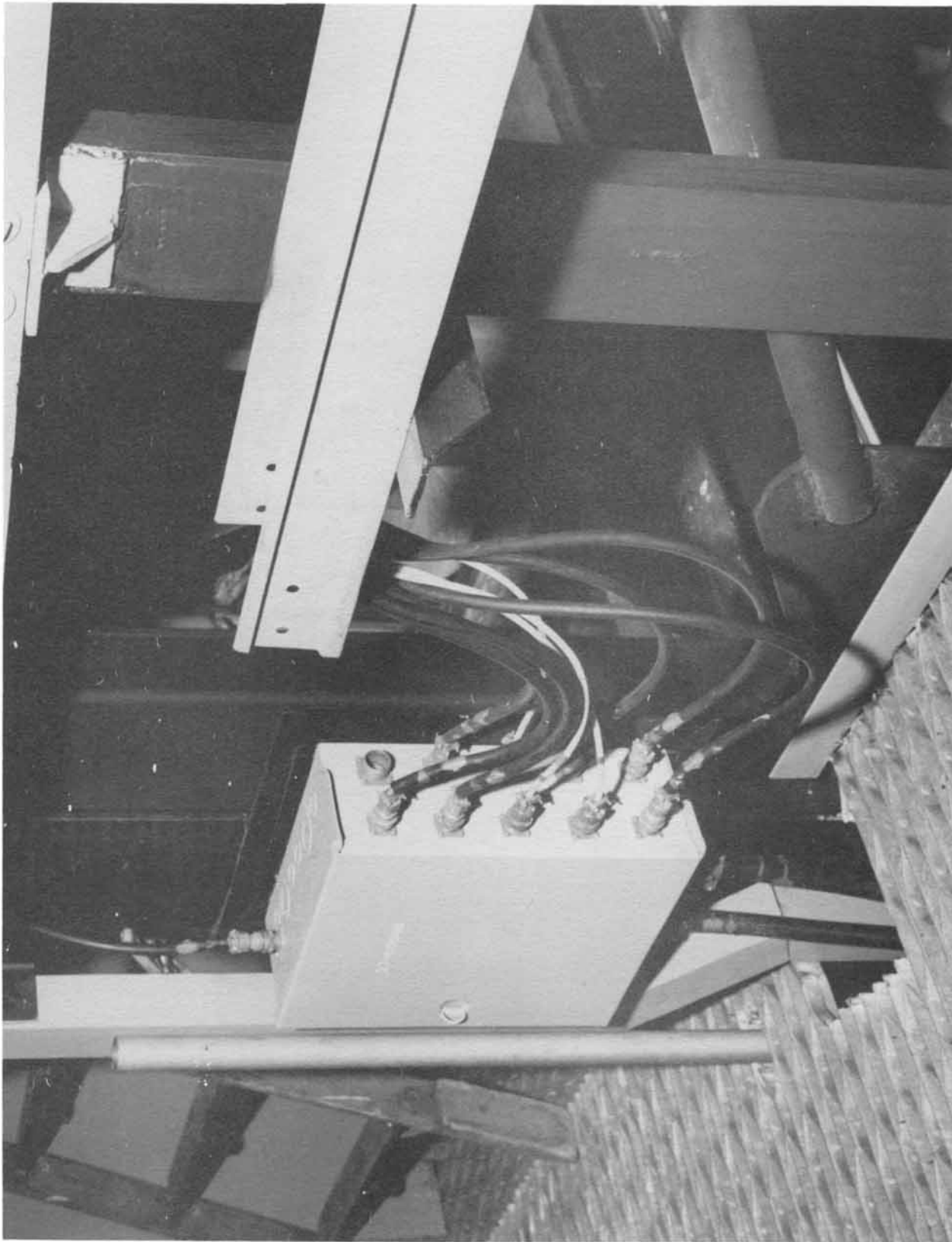
Diesel exhaust on Level 2 (Neg. No. 55752A dated 9-26-60).



Cables to hydraulic control valves (Neg. No. 55759A dated 9-26-60).

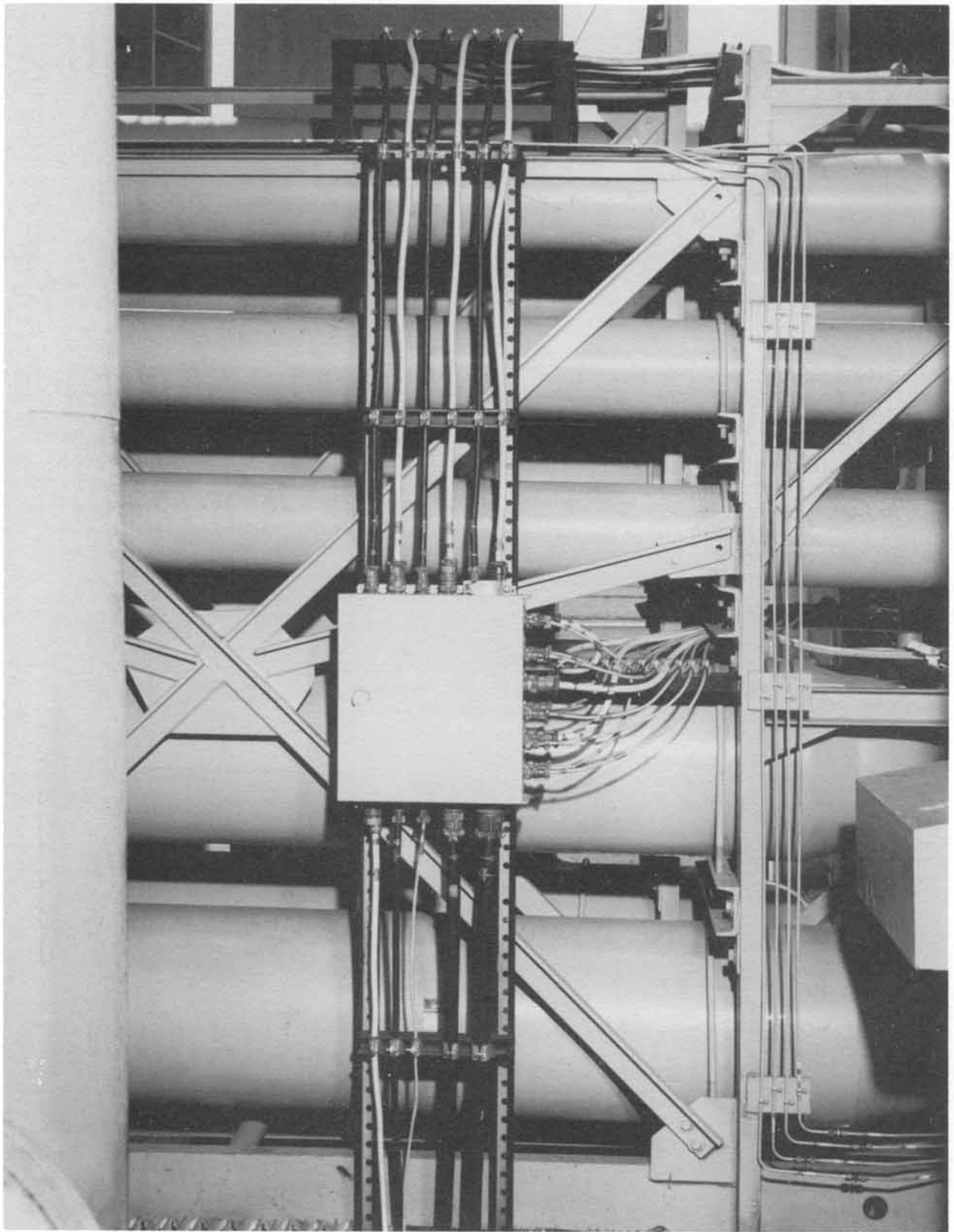


Door cylinder control manifold wiring (Neg. No. 55760A dated 9-26-60).



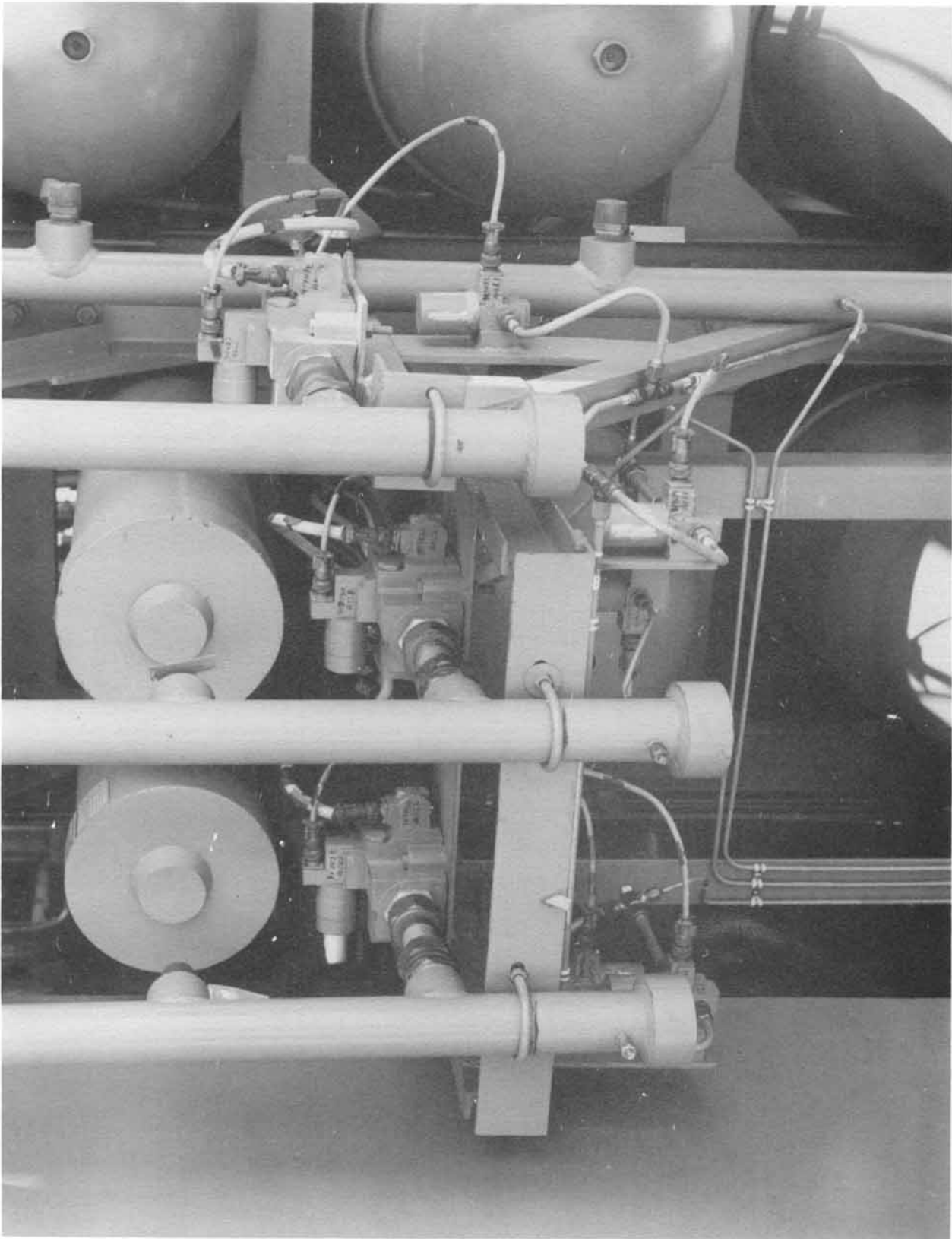
Cables to hydraulic control valves, J Box (Neg. No. 55761A dated 9-26-60).



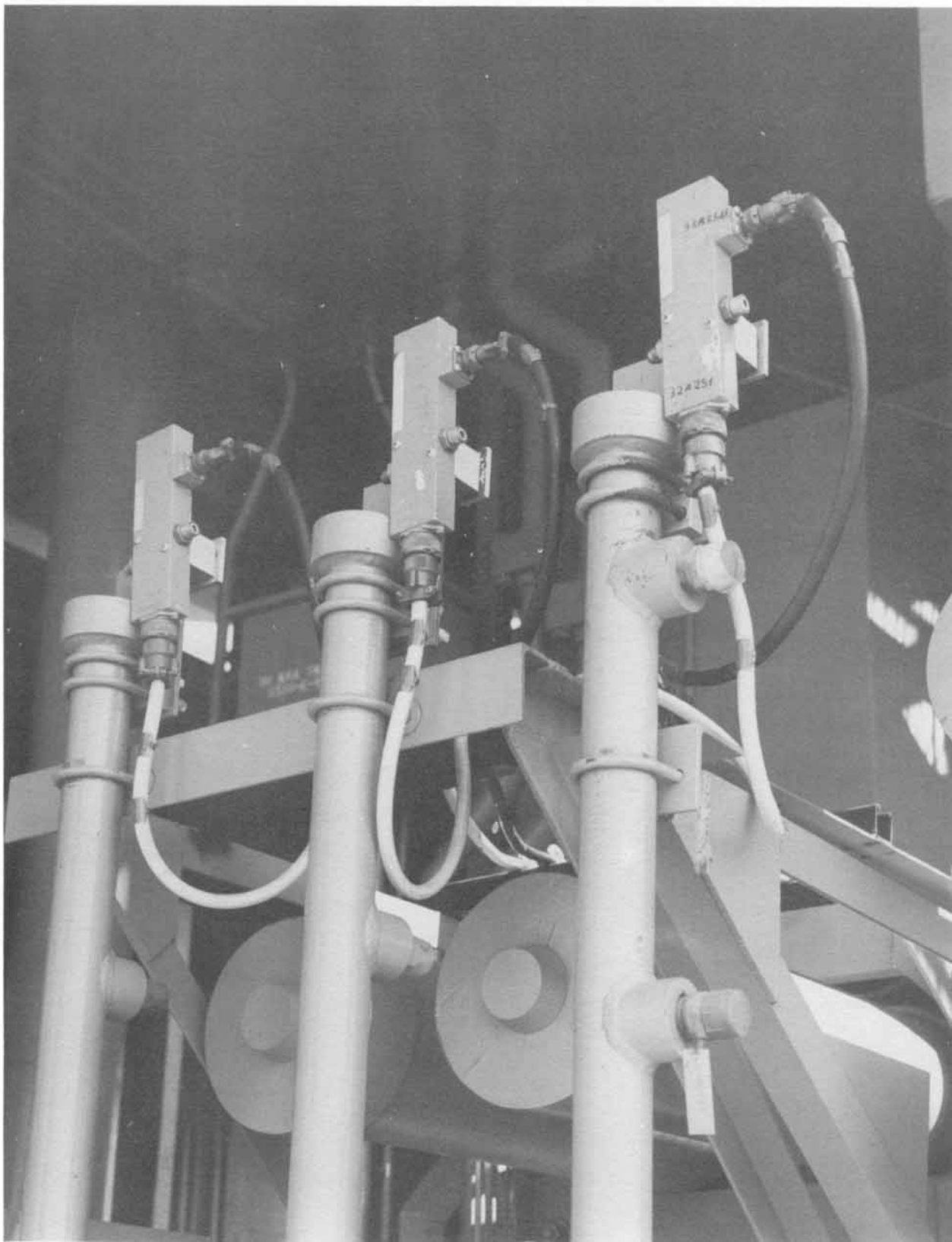


Cables to power pack and J Box (Neg. No. 55762A dated 9-26-60).

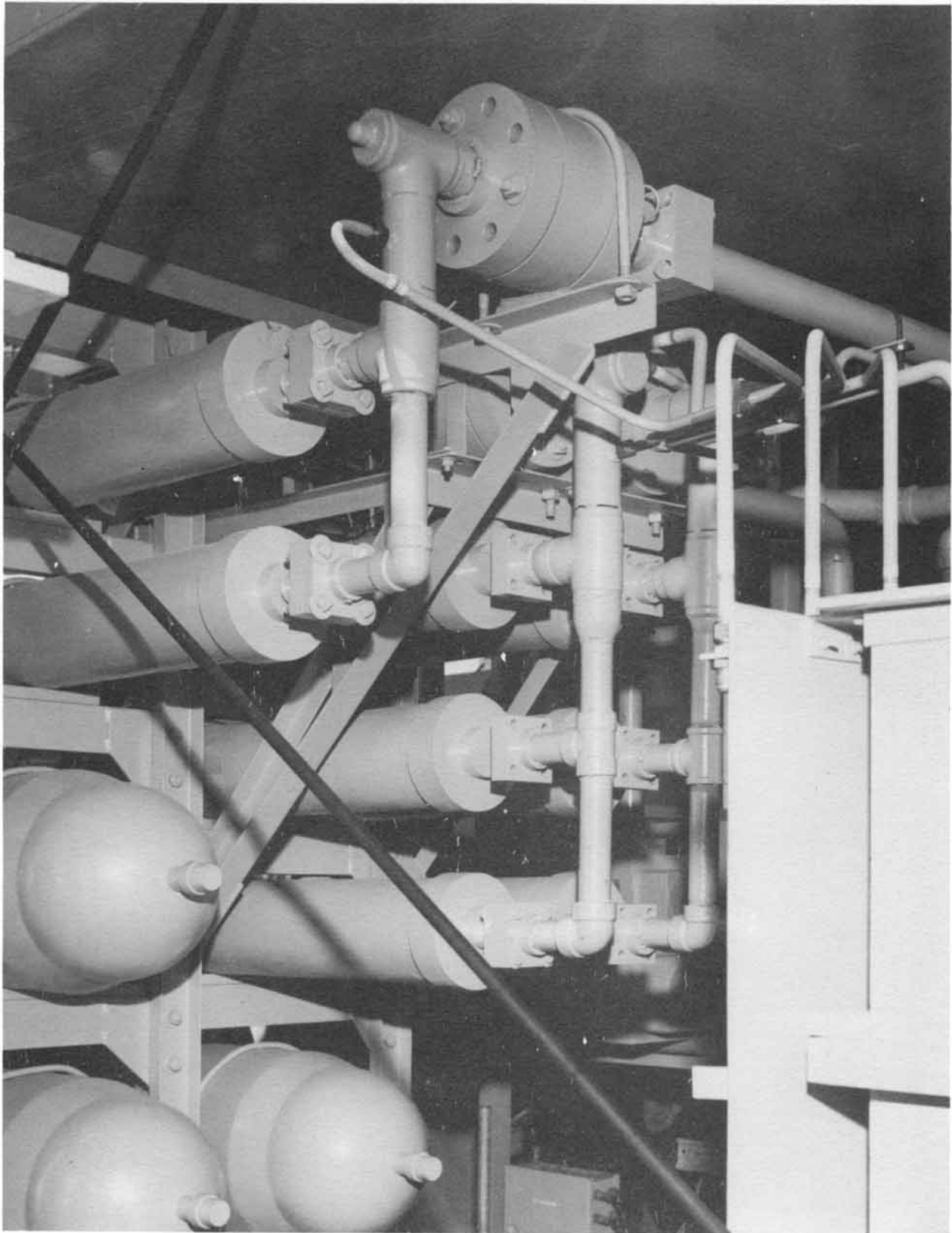




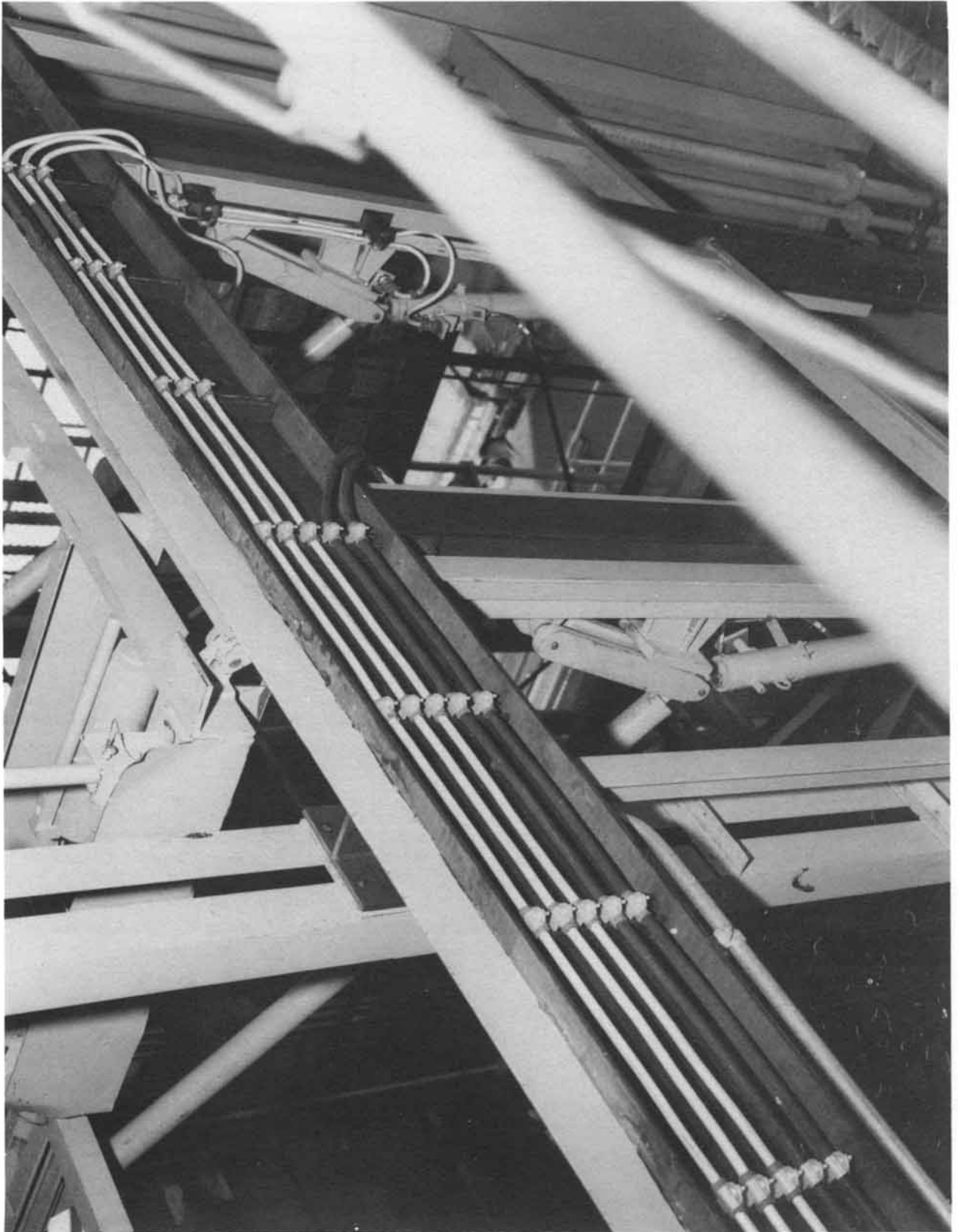
Lower hydraulic power pack valves (Neg. No. 55763A dated 9-26-60).



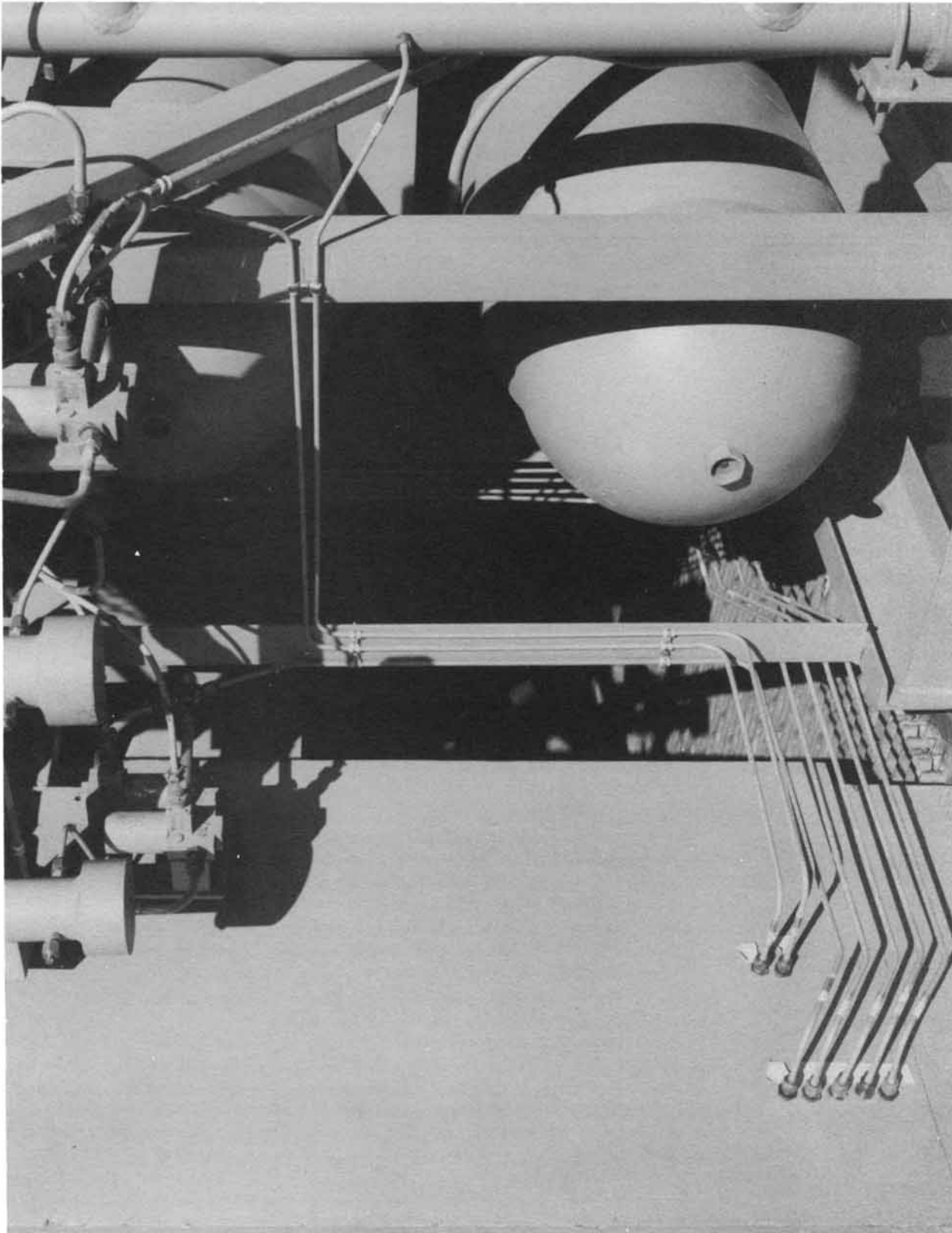
Upper hydraulic power pack valves (Neg. No. 55764A dated 9-26-60).



Manifold connectors, hydraulic control pack (Neg. No. 55765A dated 9-26-60).

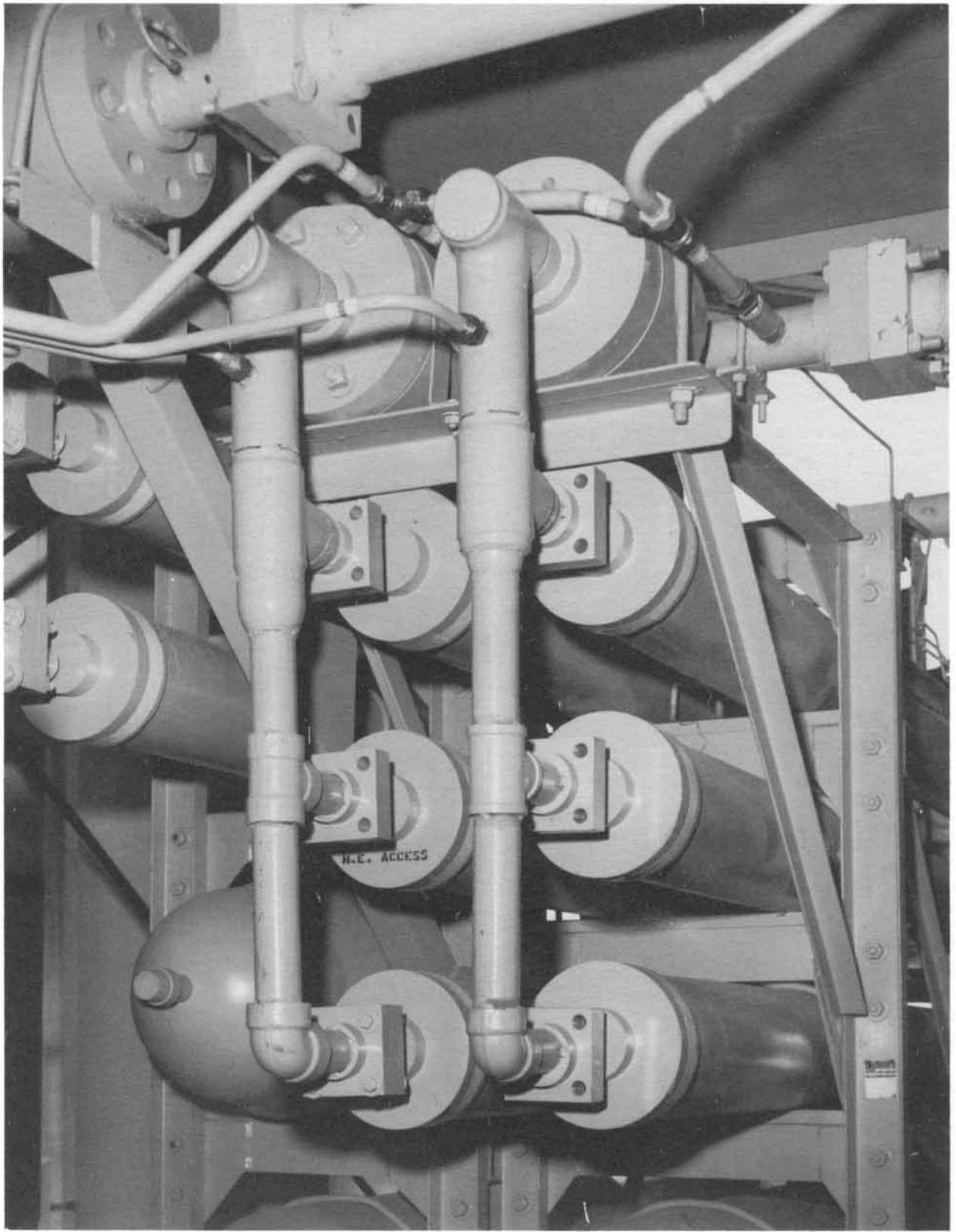


Cables to W/P beam, Column A-1 to B-1 (Neg. No. 55766A dated 9-26-60).



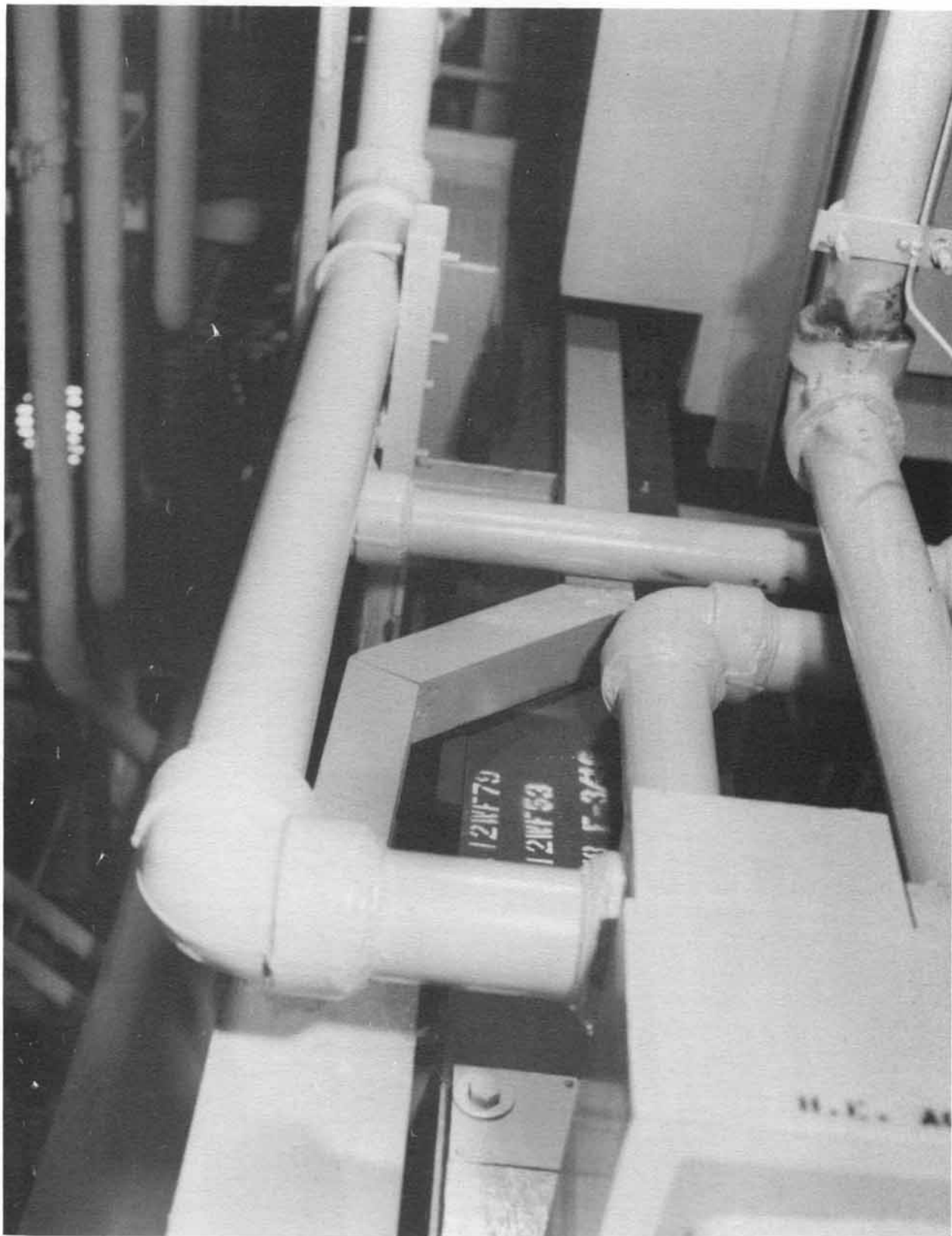
Tubing from hydraulic power pack to control panel (Neg. No. 58765A dated 11-15-60).



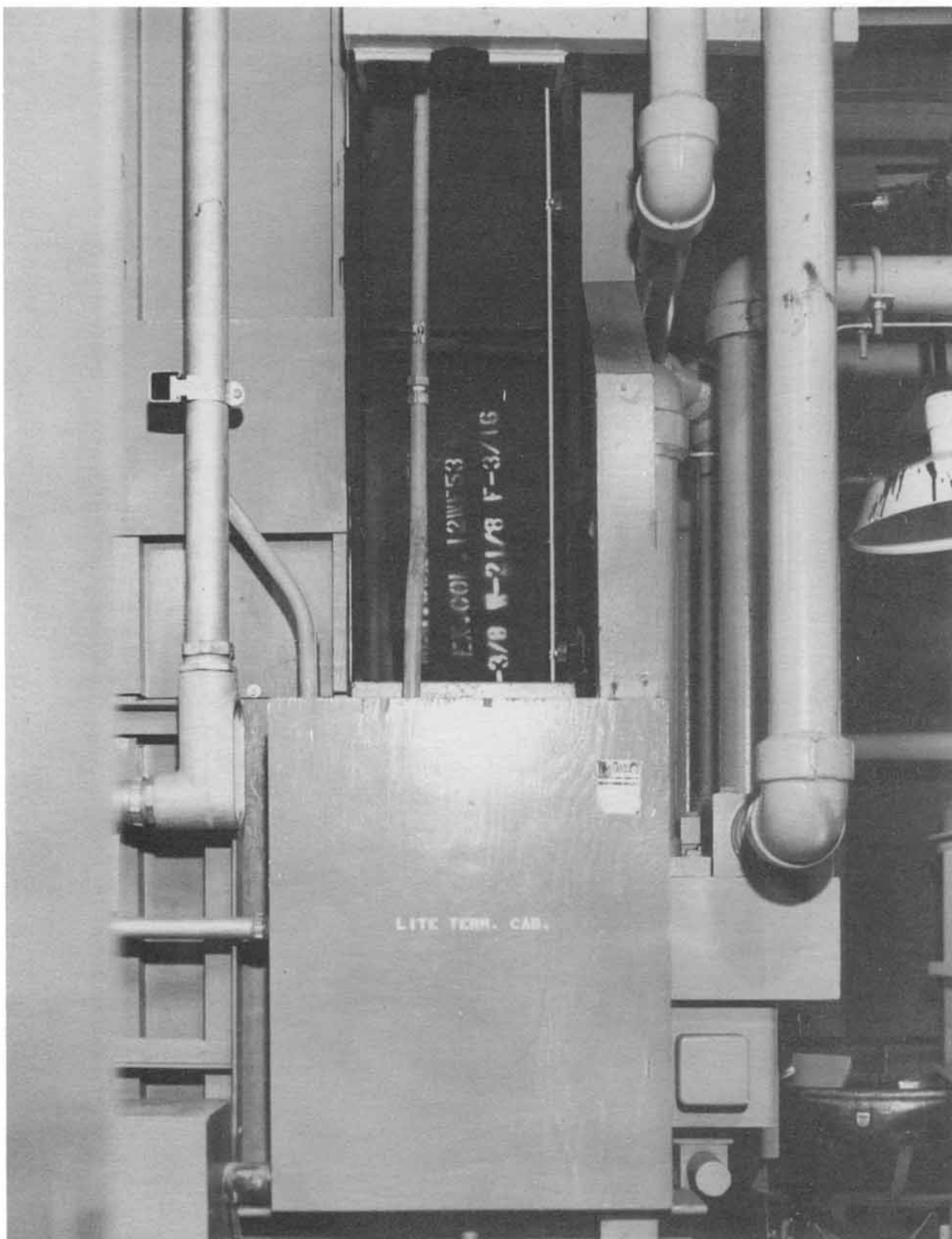


Tubing and piping on power pack (Neg. No. 58766A dated 11-15-60).

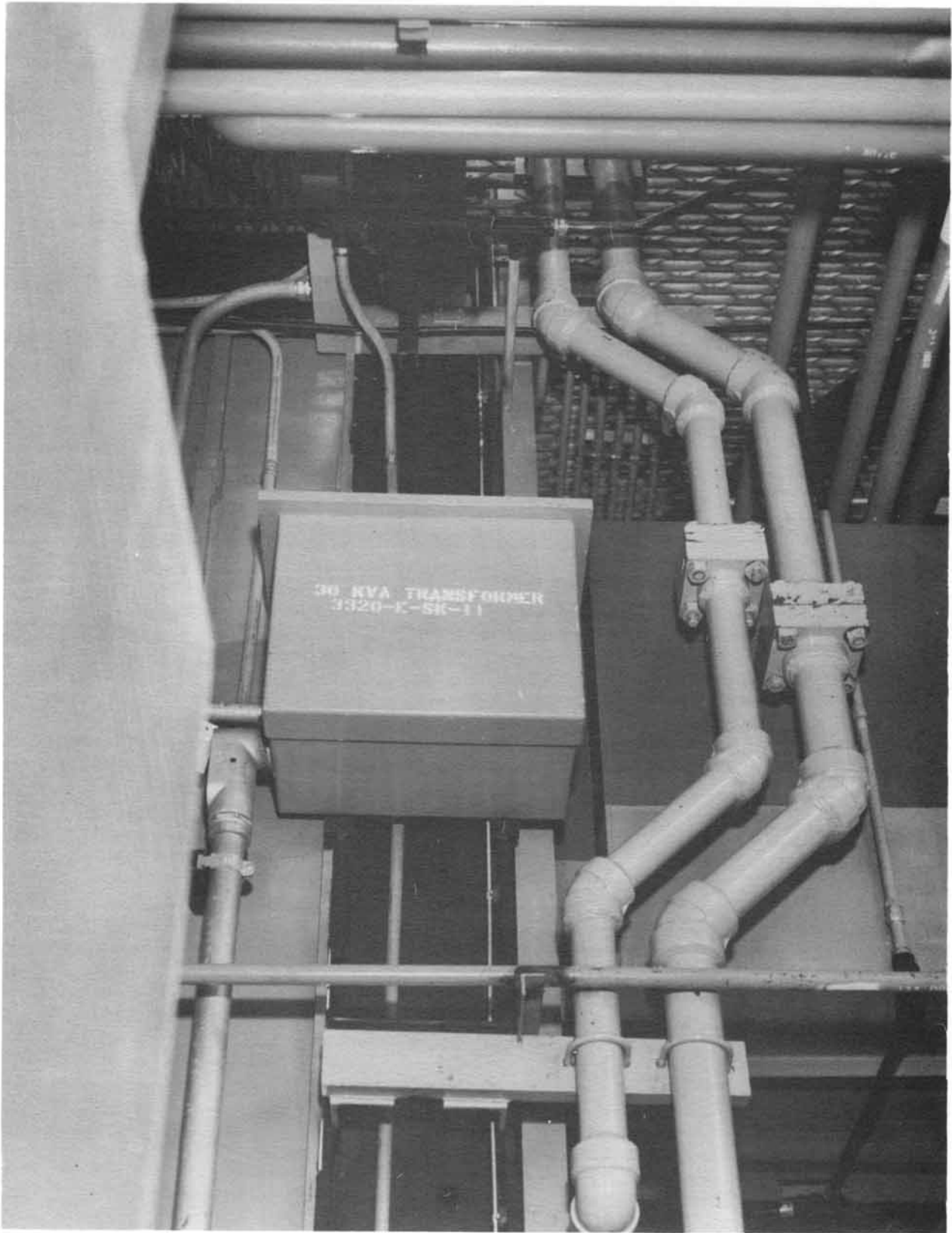




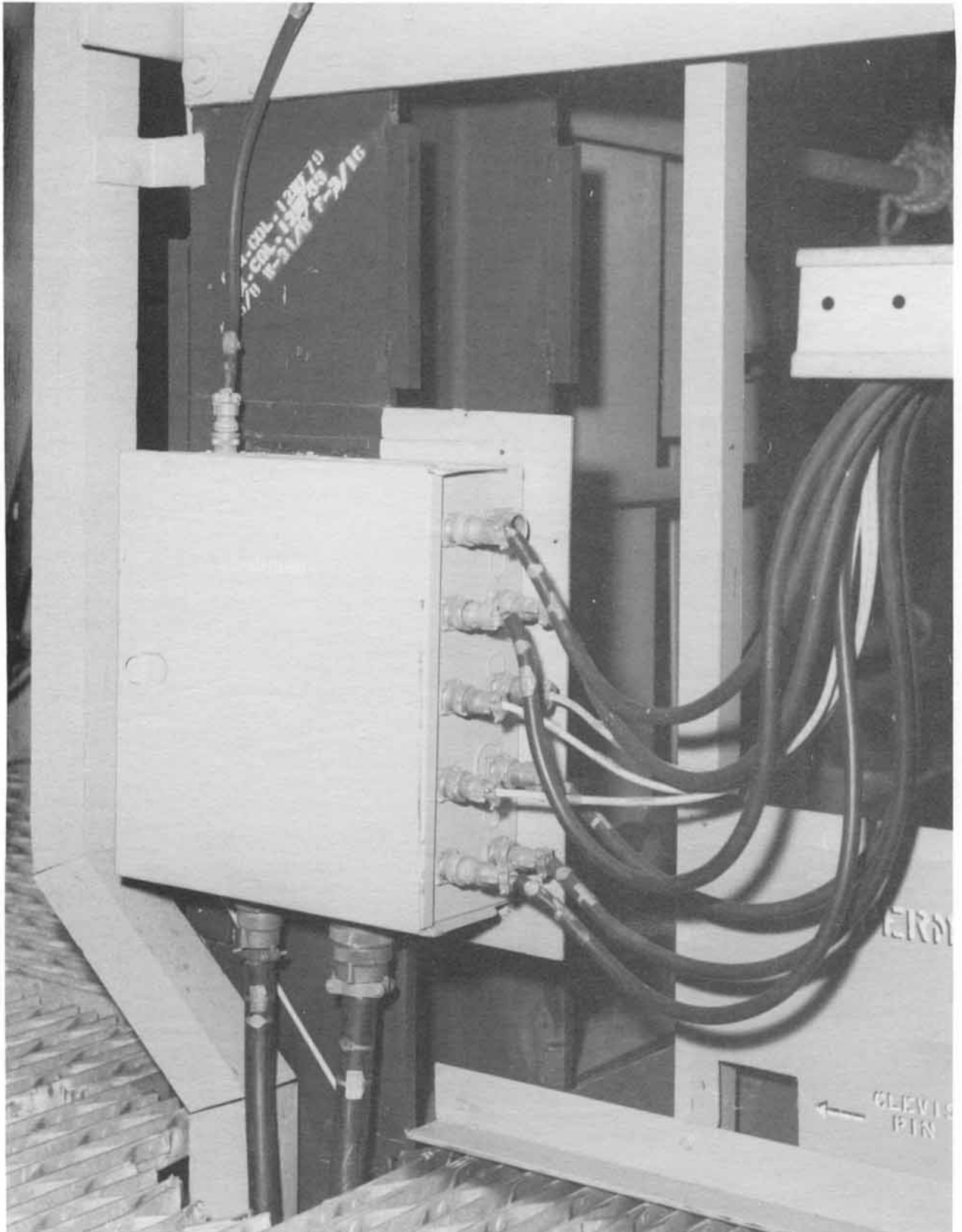
Hydraulic pipes at Column K, looking north and up (Neg. No. 66650A dated 4-3-61).



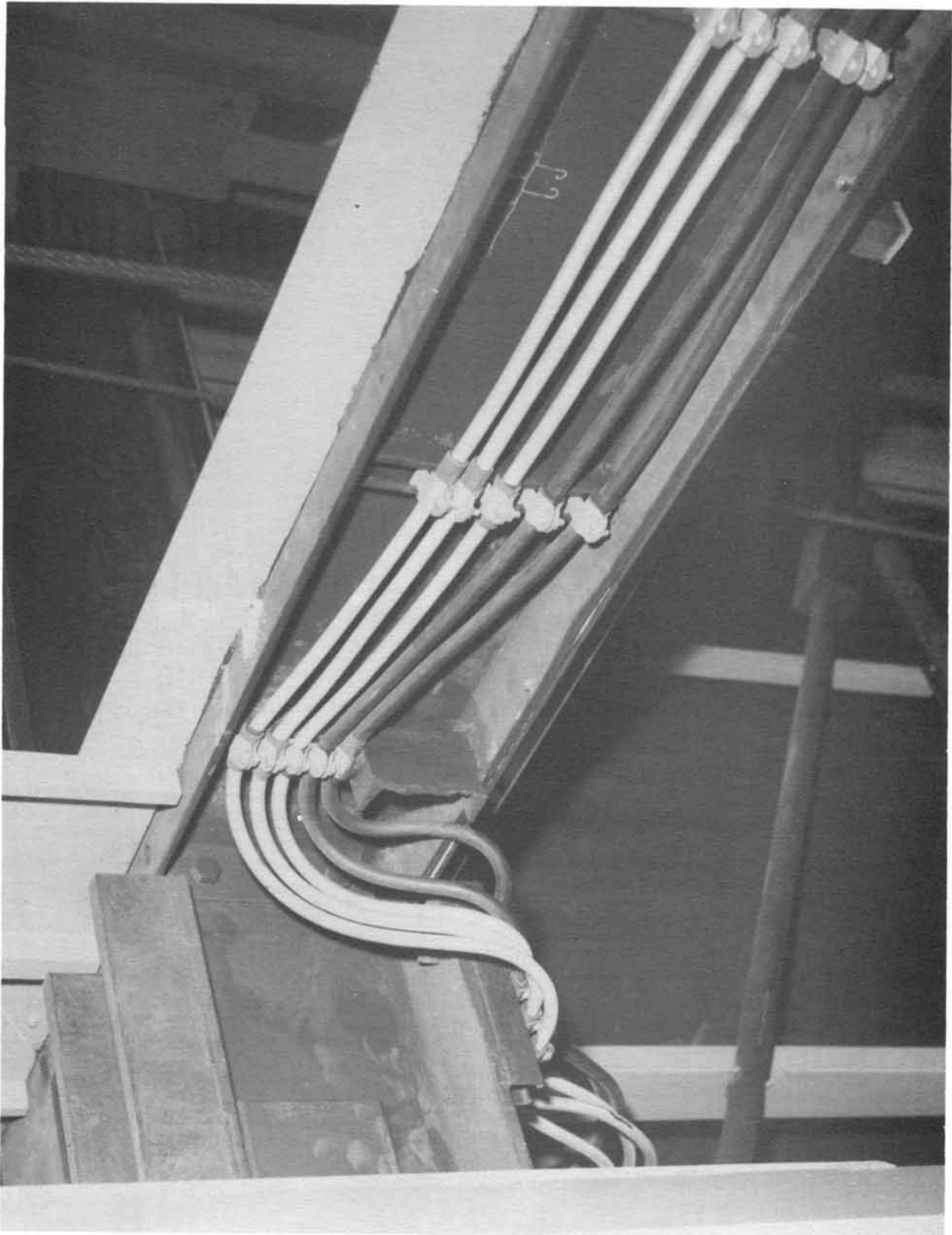
At Column K, looking east (Neg. No. 66651A dated 4-3-61).



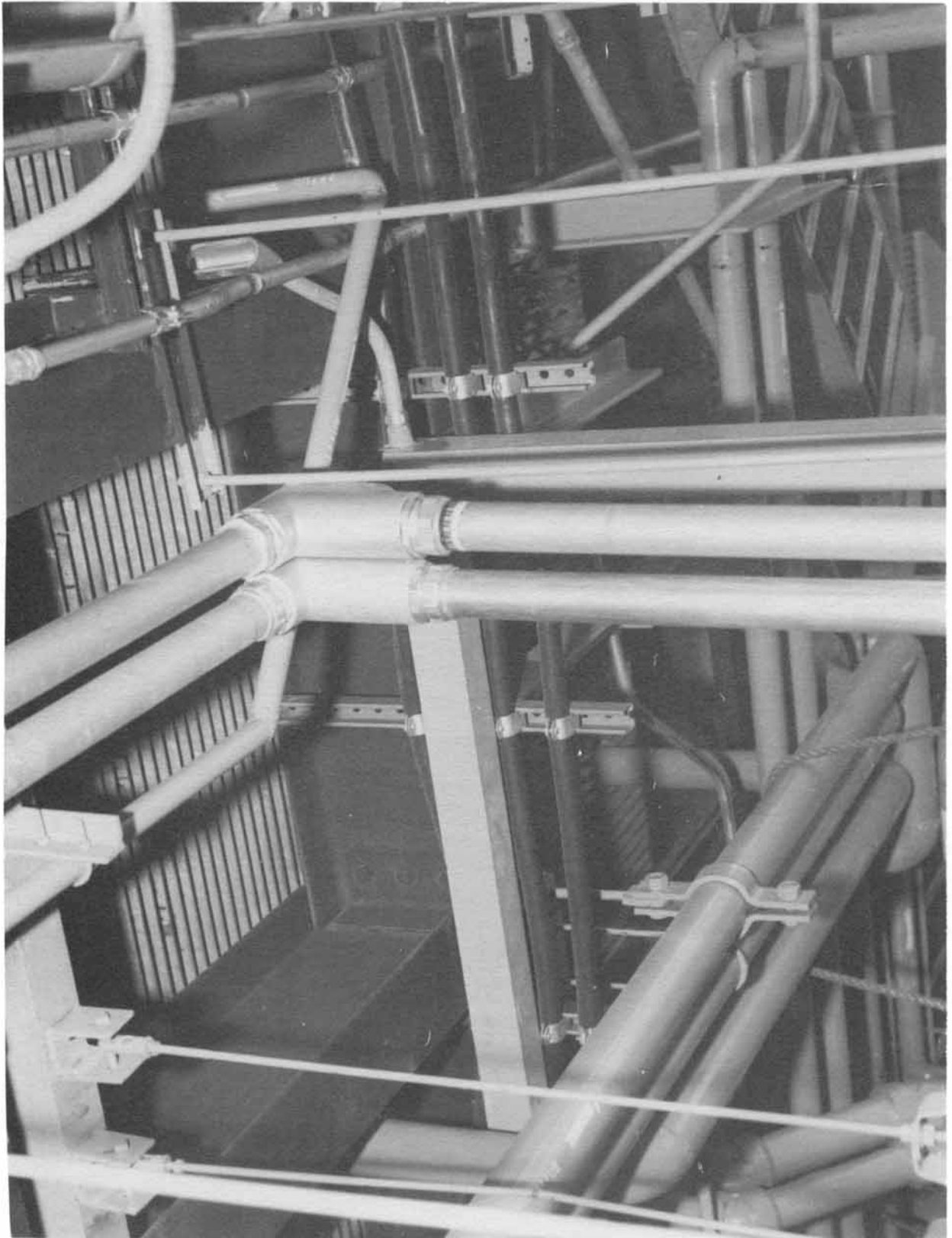
At Column K, looking east and up (Neg. No. 66652A dated 4-3-61).



J Box at Column K (Neg. No. 67324A dated 4-14-61).

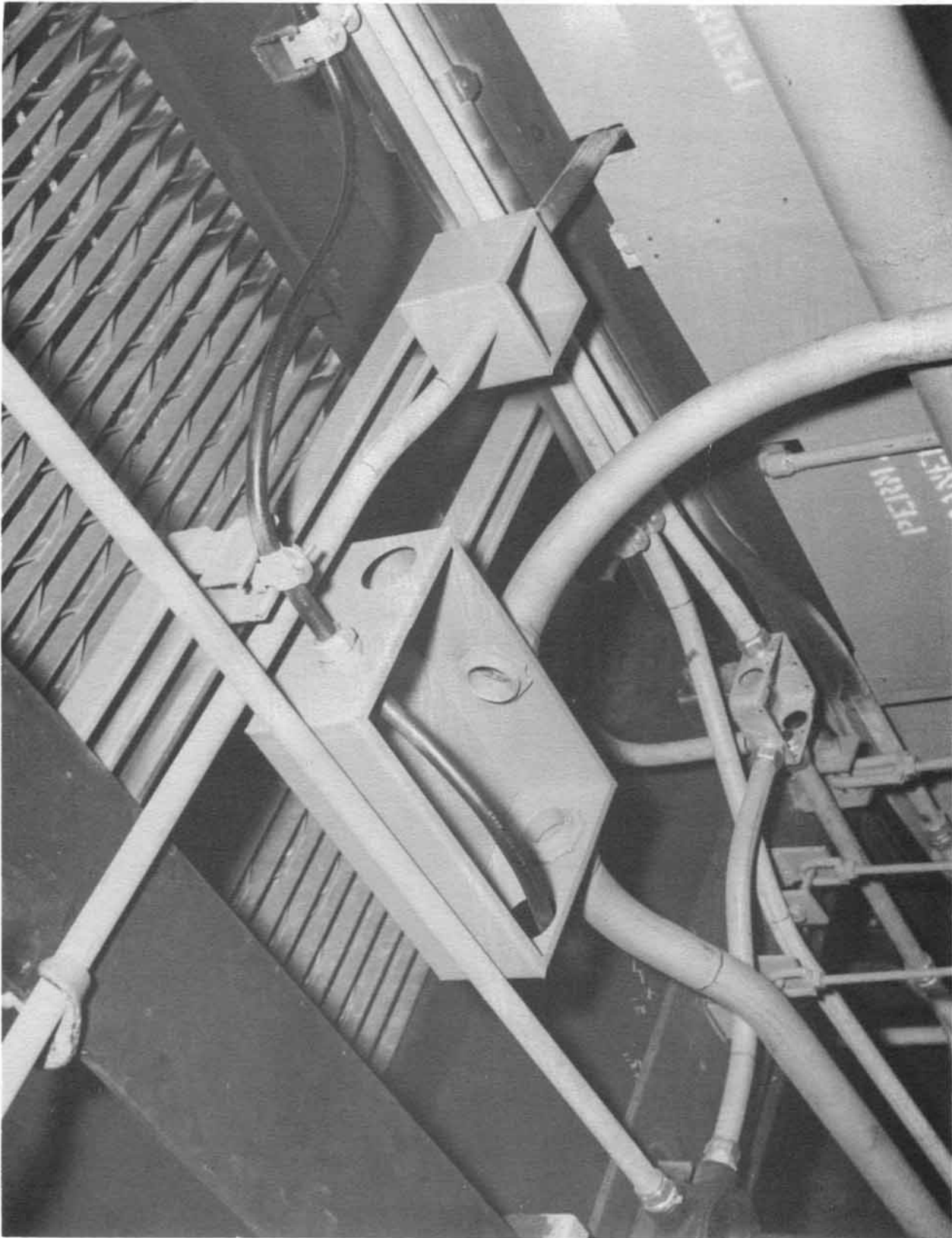


Cable routing near counterweight at Column B-1 (Neg. No. 67325A dated 4-14-61).

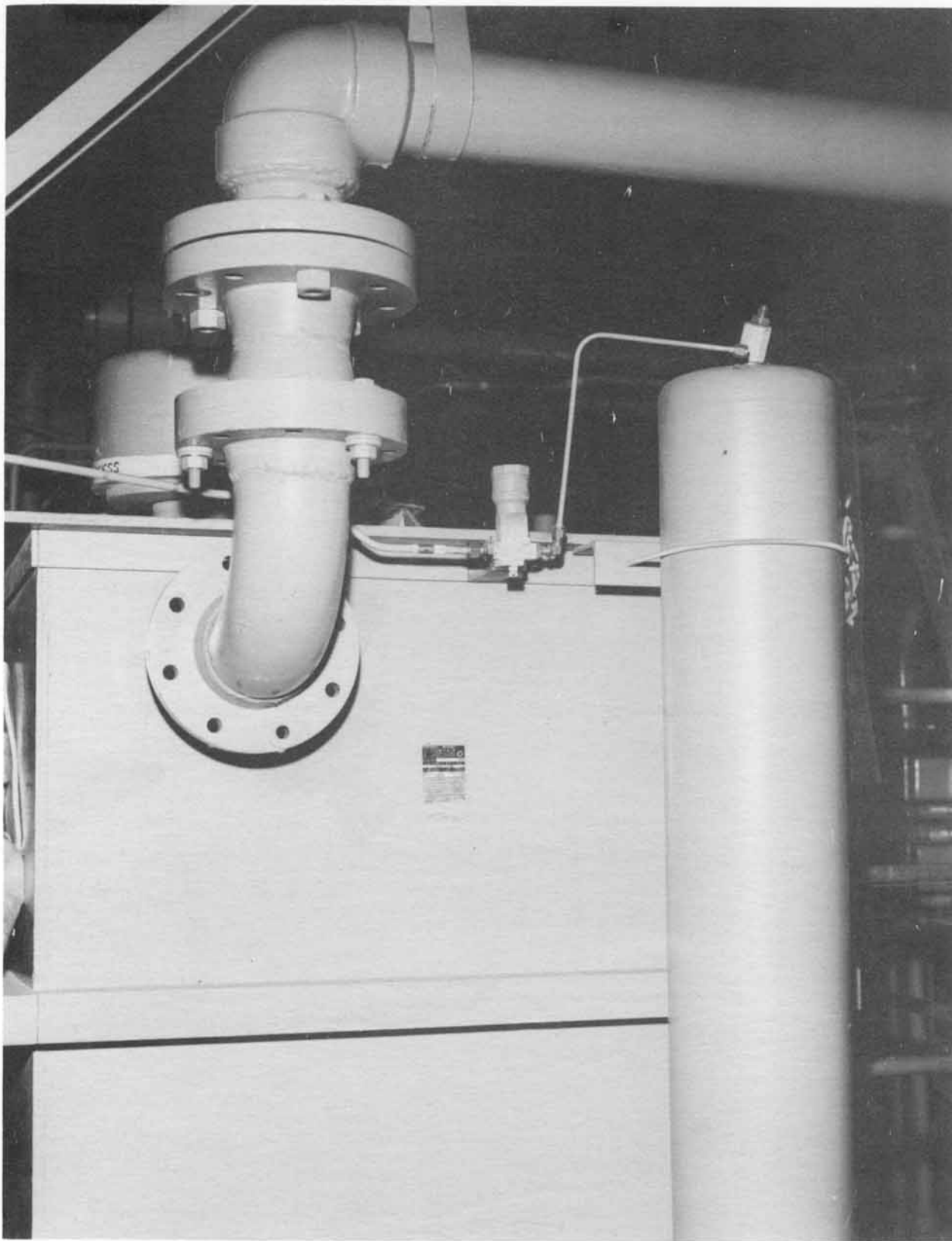


Cable routing under Level 1 (Neg. No. 67359A dated 4-14-61).

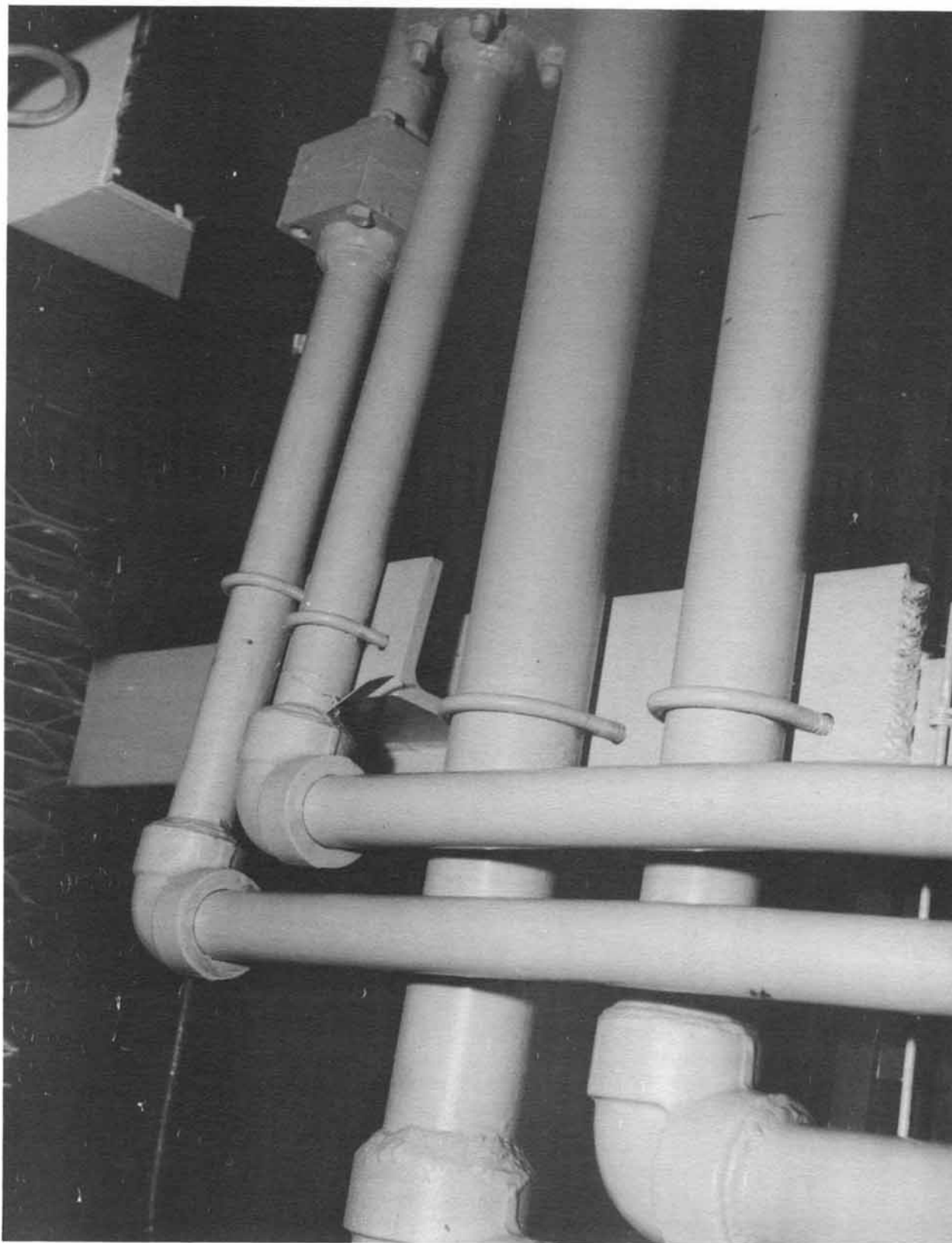




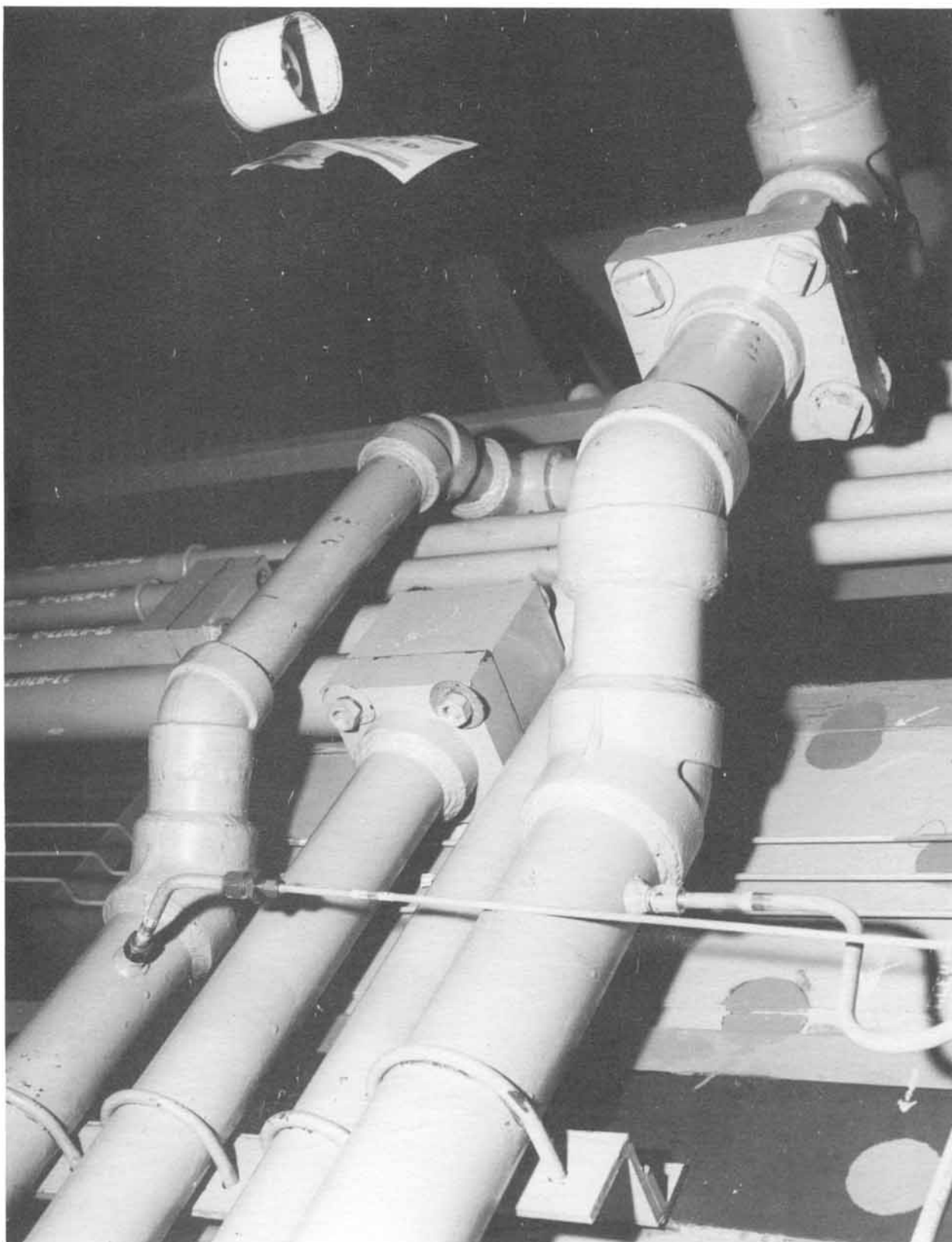
Looking north to Column K (Neg. No. 67360A dated 4-14-61).



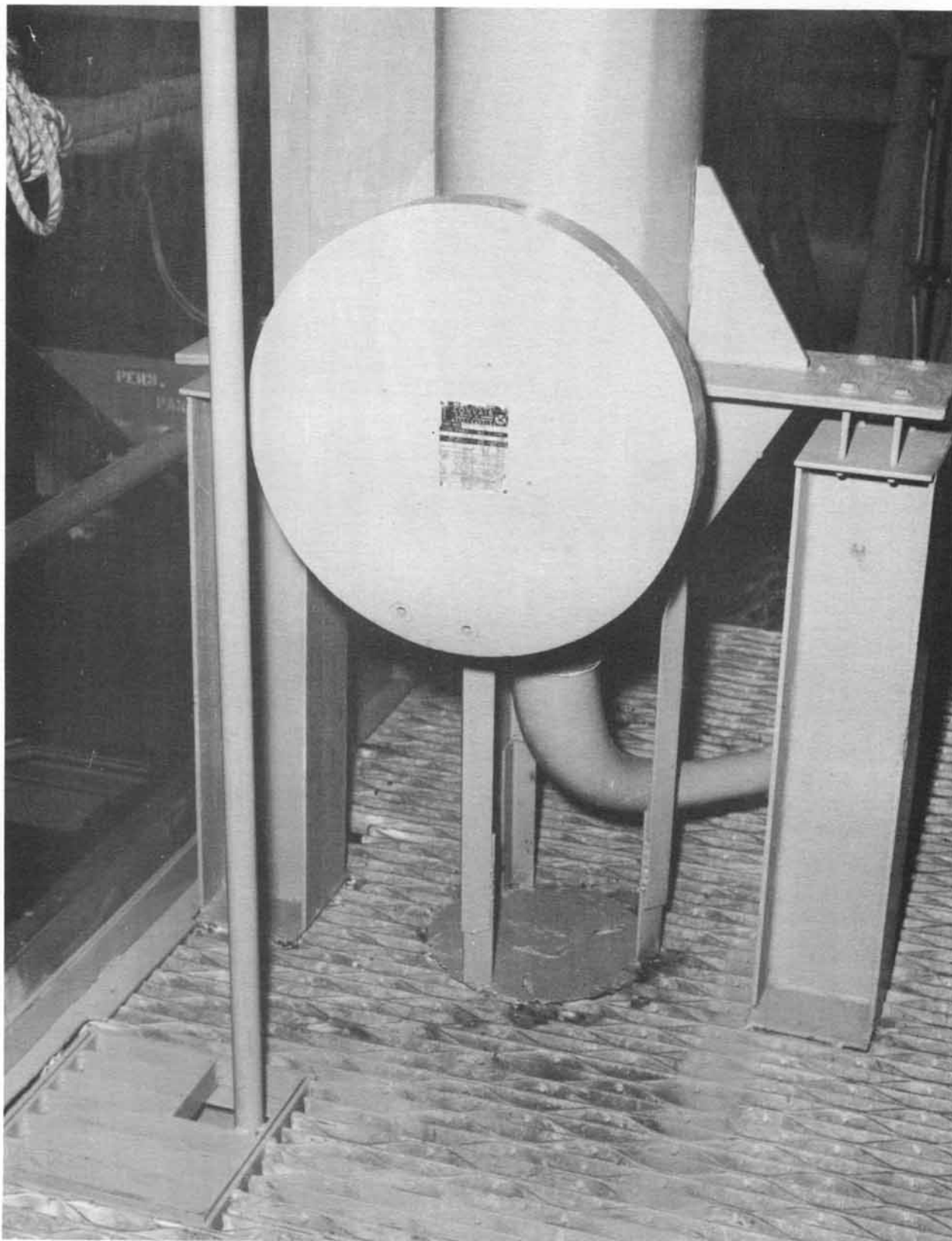
Looking northwest at Q-4 end of hydraulic reservoir unit (Neg. No. 67557A dated 4-19-61).



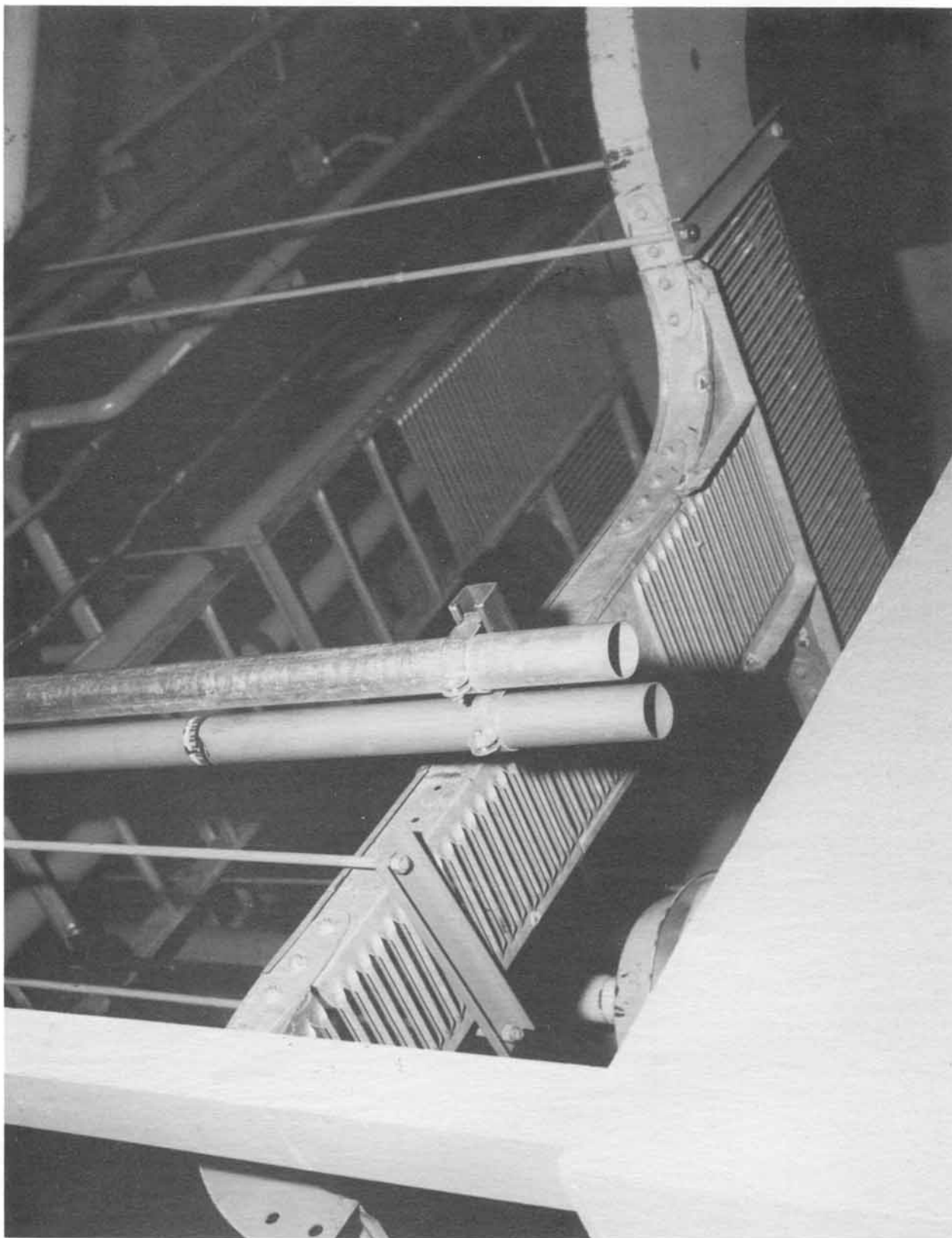
Hydraulic, looking up from Level 2 to under Level 1 and showing pipe turns (Neg. No. 67558A dated 4-19-61).



View of interconnects and routing of hydraulic pipes leaving the manifolds (Neg. No. 67559A dated 4-19-61).

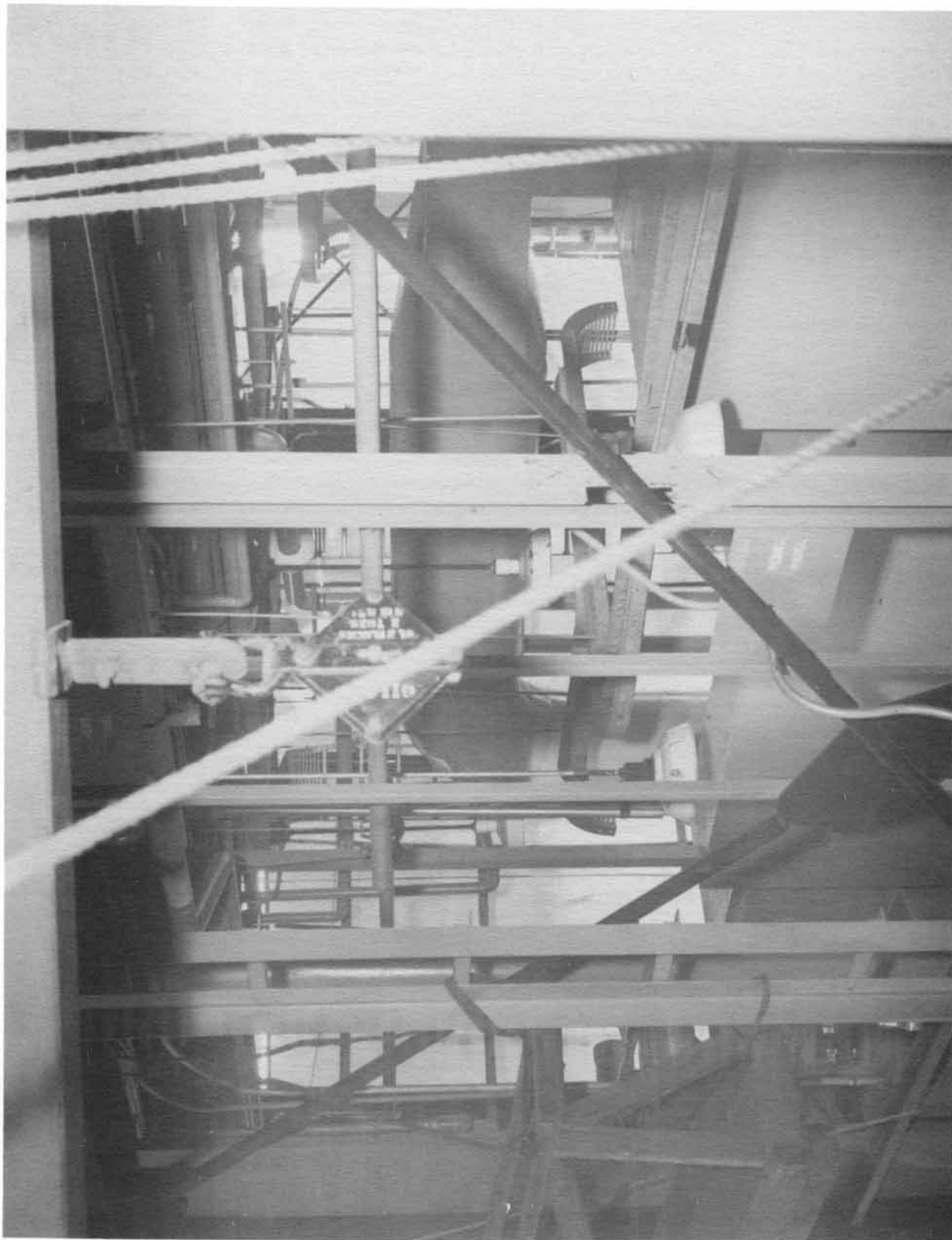


Showing where drain sump should be located (Neg. No. 67560A dated 4-19-61).

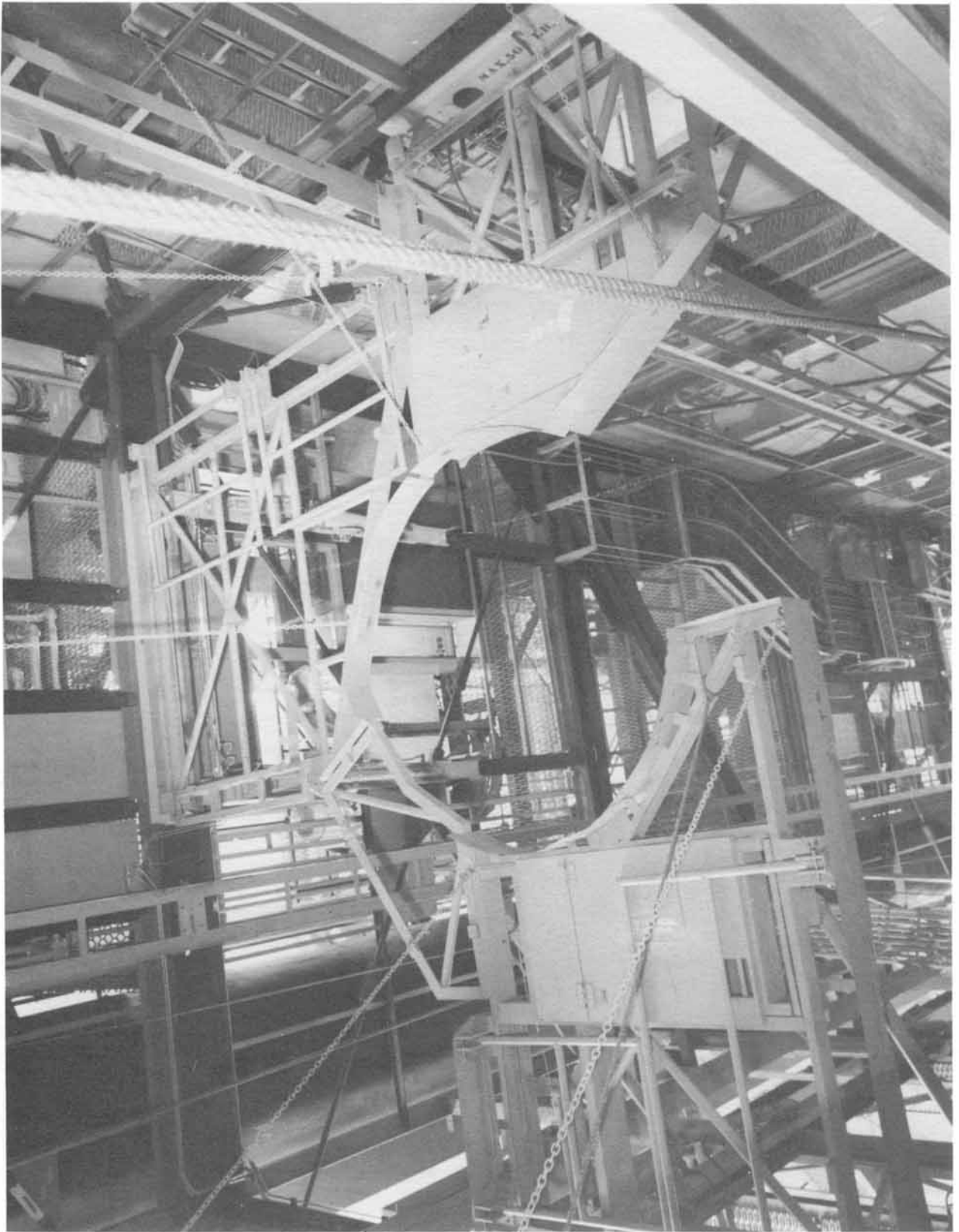


Showing proper routing of facility cable tray and conduit above nonessential and essential bus (Neg. No. 67561A dated 4-19-61).

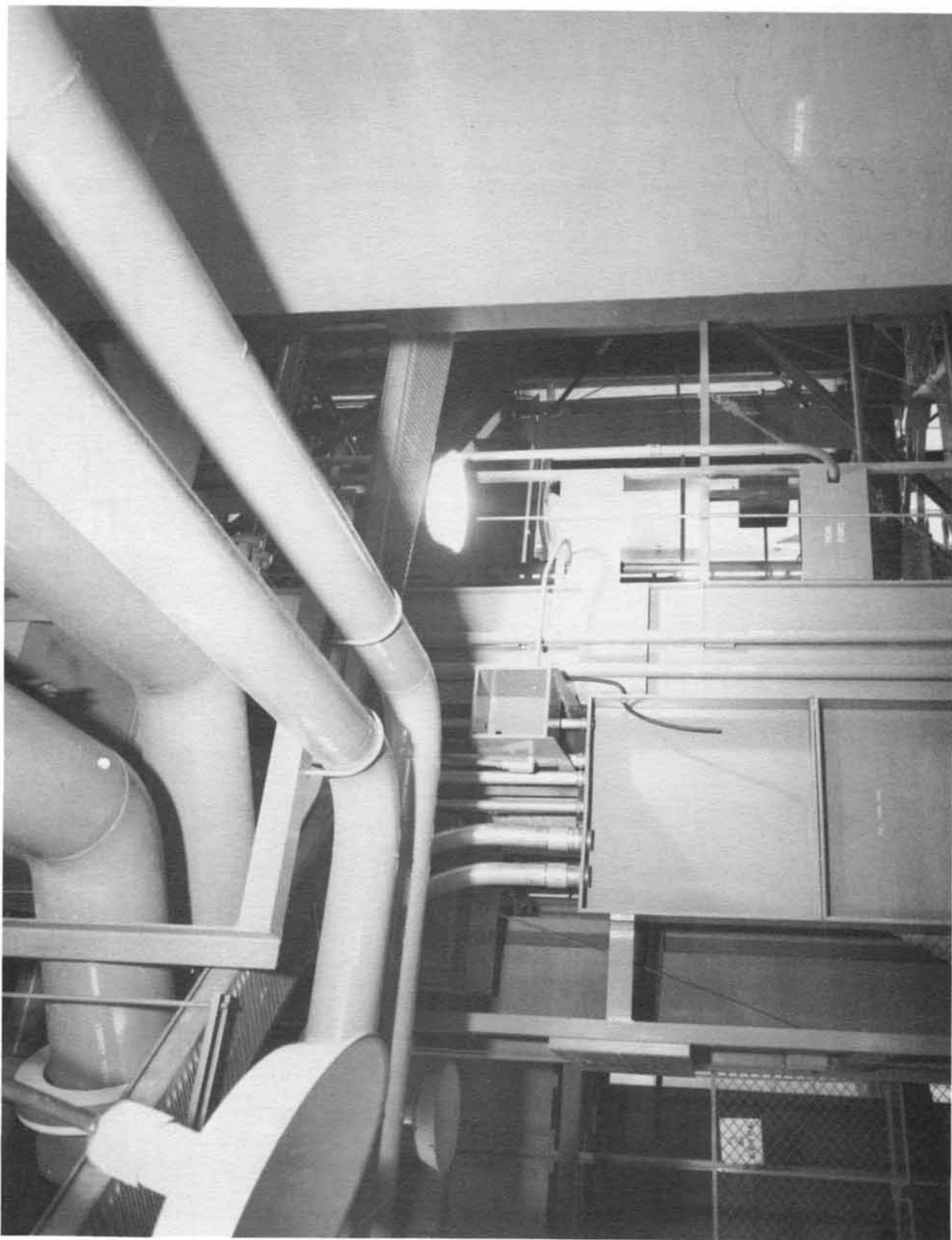




Looking southwest from elevator and showing nonessential MCC (Neg. No. 68019A dated 4-26-61).



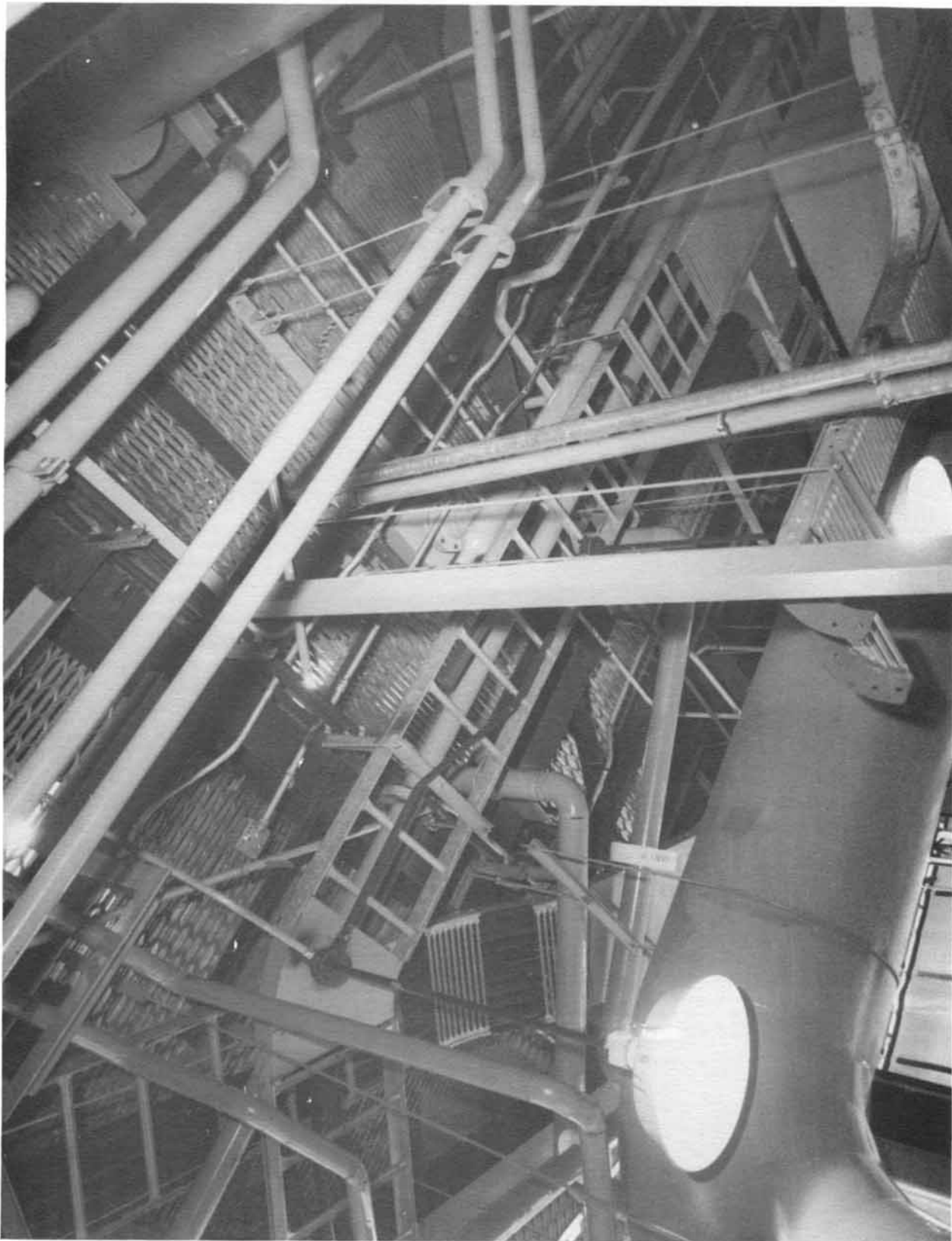
Looking south from elevator at work platform (Neg. No. 68020A dated 4-26-61).



Six-inch C and CR, looking from tunnel entrance toward Column J (Neg. No. 68021A dated 4-26-61).

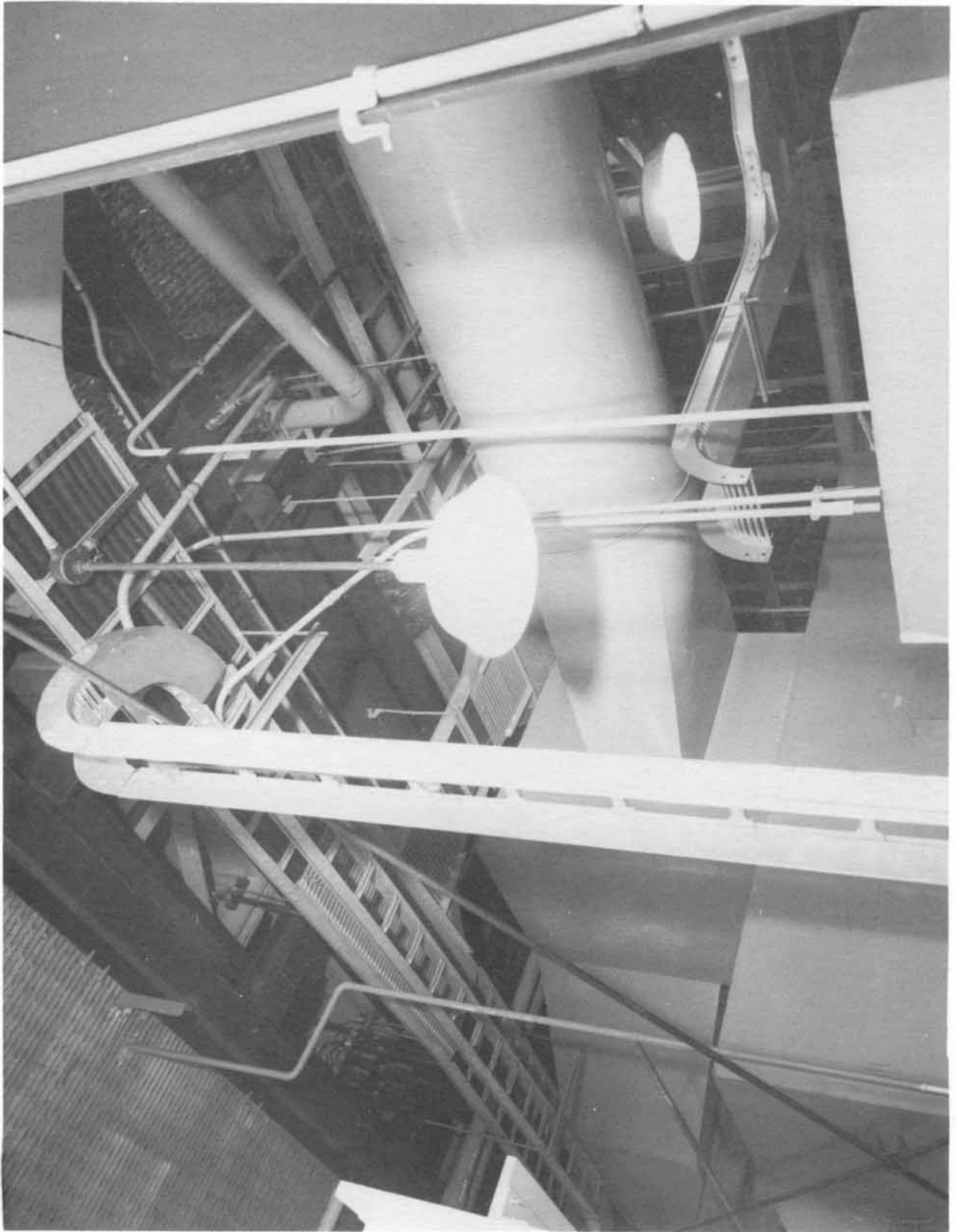


Twelve-inch diesel exhausts and ducting, looking up from elevator toward Column F (Neg. No. 68022A dated 4-26-61).



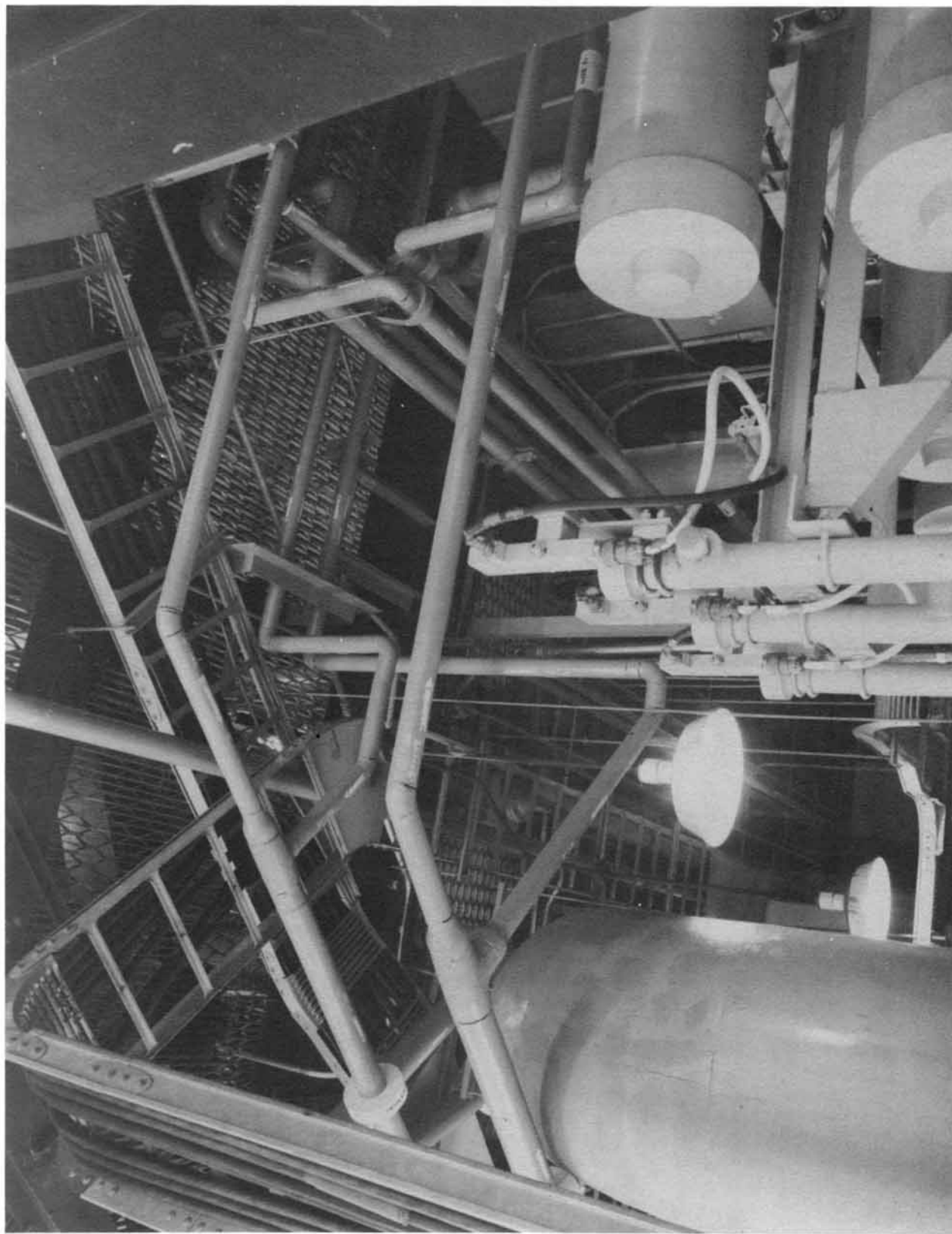
Cable trays and conduit, looking up from Column K toward silo exhaust fan (Neg. No. 68023A dated 4-26-61).



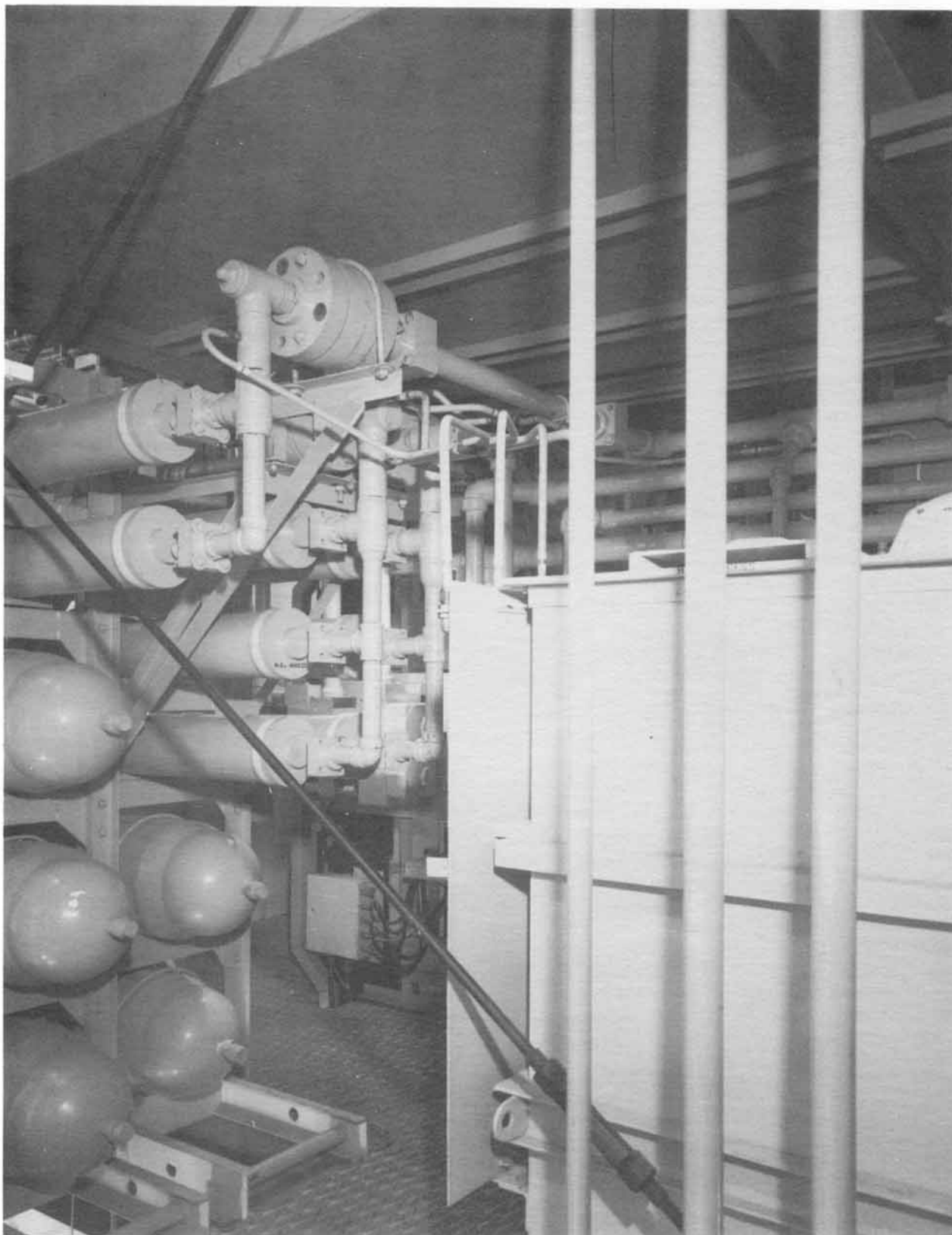


Looking up from Column E toward silo exhaust fan (Neg. No. 68024A dated 4-26-61).

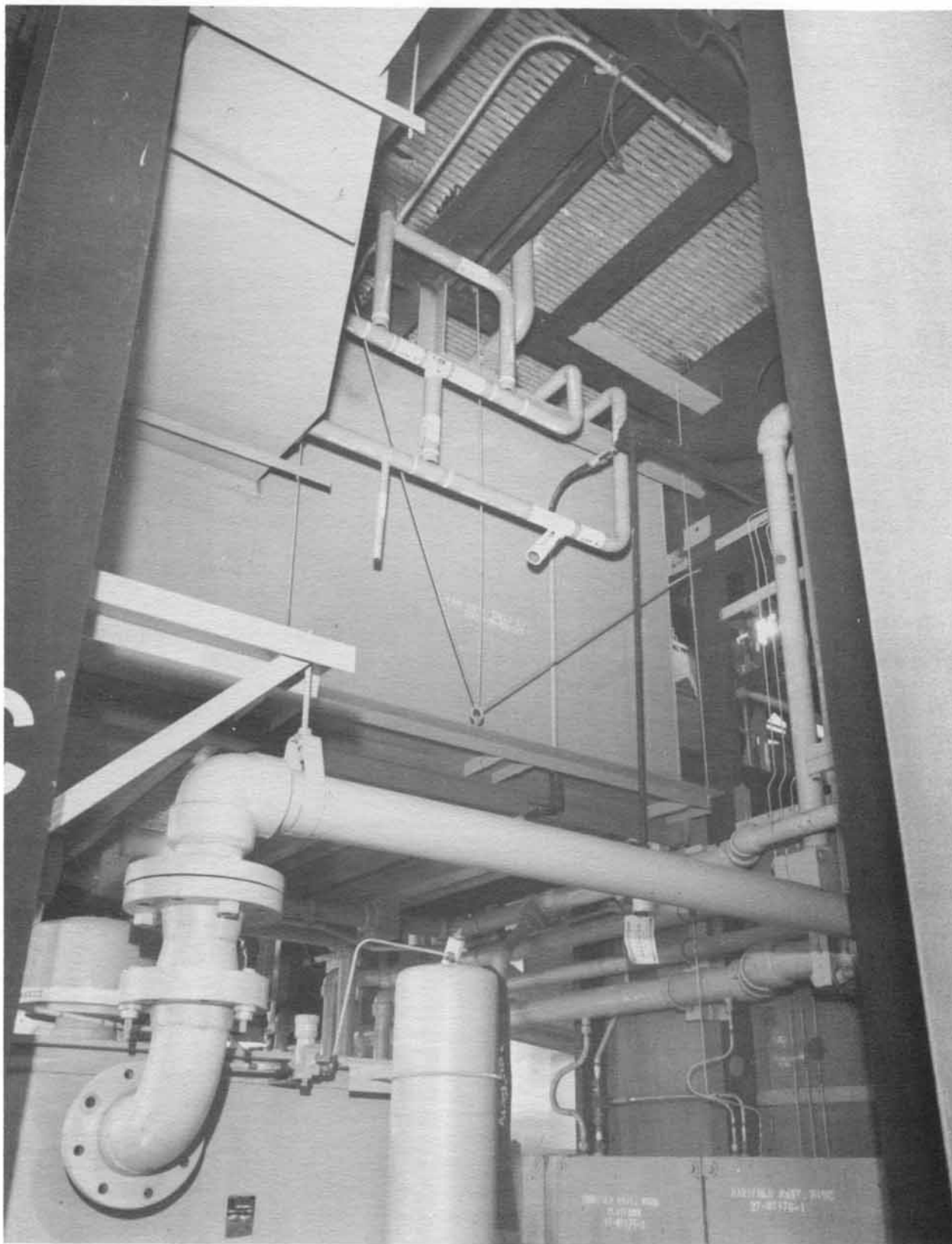




Looking up and north from Column D (Neg. No. 68025A dated 4-26-61).

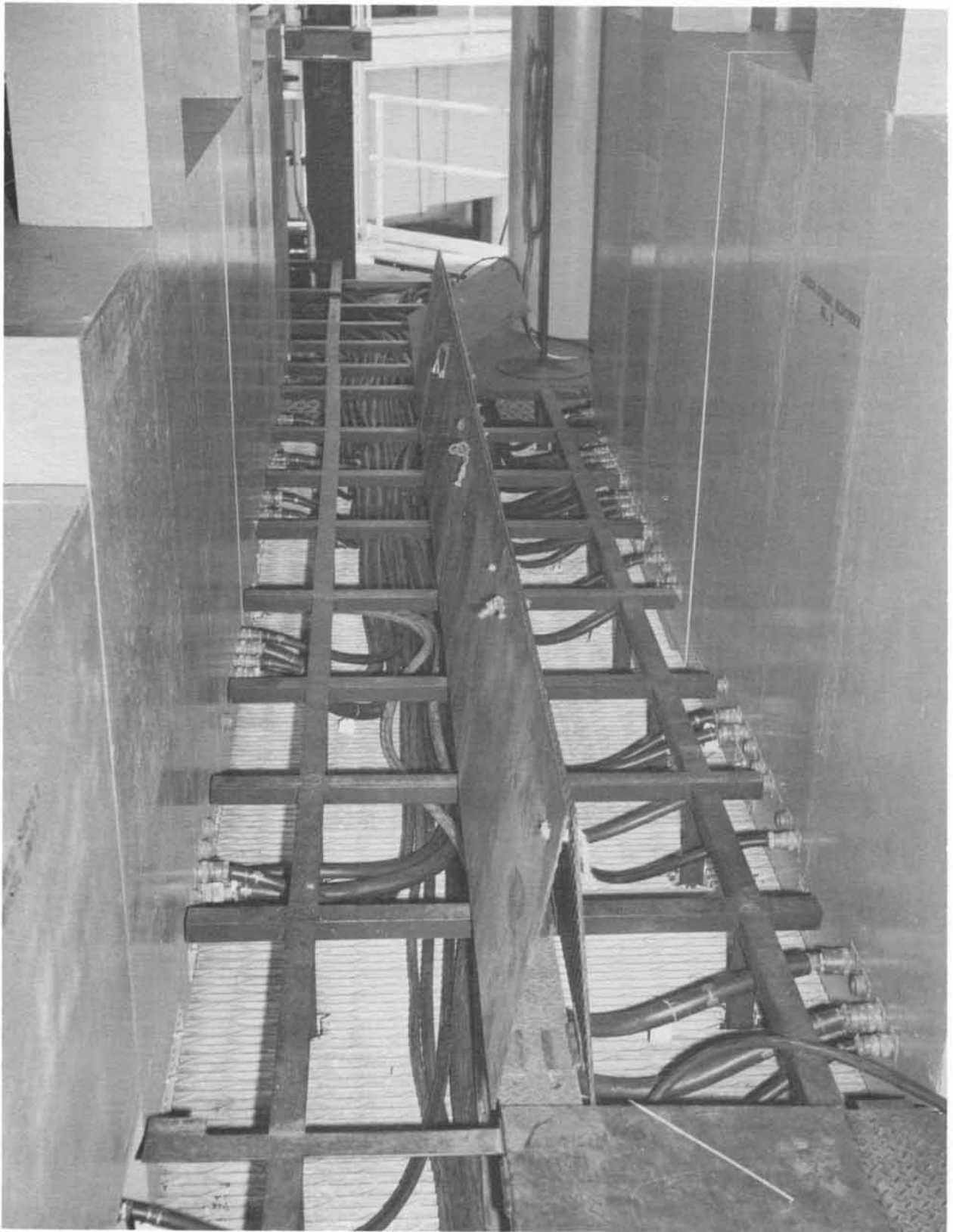


Hydraulic accumulators viewed from the south side (Neg. No. 68026A dated 4-26-61).



Looking up and west from Column C toward fan coil unit (Neg. No. 68027A dated 4-26-61).

LEVEL 3



Layer No. 2 L/ C cables (Neg. No. 53293A dated 8-8-60).

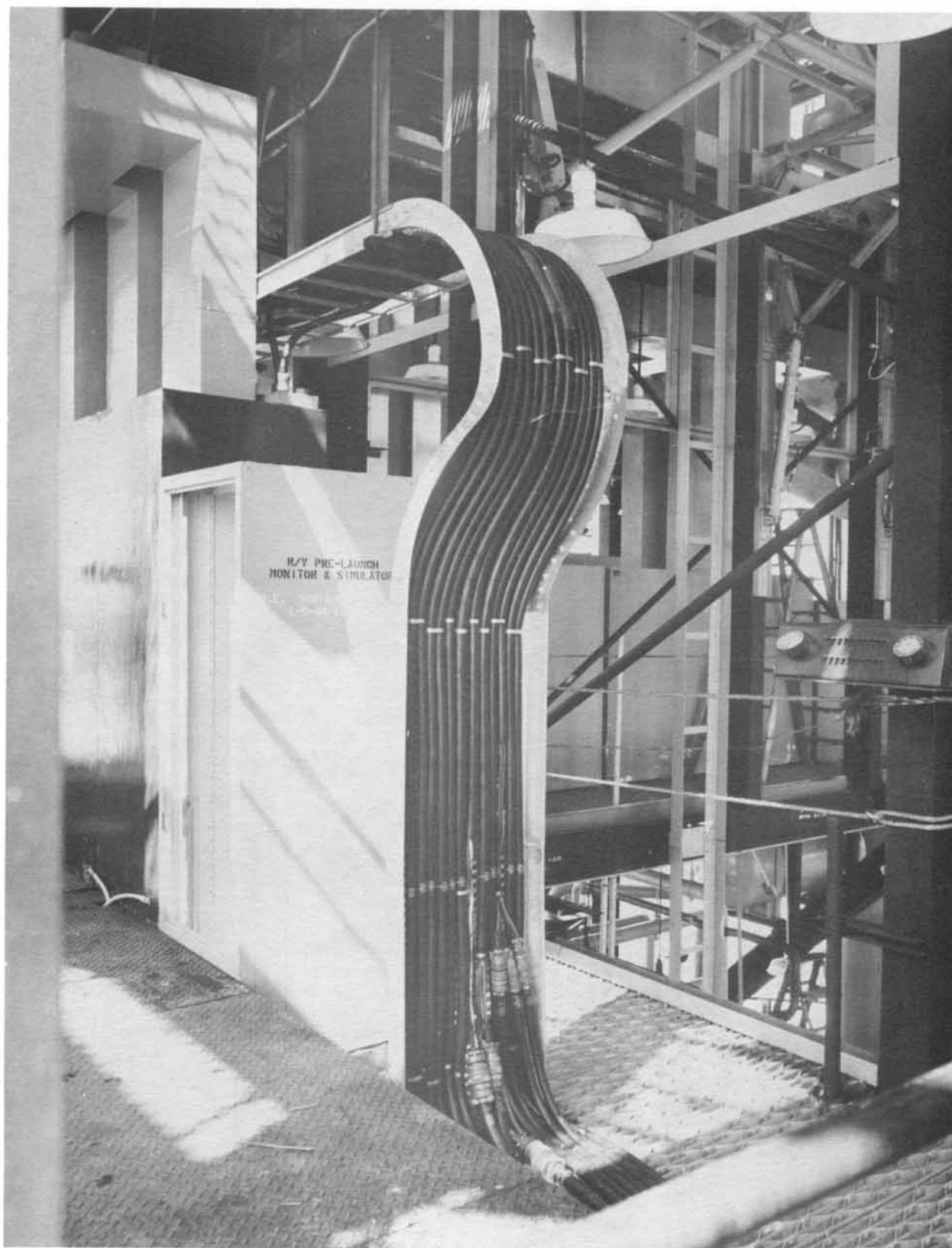


Cables under steel deck logic No. 2 to responder No. 2 (Neg. No. 55771A dated 9-27-60).

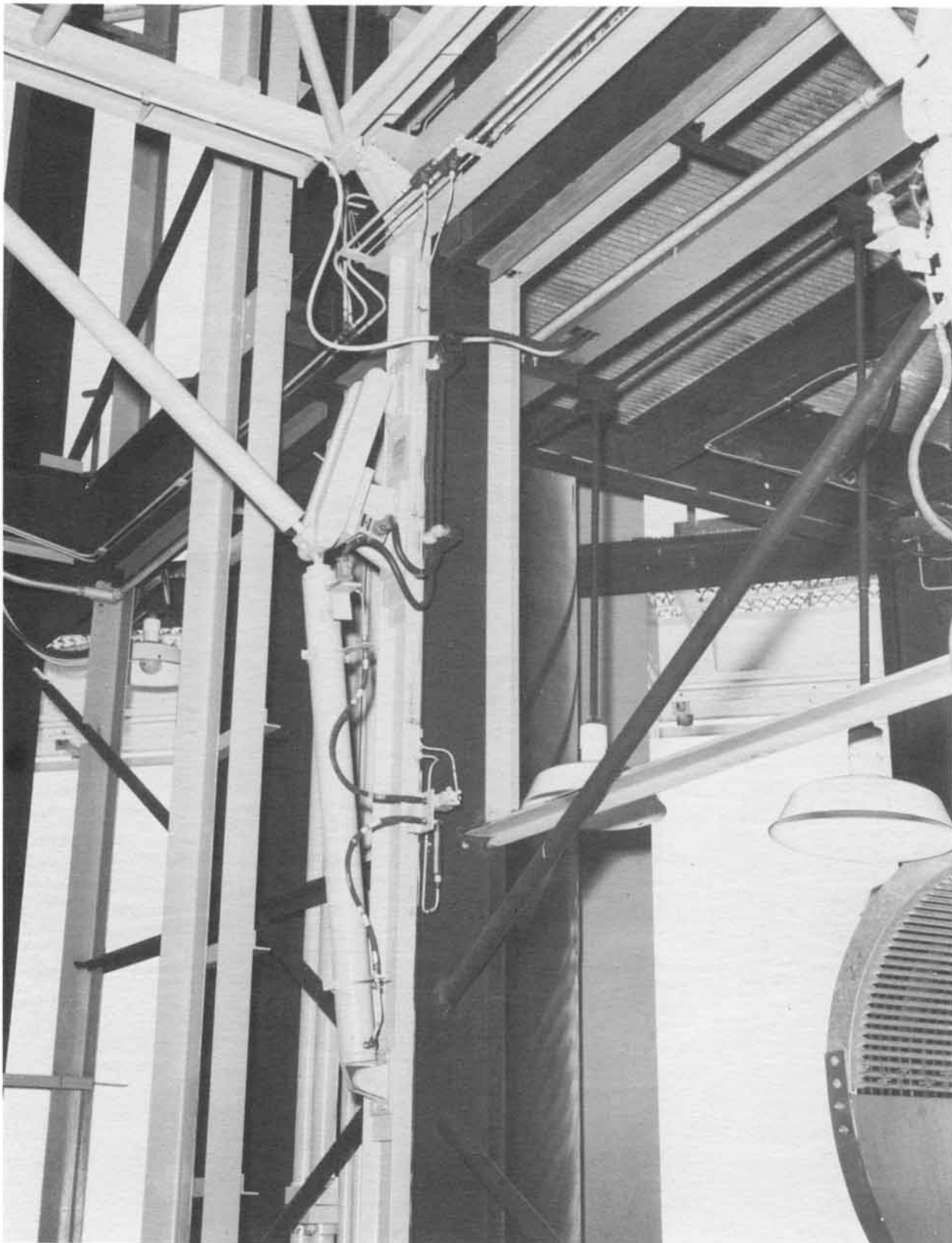




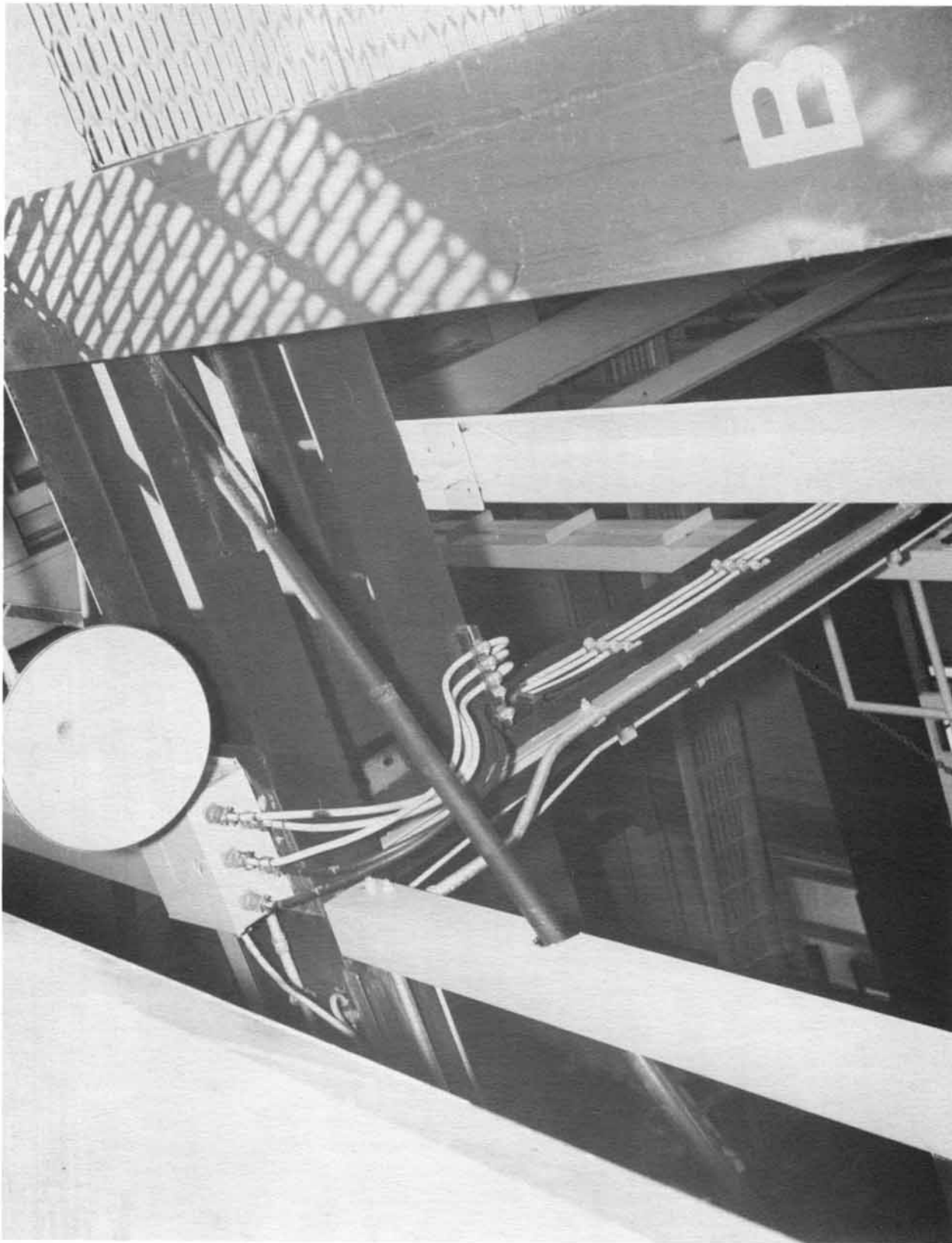
Cables under steel deck logic No. 1 to responder No. 1 (Neg. No. 55772A dated 9-27-60).



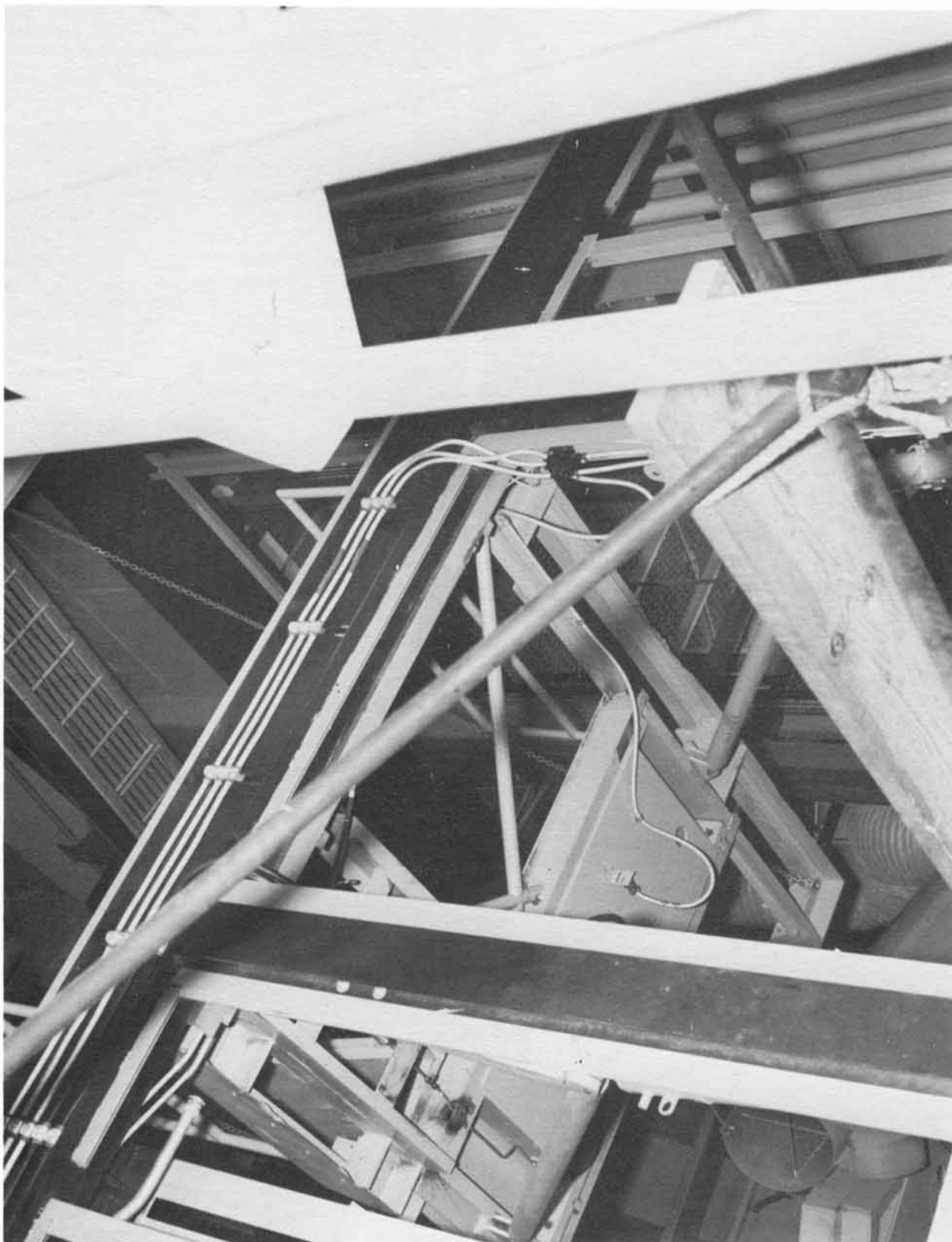
Cables and tray to ARMA rack (Neg. No. 55773A dated 9-27-60).



Cables to W/ P, south side (Neg. No. 55778A dated 9-27-60).



Cables and J Box at Column B-1 (Neg. No. 55780A dated 9-27-60).



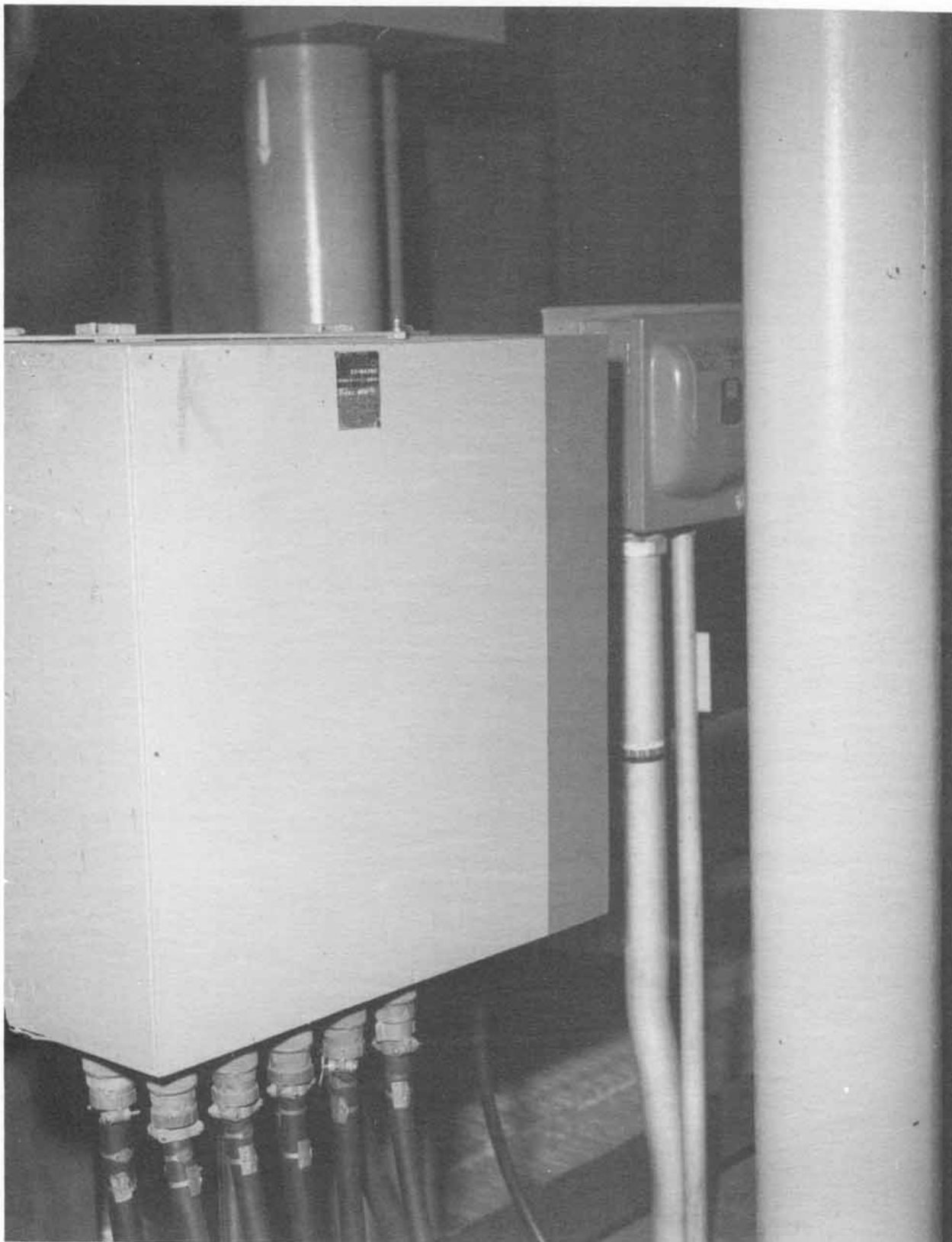
Cables to W/ P 1-B (Neg. No. 55781A dated 9-27-60).





Cables to hydraulic reservoir (Neg. No. 56444A dated 10-7-60).

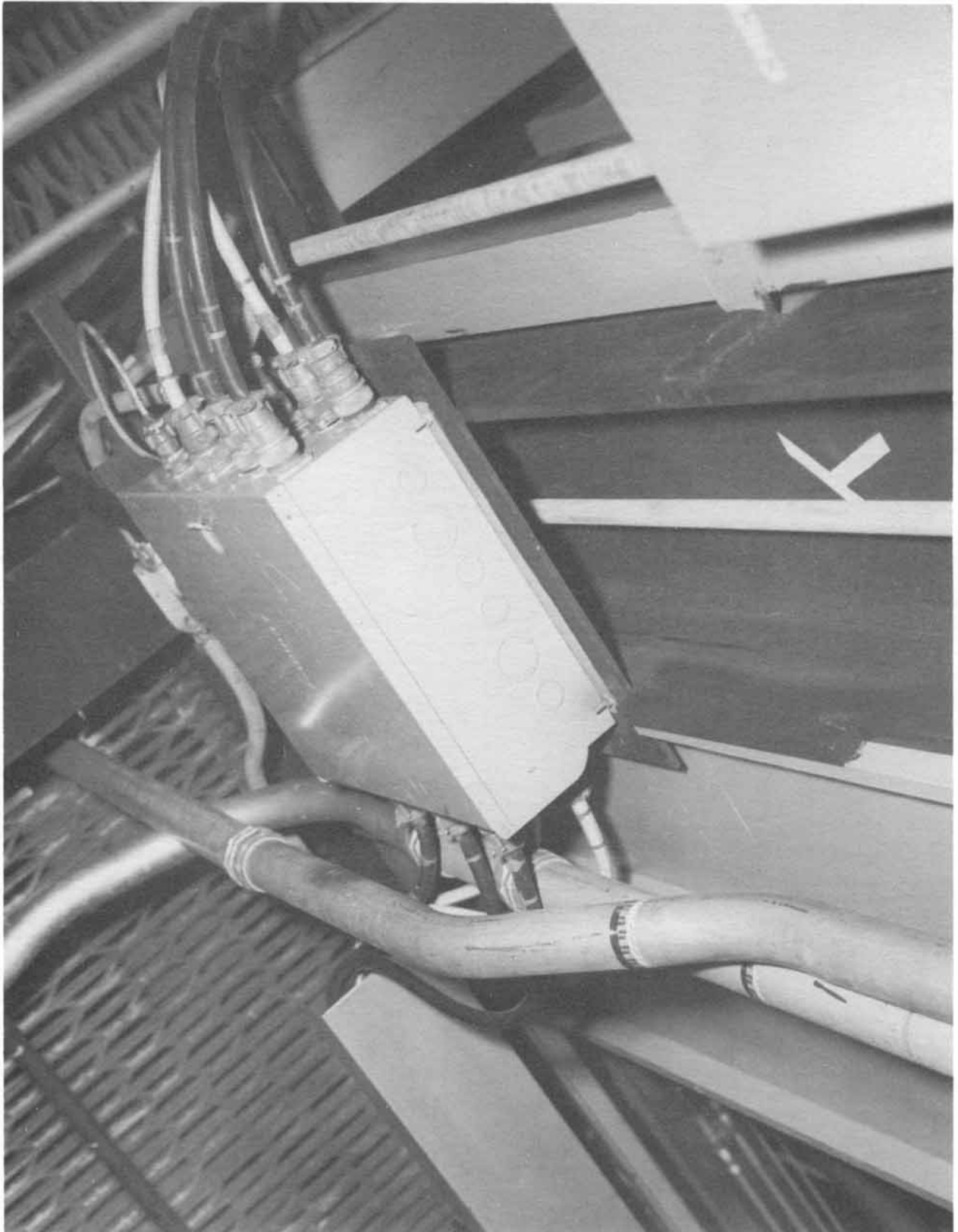




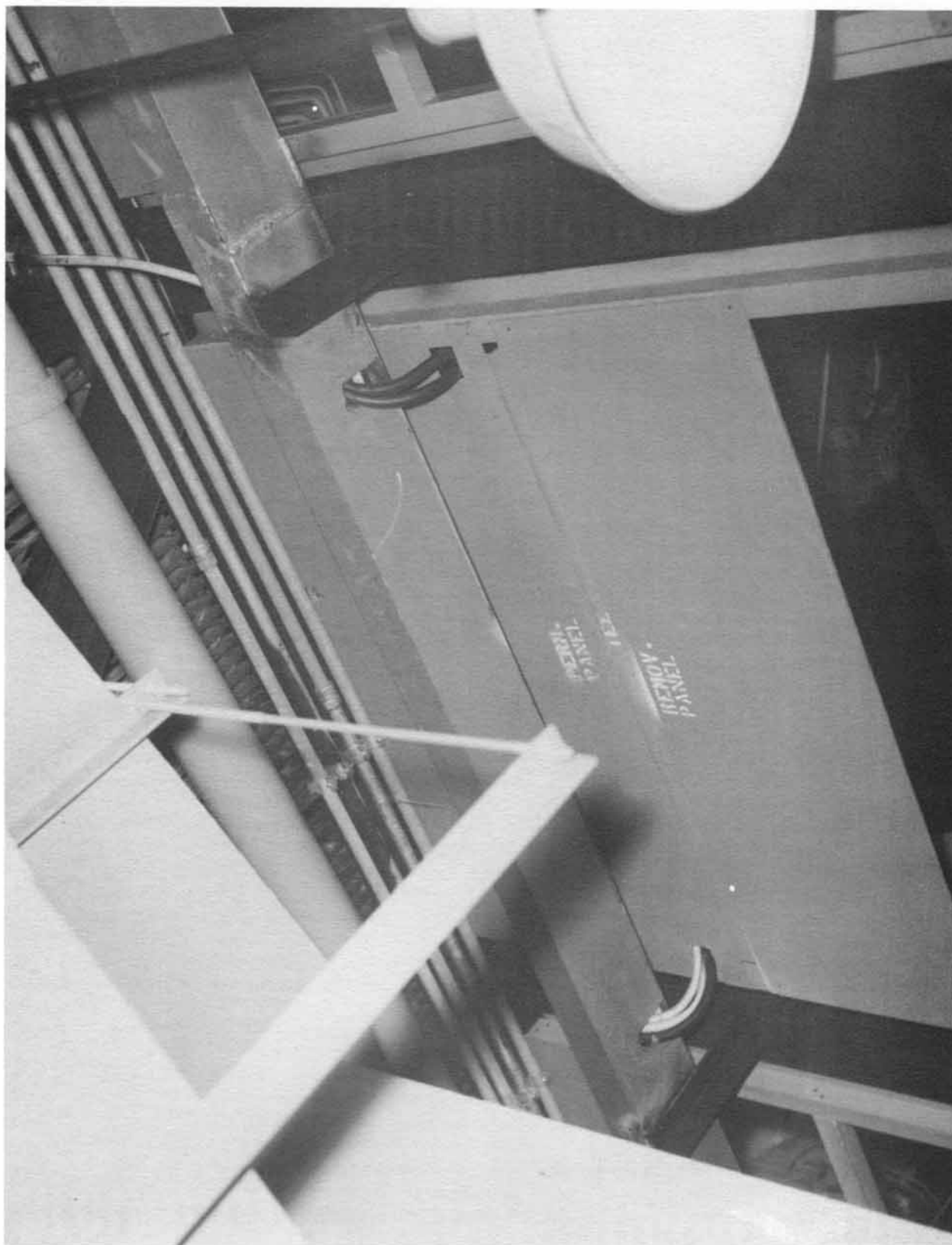
A-C distribution box and water piping (Neg. No. 67326A dated 4-14-61).



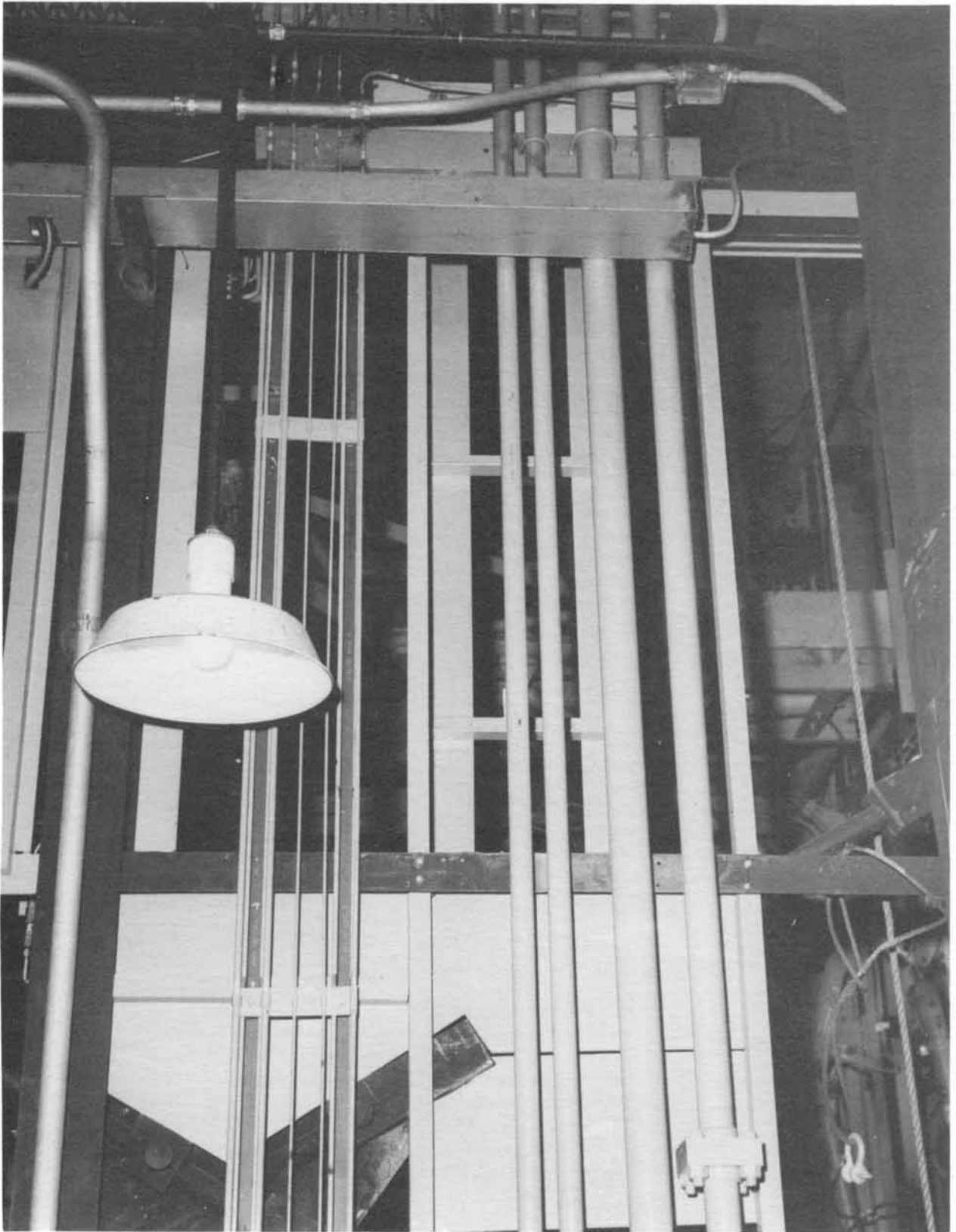
Emergency battery and water pipe (Neg. No. 67327A dated 4-14-61).



Column K, J Box 27-09937 and conduit (Neg. No. 67328A dated 4-14-61).



Column J to K, AMF cable breakouts (Neg. No. 67329A dated 4-14-61).

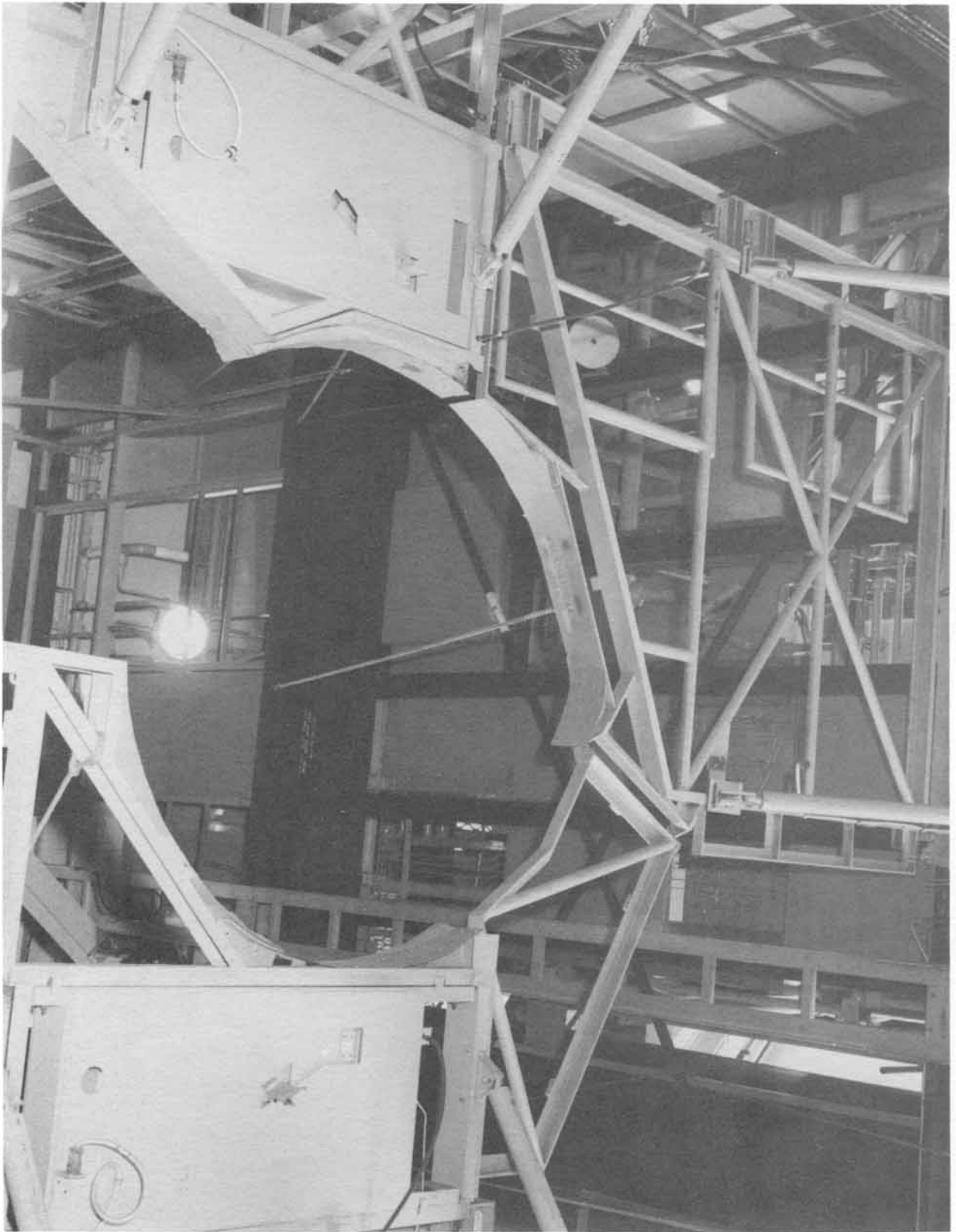


Vertical run, looking north toward missile shaftway under Level 2 (Neg. No. 67562A dated 4-19-61).

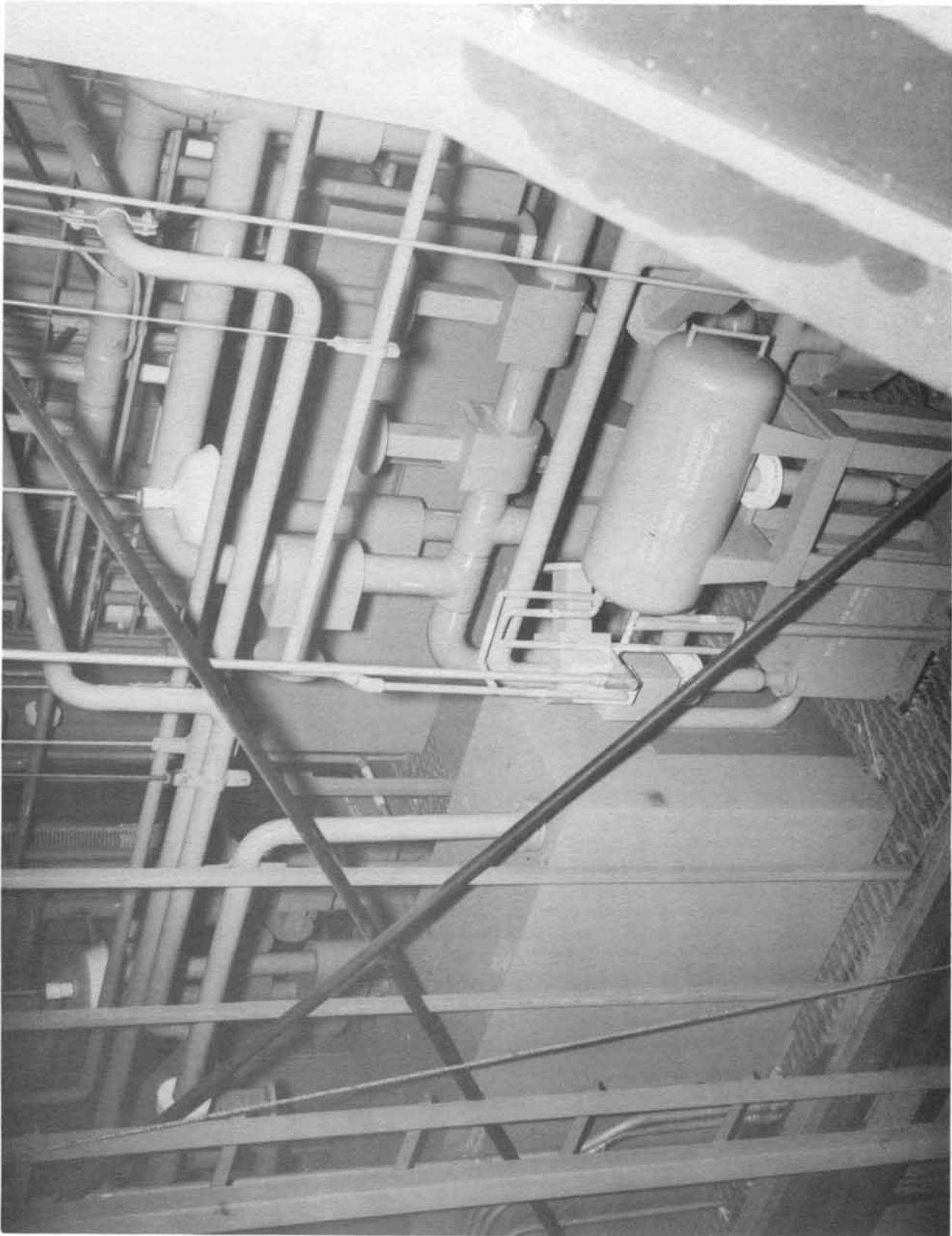


Umbilical cables from elevator (Neg. No. 68005A dated 4-26-61).





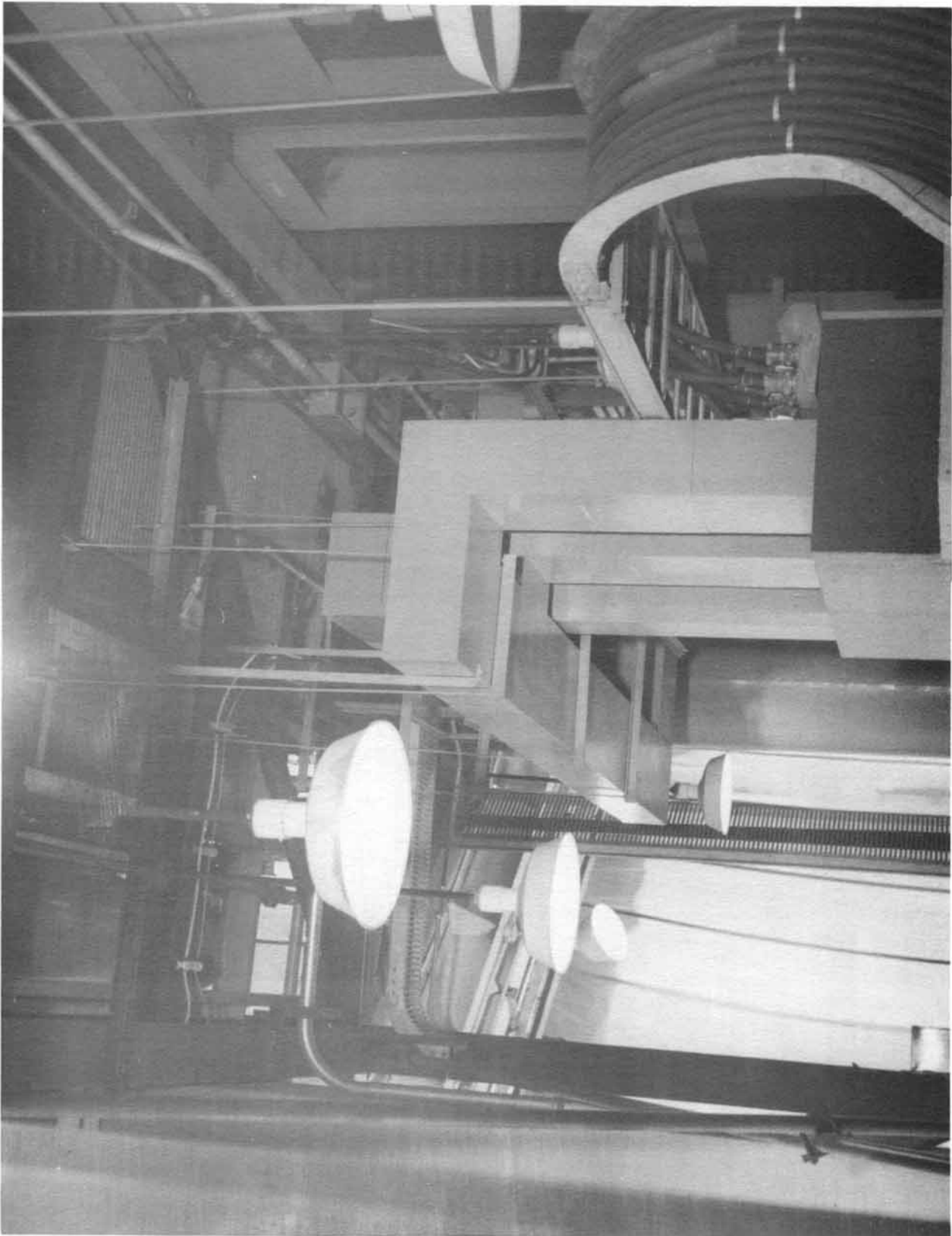
Underneath work platform at Level 2 (Neg. No. 68006A dated 4-26-61).



Looking down into Level 4, west side (Neg. No. 68007A dated 4-26-61).



Looking from Column B past counterweight to missile enclosure steel (Neg. No. 68028A dated 4-26-61).



Looking from Column C up toward Column D - K (Neg. No. 68029A dated 4-26-61).



Looking from Column D in toward Column K (Neg. No. 68030A dated 4-26-61).

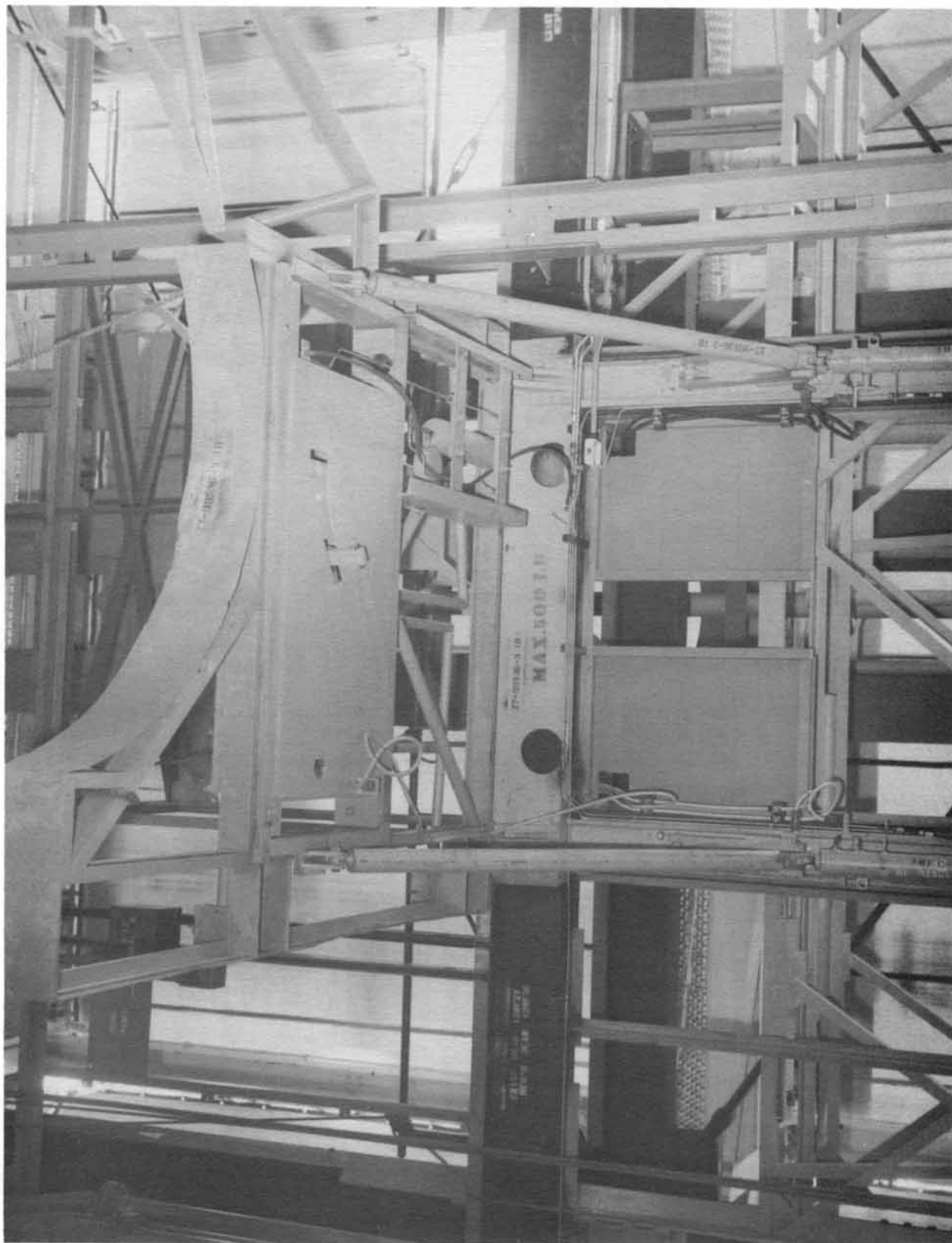


Looking from Column D north toward Column G (Neg. No. 68031A dated 4-26-61).

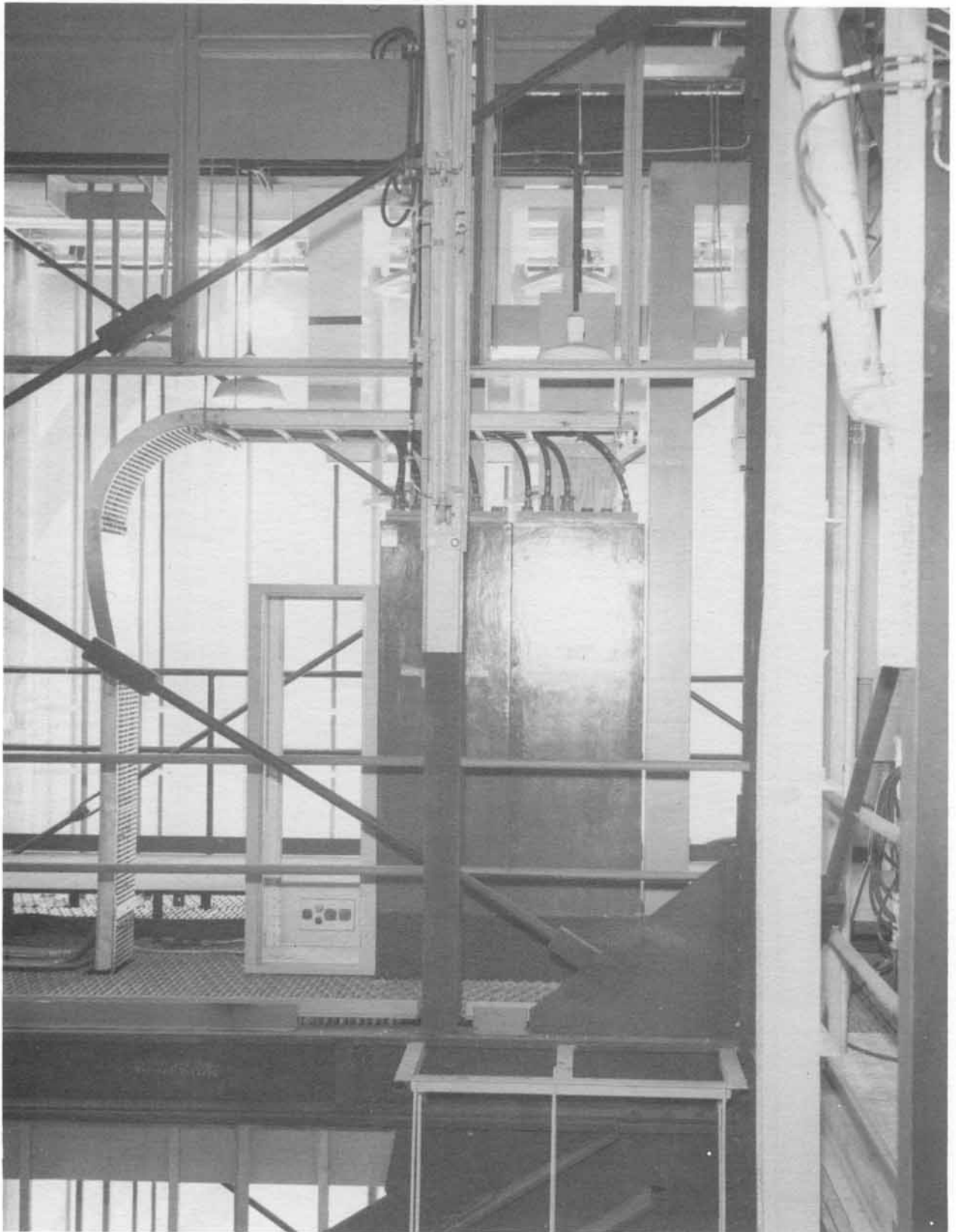




Looking from Column K north toward Column G (Neg. No. 68032A dated 4-26-61).



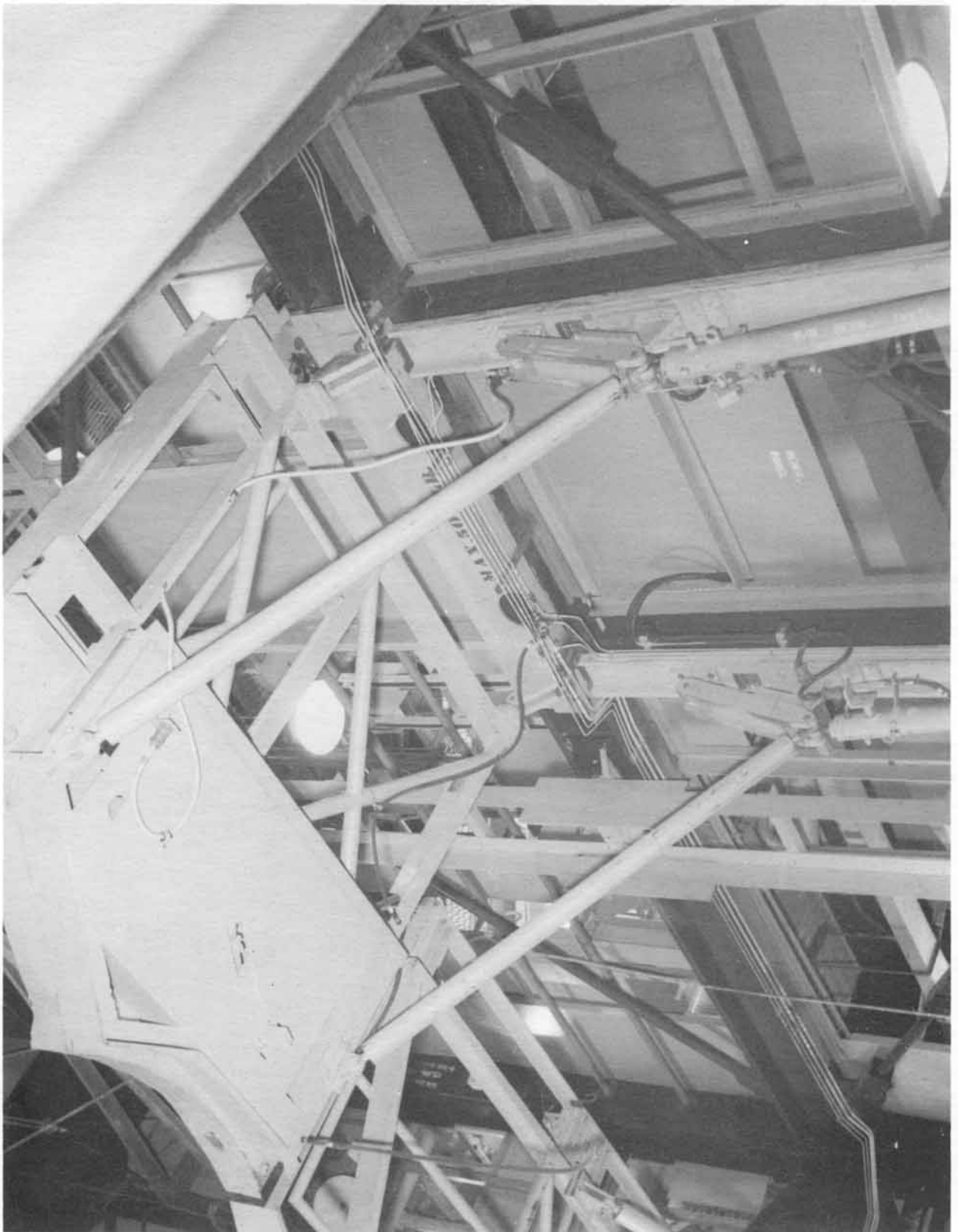
Looking east to work platform between Column J to K (Neg. No. 68033A dated 4-26-61).



Looking from Column J across missile shaft to south side (Neg. No. 68034A dated 4-26-61).



Looking south to work platform tubing from Column J (Neg. No. 68035A dated 4-26-61).



West work platform viewed from elevator (Neg. No. 68036A dated 4-26-61).





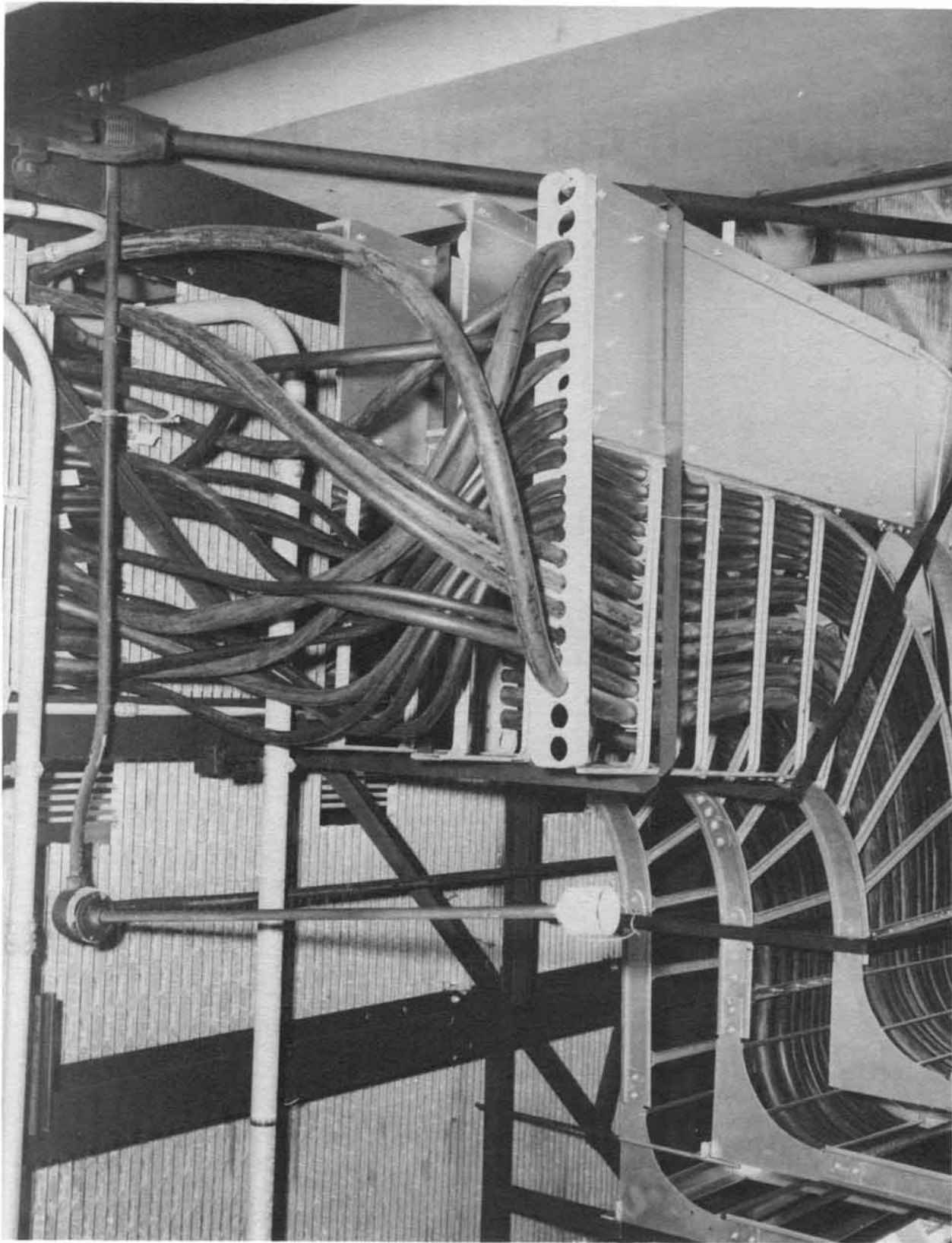
Looking from south side down to Level 4 toward Column J (Neg. No. 68037A dated 4-26-61).



LEVEL 4



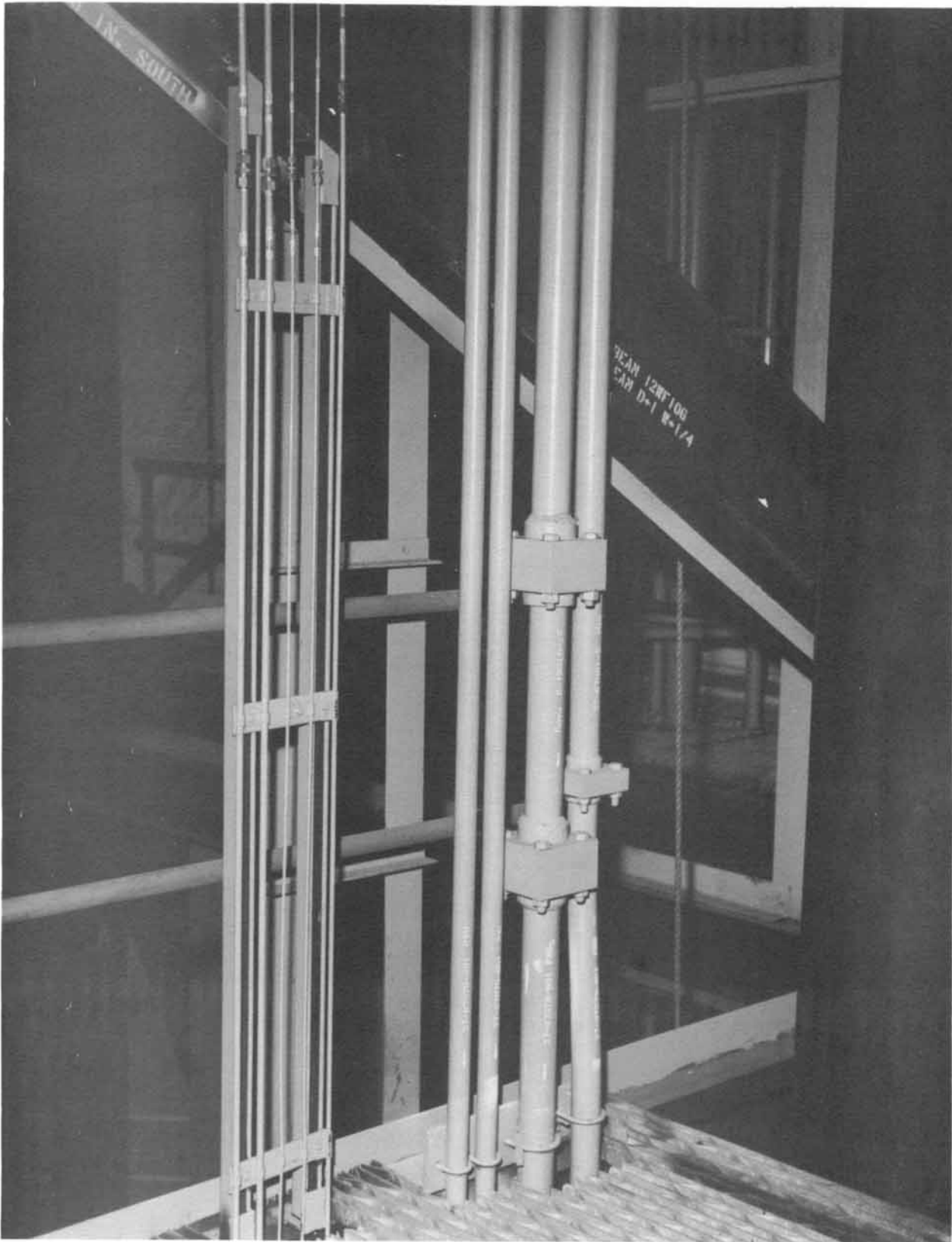
Cable trays on Level 4 (Neg. No. 53295A dated 8-8-60).



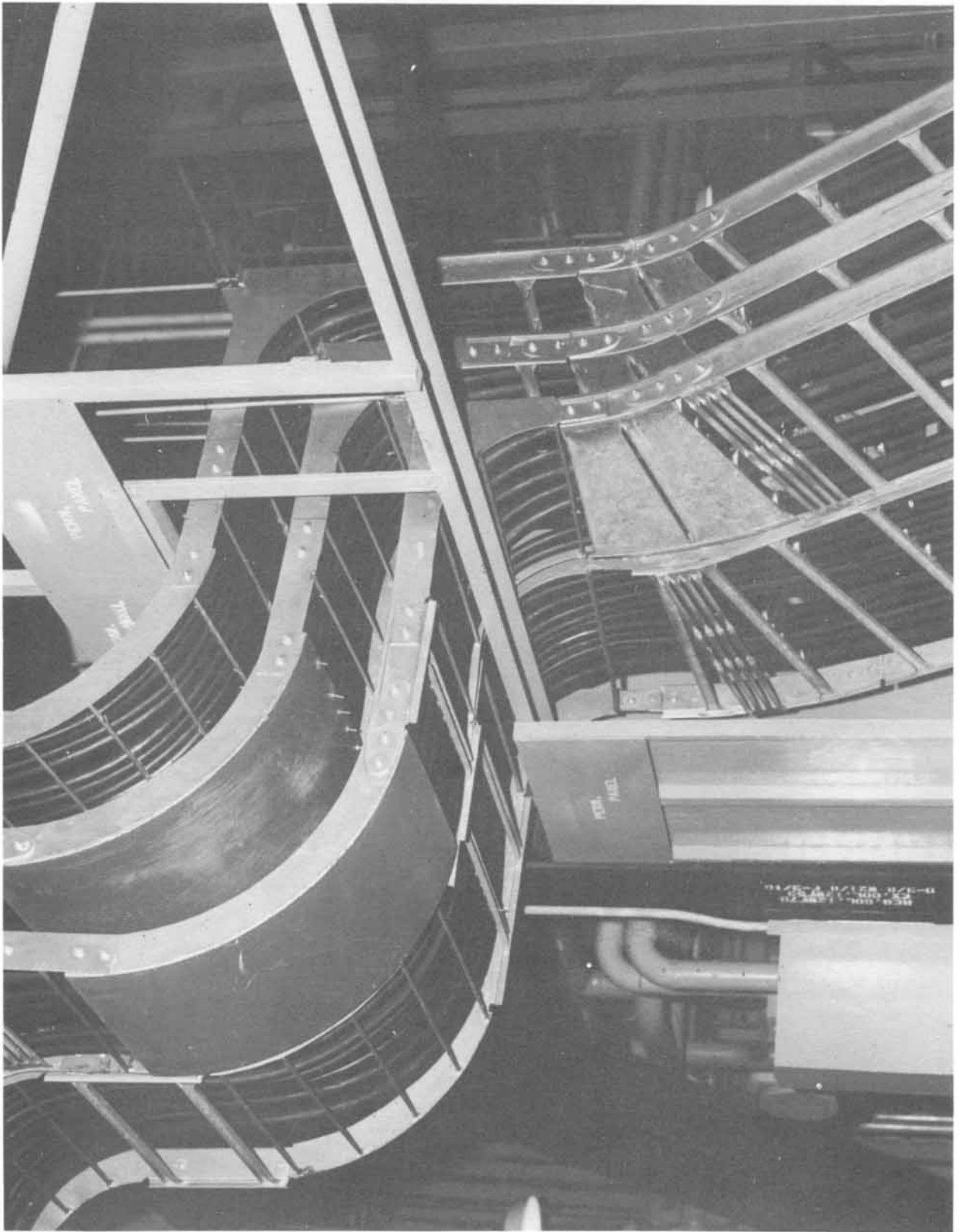
Cable trays (Neg. No. 53296A dated 8-8-60).



Overhead Quad 2/3 bonding cables (Neg. No. 55785A dated 9-27-60).



Vertical run, showing hydraulic pipes running through Level 4 (Neg. No. 67563A dated 4-19-61).

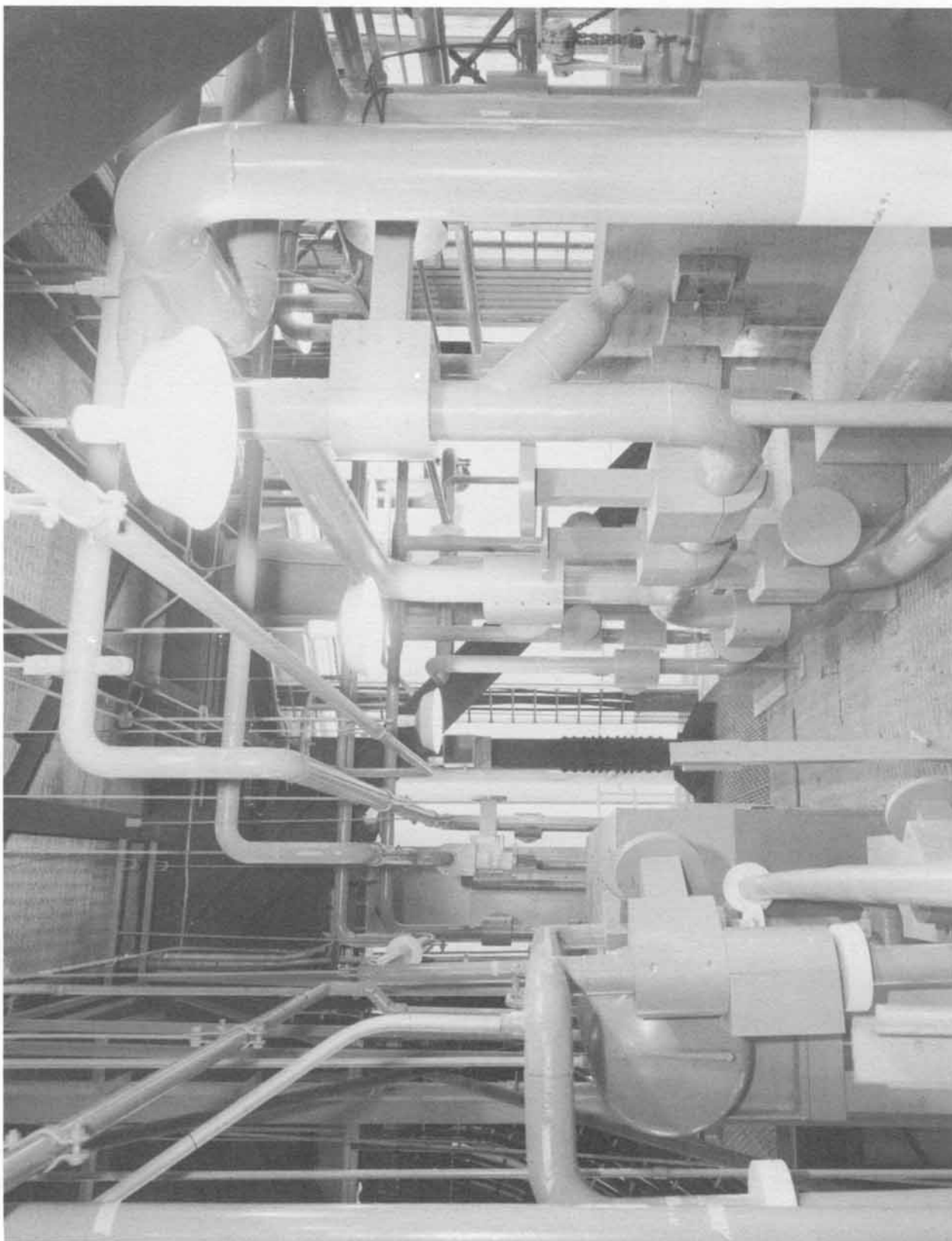


Umbilical loop shown extending through missile enclosure panels (Neg. No. 67564A dated 4-19-61).

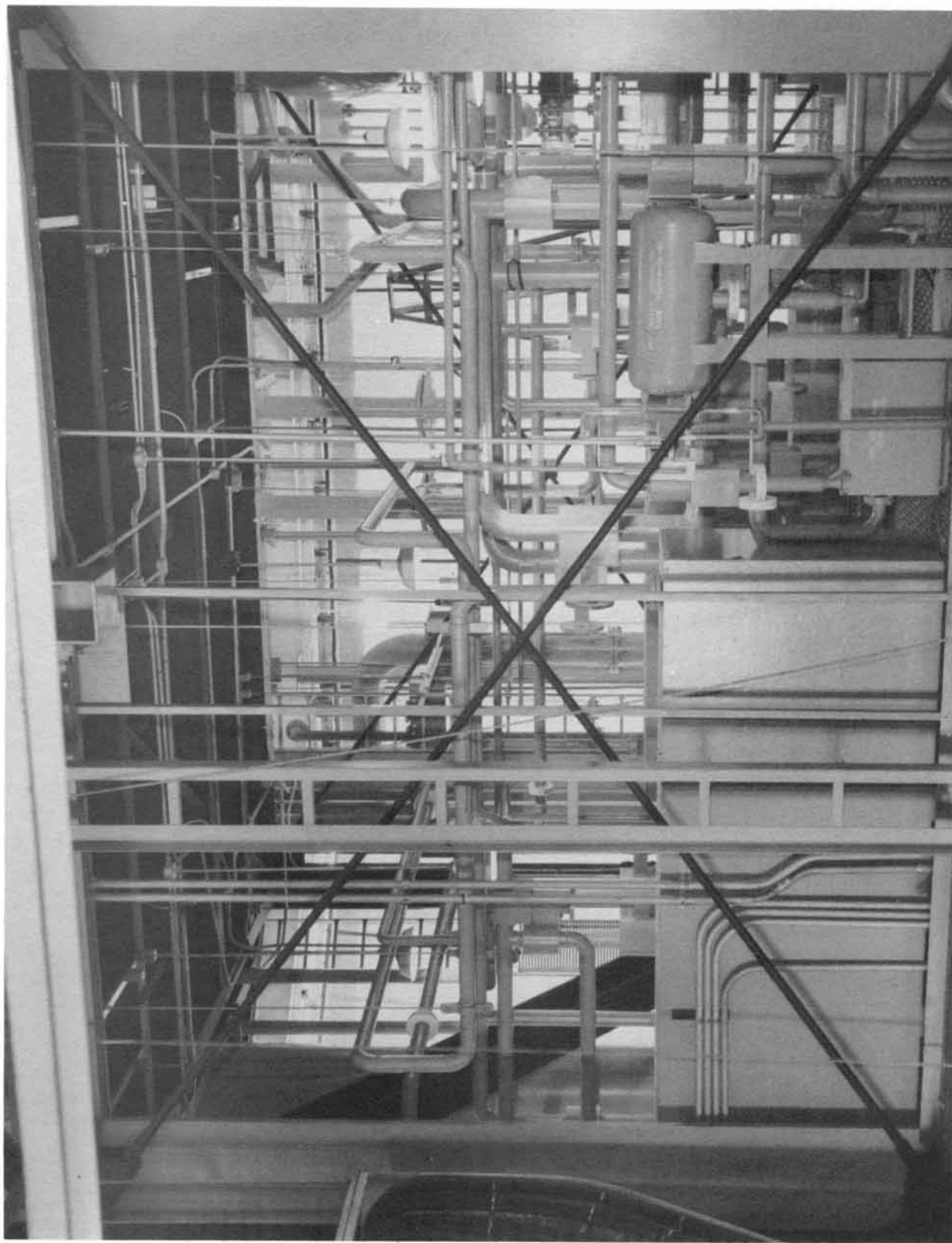




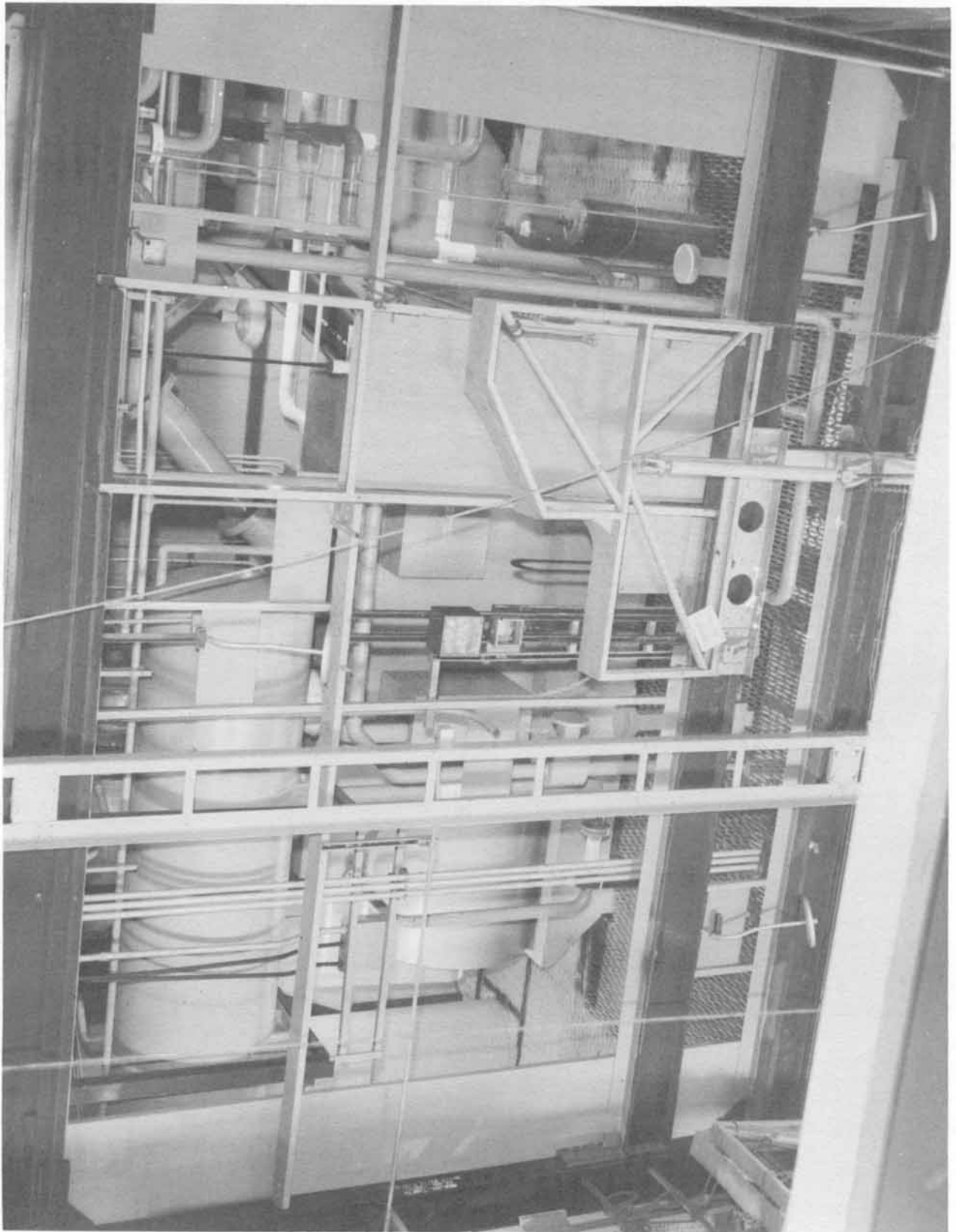
Looking north from Column D toward G (Neg. No. 68044A dated 4-26-61).



Looking south from Column G toward D (Neg. No. 68045A dated 4-26-61).

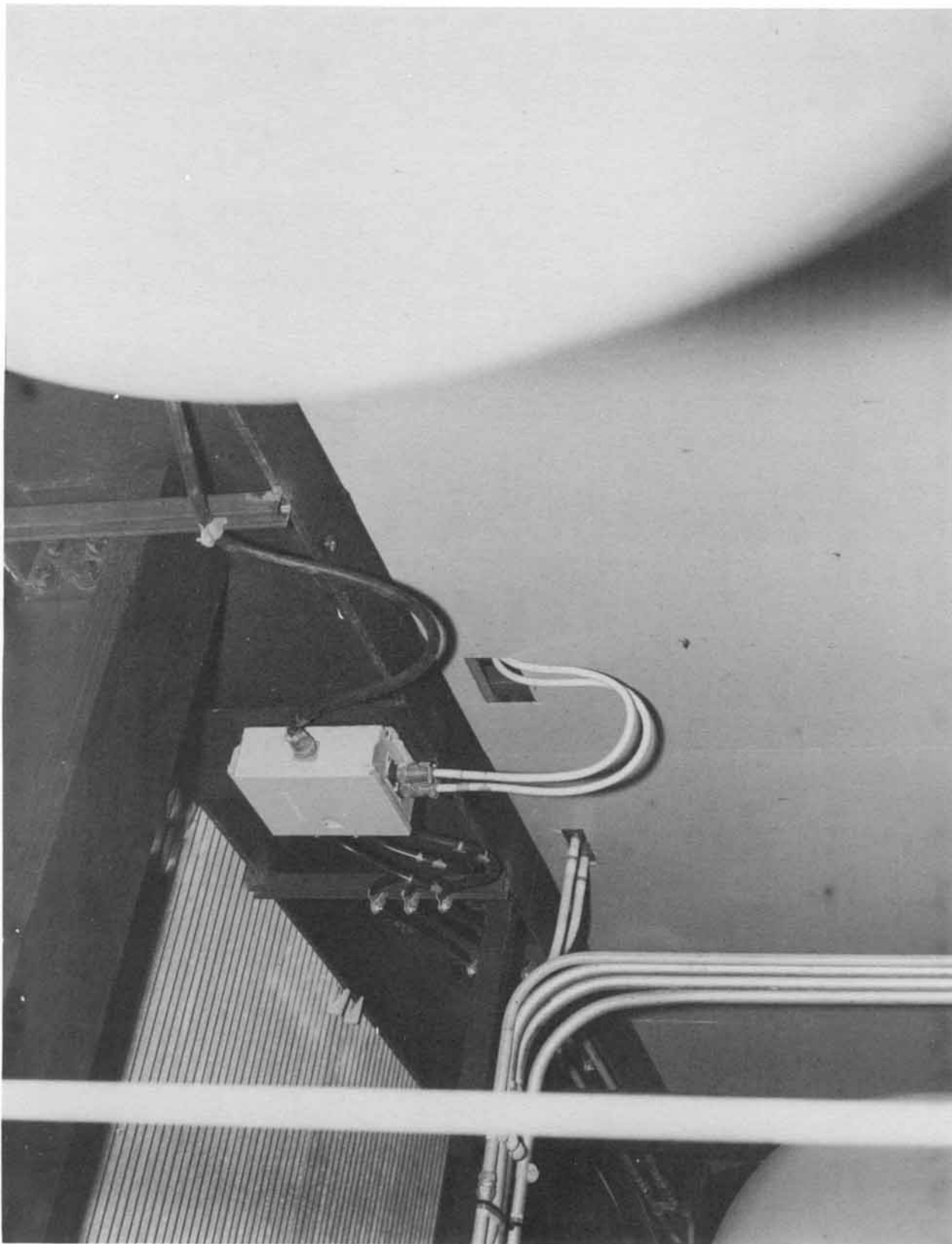


Looking west from counterweight area (Neg. No. 68048A dated 4-26-61).



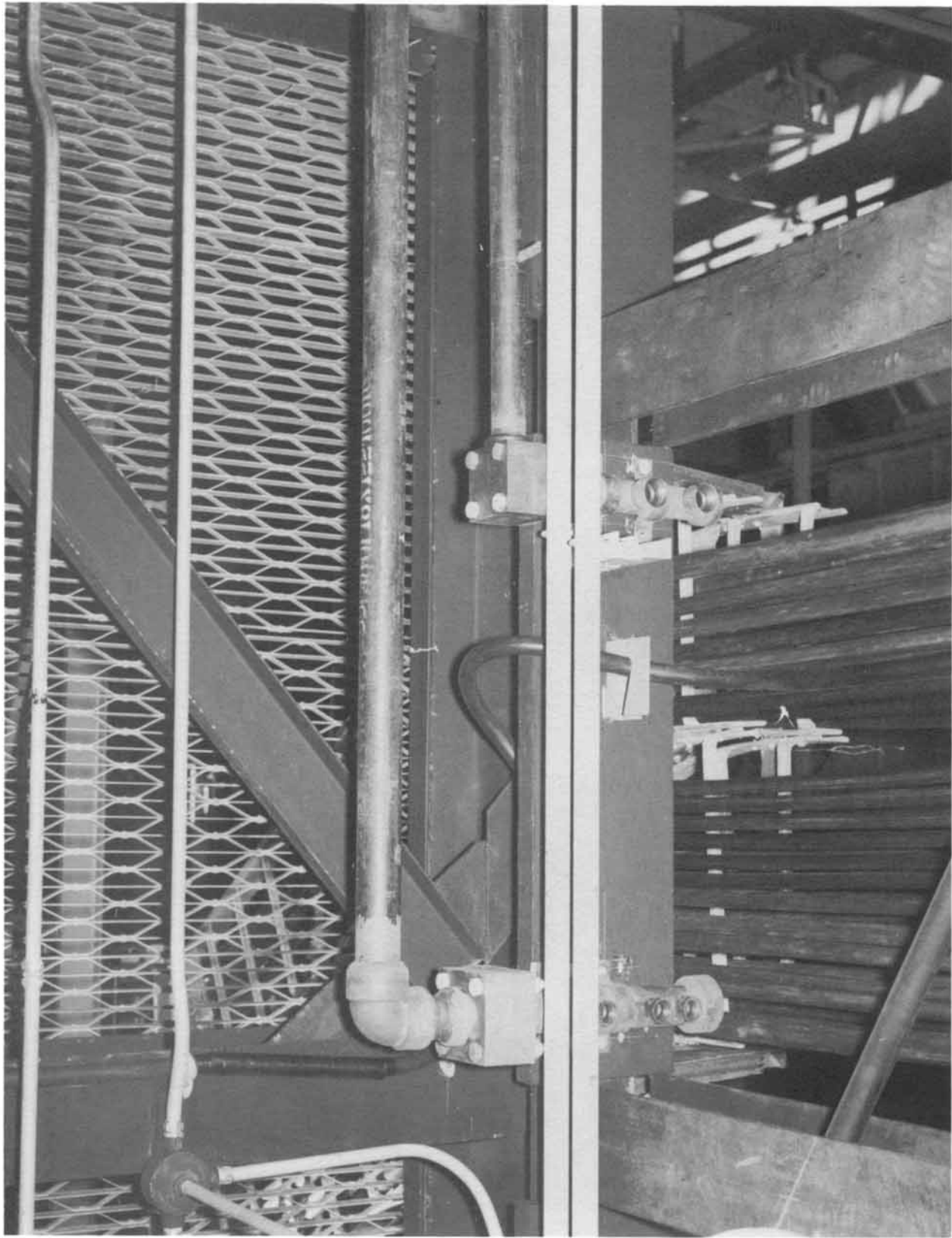
Looking down into Level 5, west side (Neg. No. 68049A dated 4-26-61).

LEVEL 5



West J Box Y-Y axis (Neg. No. 55814A dated 9-27-60).

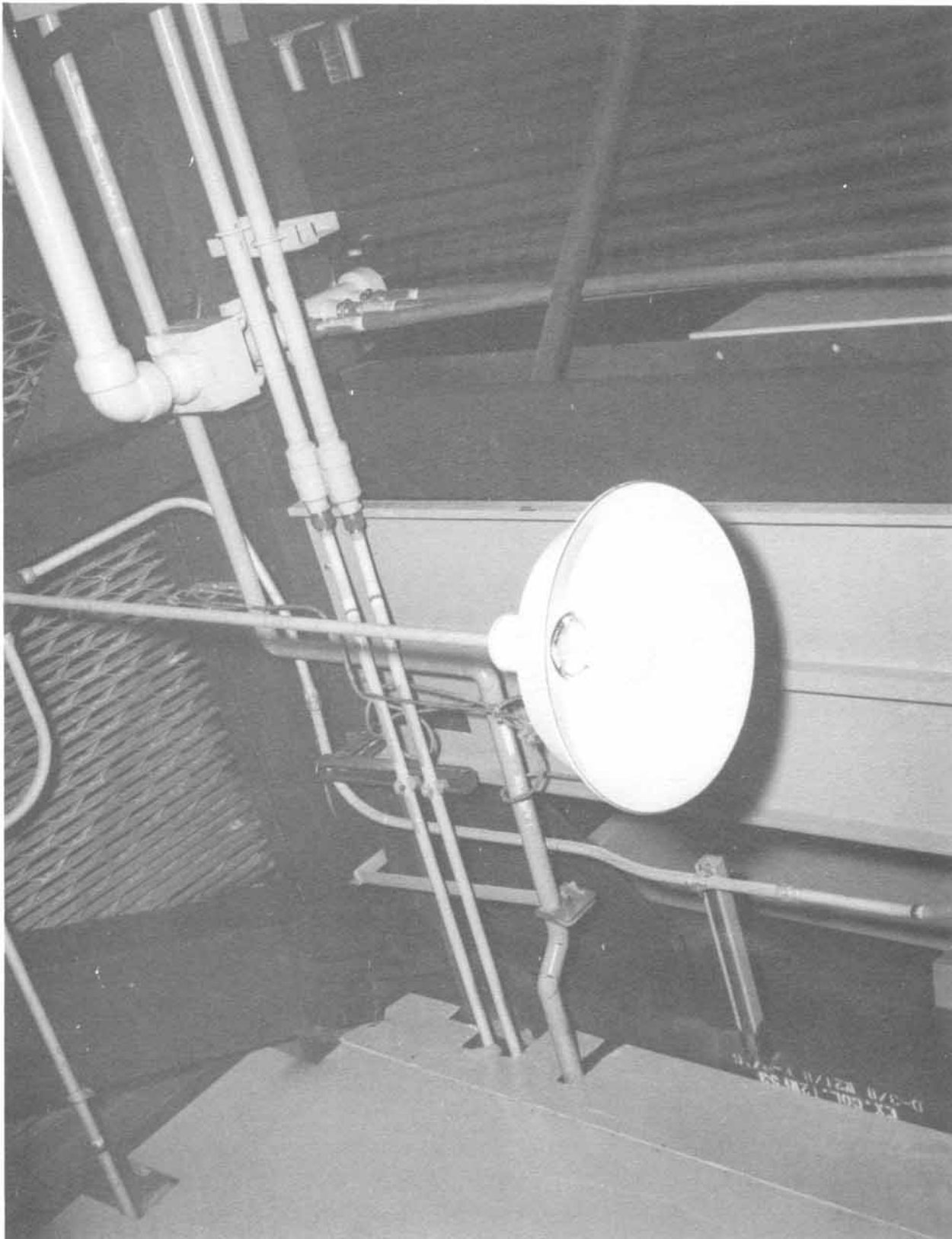




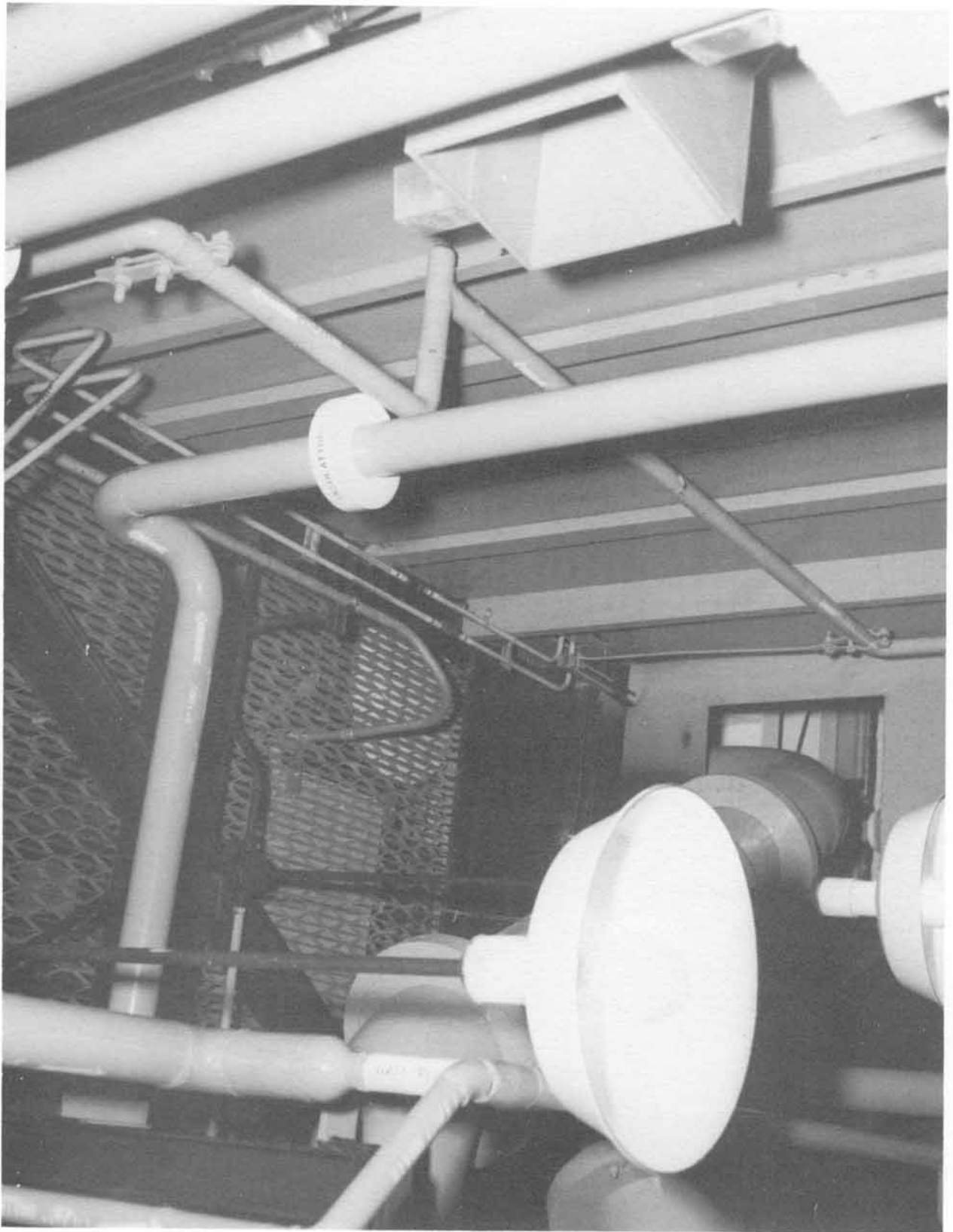
Hydraulic manifold for umbilical hoses (Neg. No. 58767A dated 11-16-60).



Piping on west side of diesel generator (Neg. No. 61633A dated 1-5-61).



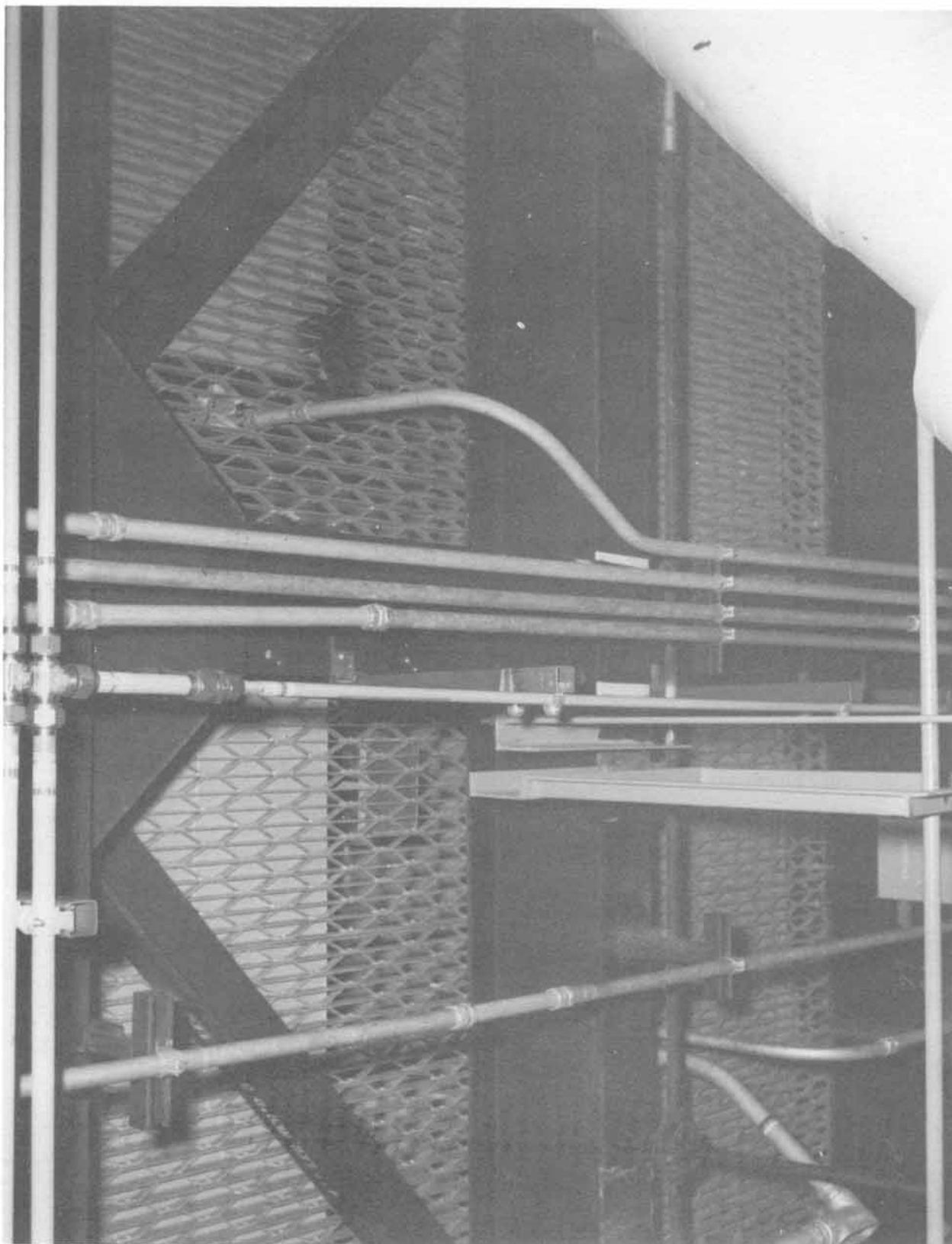
Hydraulic tubes at Column K (Neg. No. 64926A dated 2-27-61).



Hydraulic tubes near Column G (Neg. No. 64927A dated 2-27-61).



Hydraulic tubes near Column D (Neg. No. 64928A dated 2-27-61).

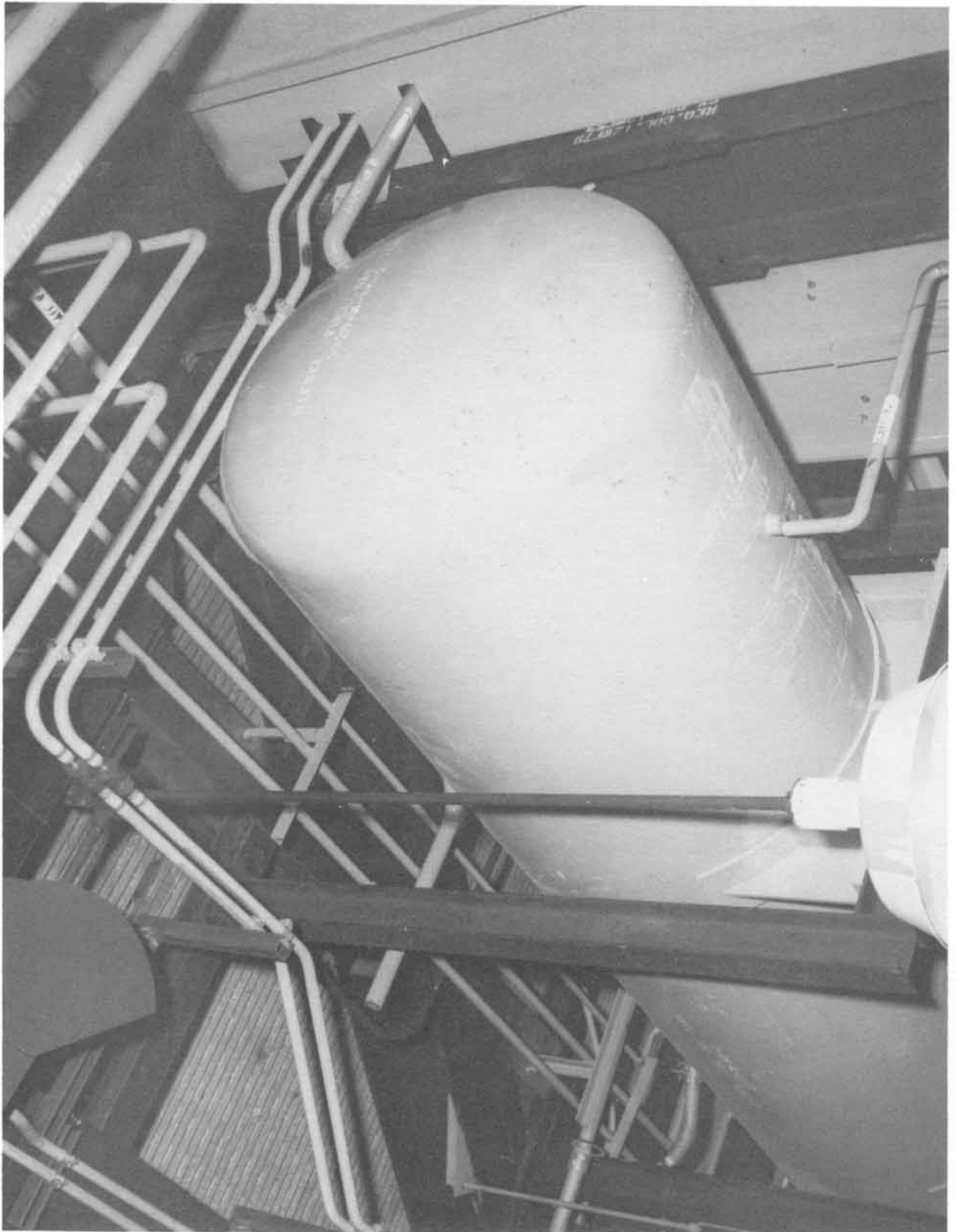


Hydraulic tubes, west from Column J to K (Neg. No. 64929A dated 2-27-61).





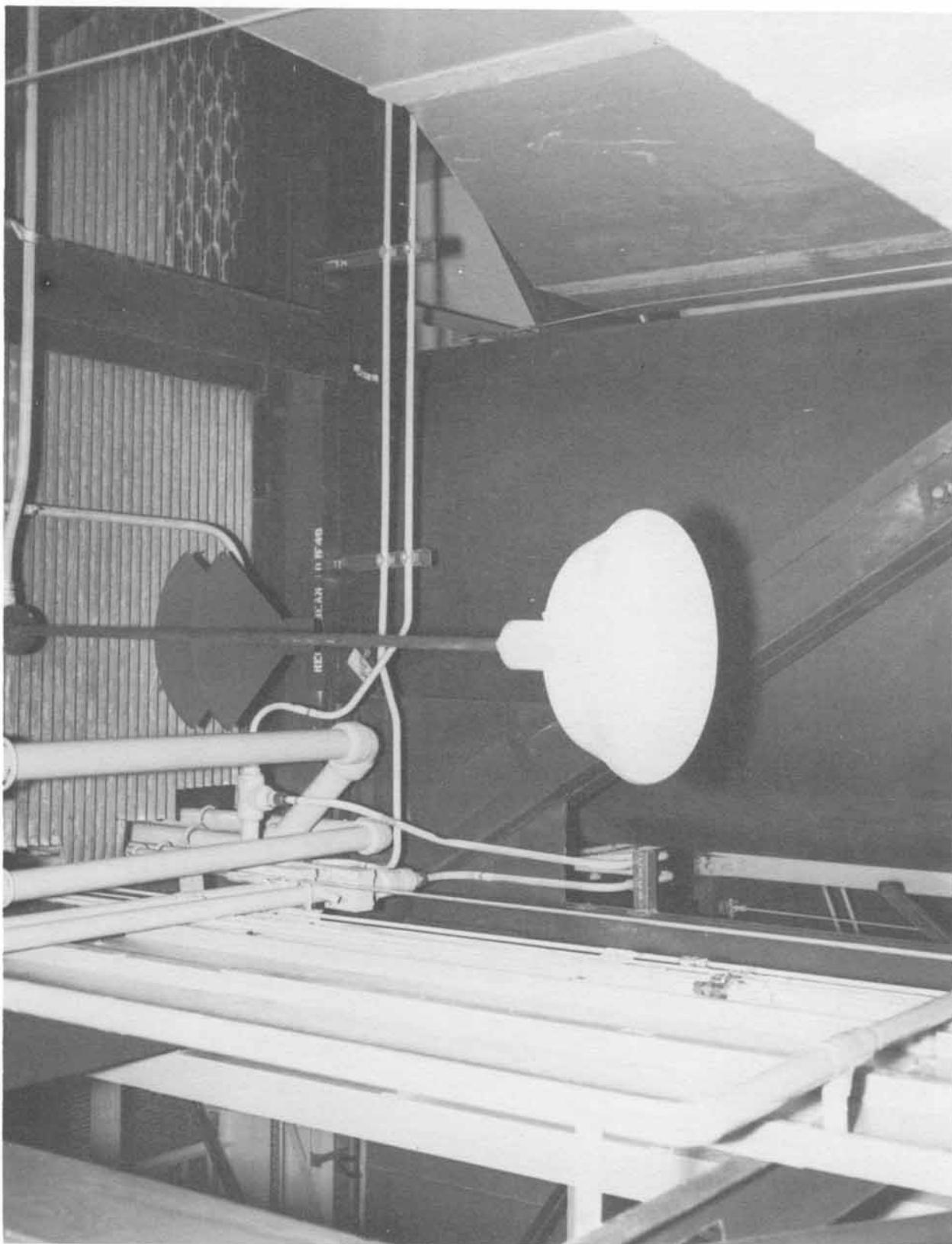
Hydraulic tubes to west crib lock (Neg. No. 64930A dated 2-27-61).



Hydraulic tubes at Column K (Neg. No. 64931A dated 2-27-61).



Hydraulic tubes to crib lock at Column D (Neg. No. 64932A dated 2-27-61).



Hydraulic pipes and tubes at Column B (Neg. No. 64933A dated 2-27-61).

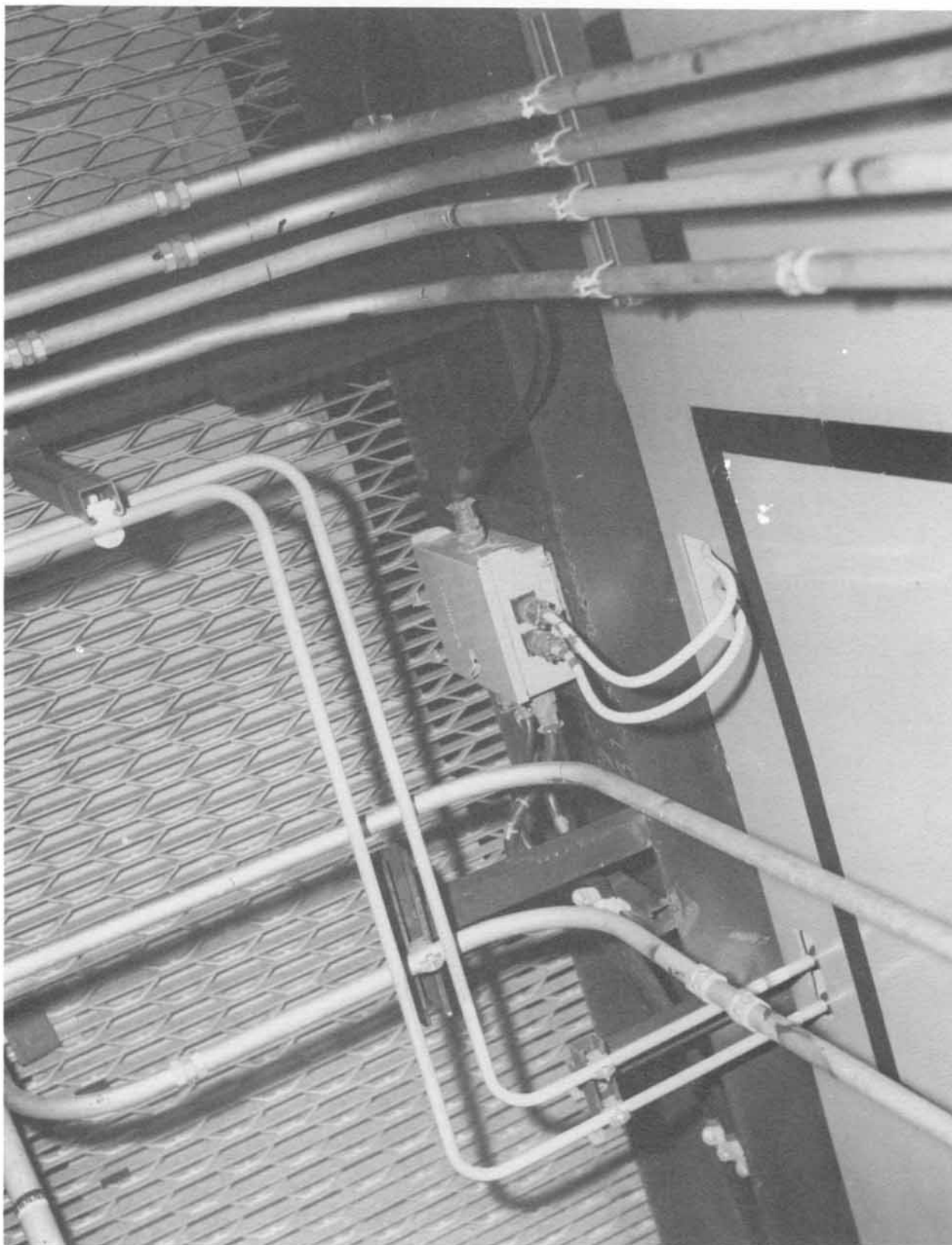


Hydraulic tubes at south side (Neg. No. 64934A dated 2-27-61).

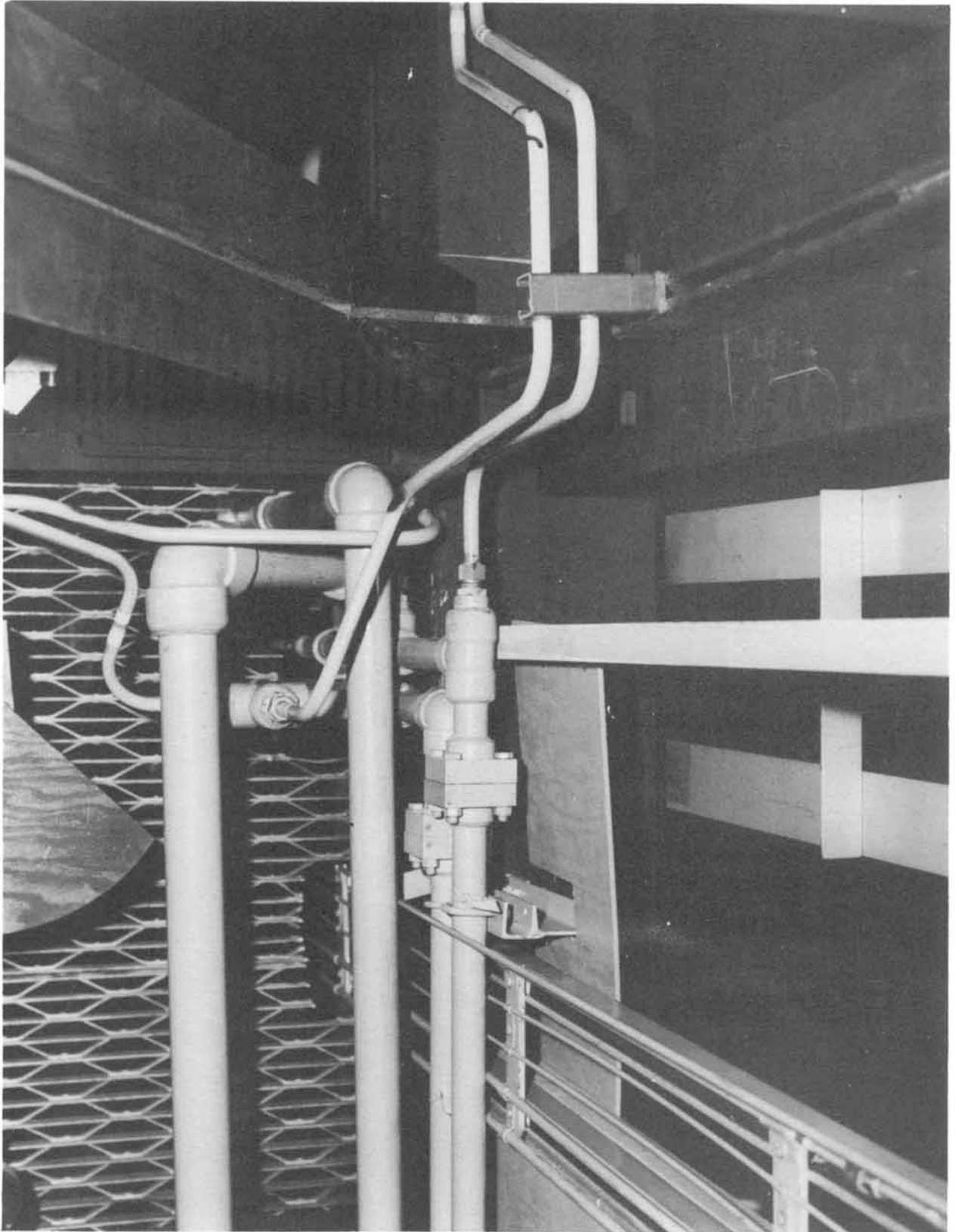


Cable loop bracket (Neg. No. 67330A dated 4-14-61).

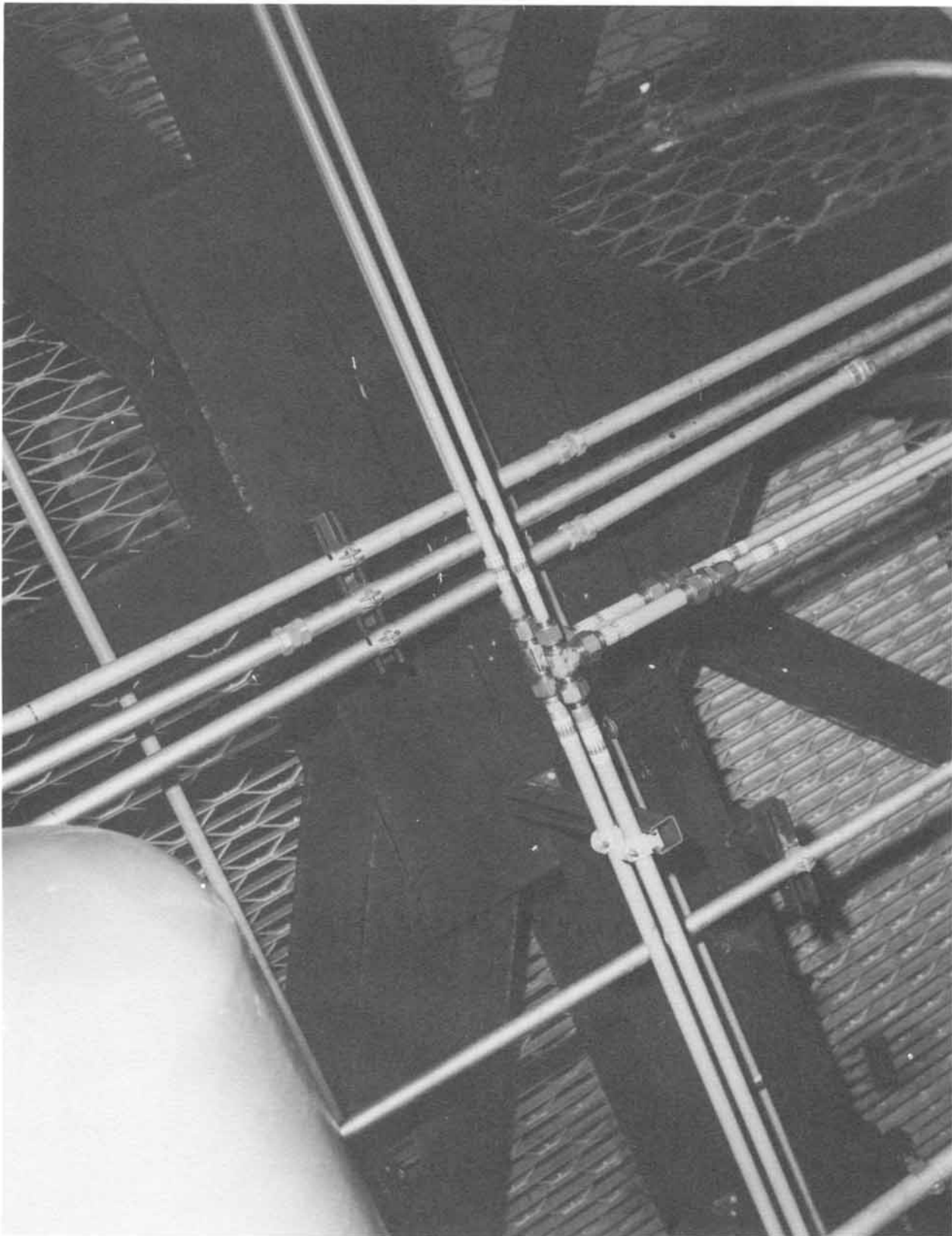




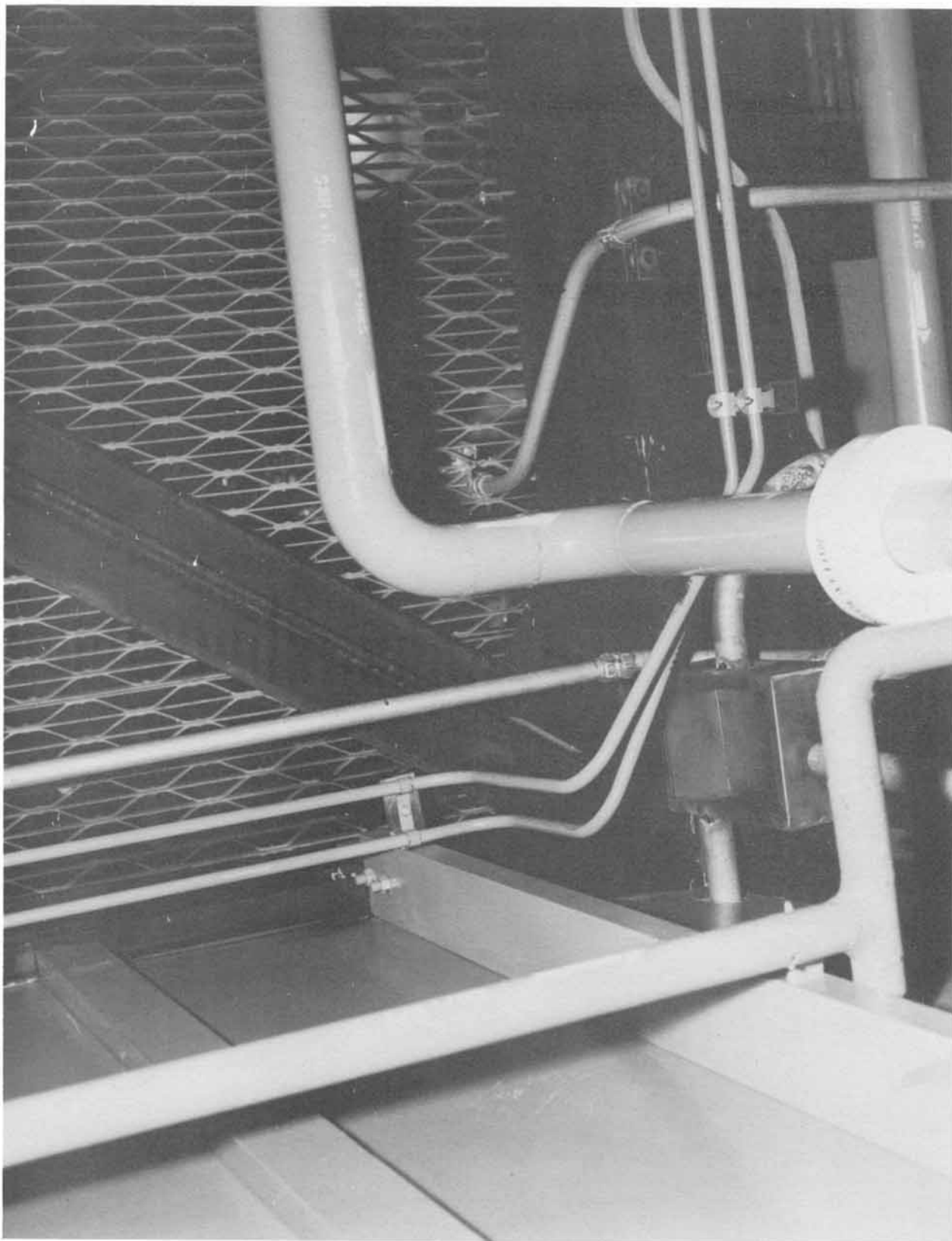
AMF J Box, west side (Neg. No. 67331A dated 4-14-61).



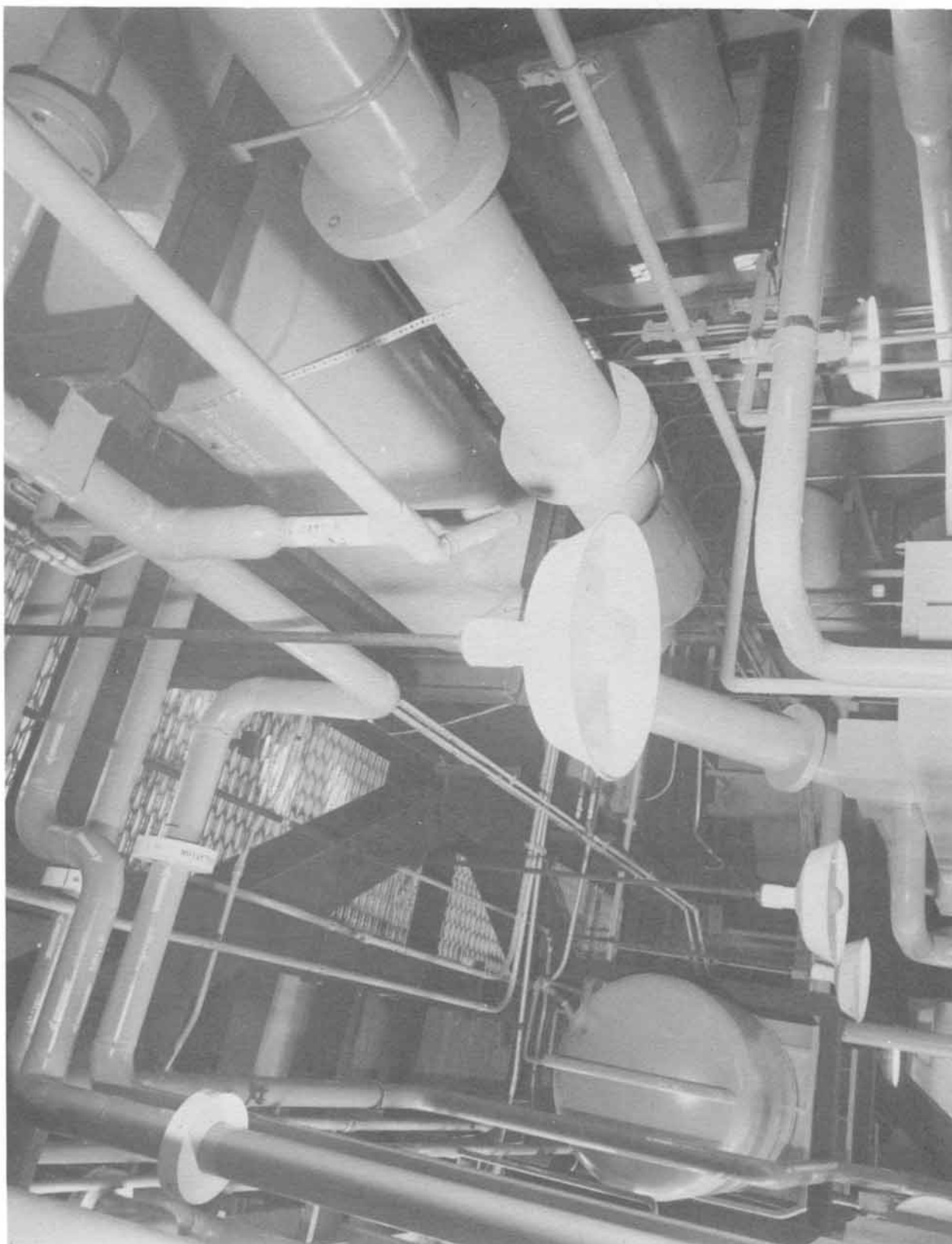
View showing congestion where hydraulic lines turn west under Level 4  
(Neg. No. 67565A dated 4-19-61).



Routing of hydraulic lines to vertical locks (Neg. No. 67566A dated 4-19-61).

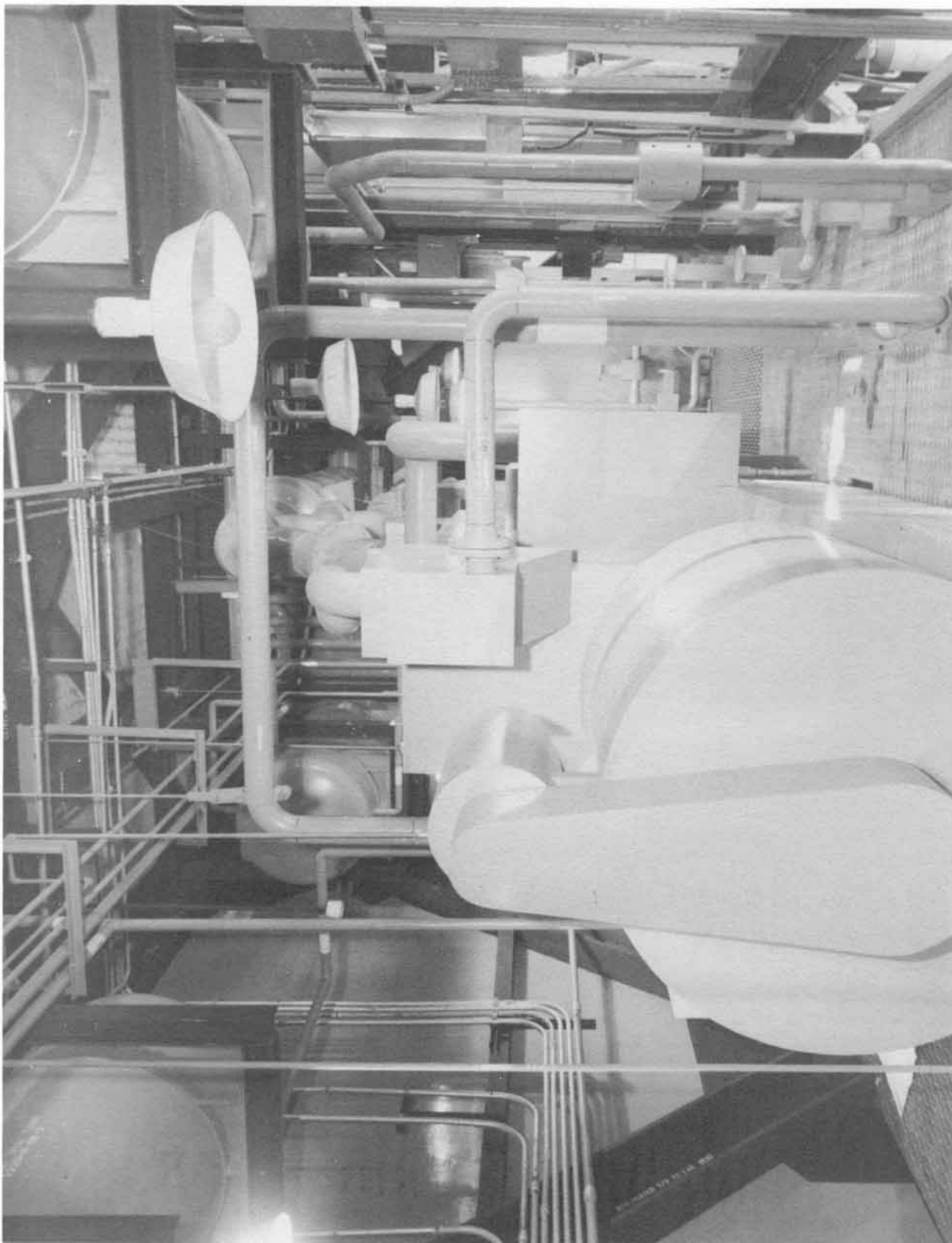


Showing north vertical lock lines as they should be routed--Column J  
(Neg. No. 67567A dated 4-19-61).



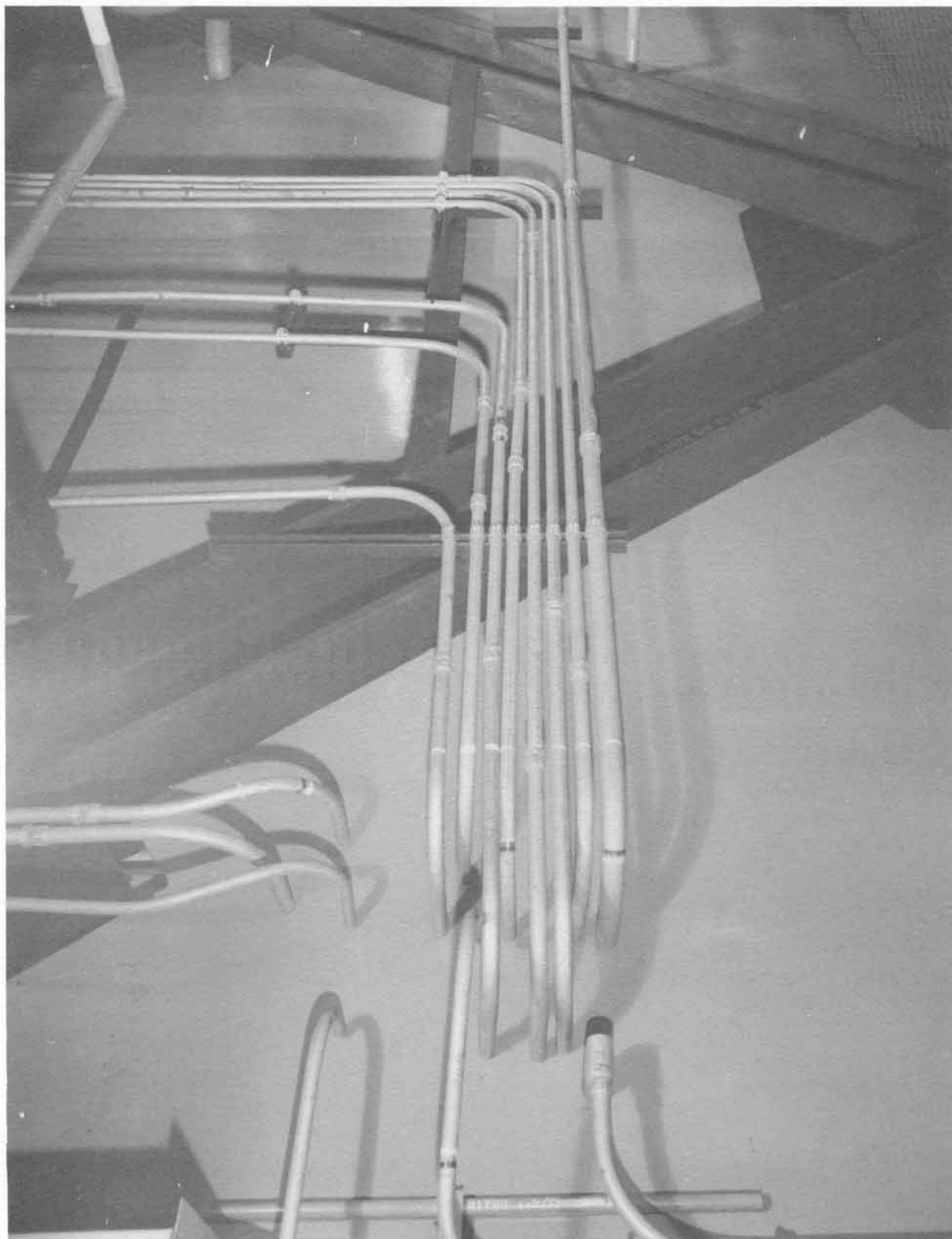
Looking up from Column G toward Column E (Neg. No. 68066A dated 4-27-61).



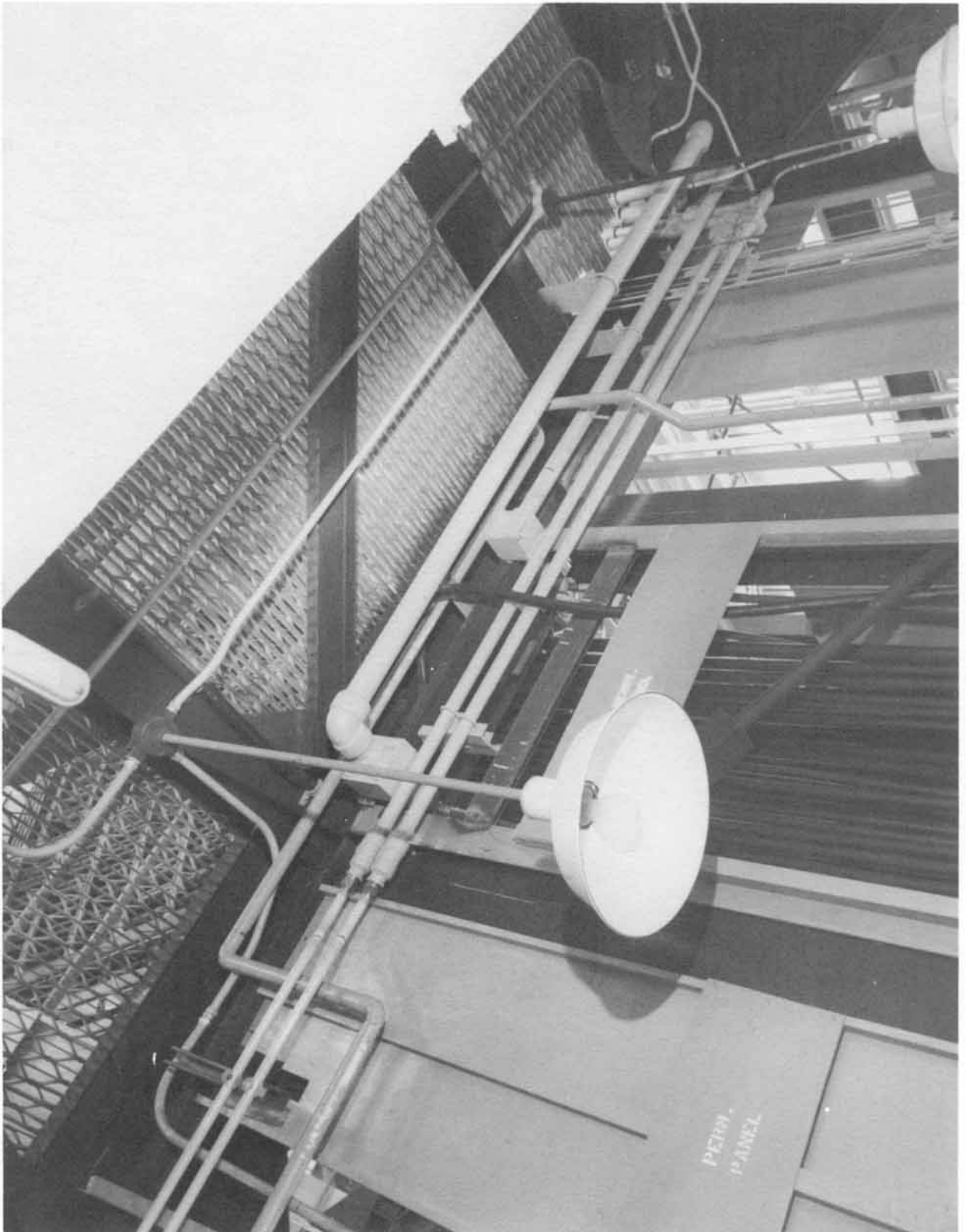


Looking from Column D toward Column G (Neg. No. 68067A dated 4-27-61).





Looking from near Column D toward conduit west side diesel enclosure (Neg. No. 68068A dated 4-27-61).

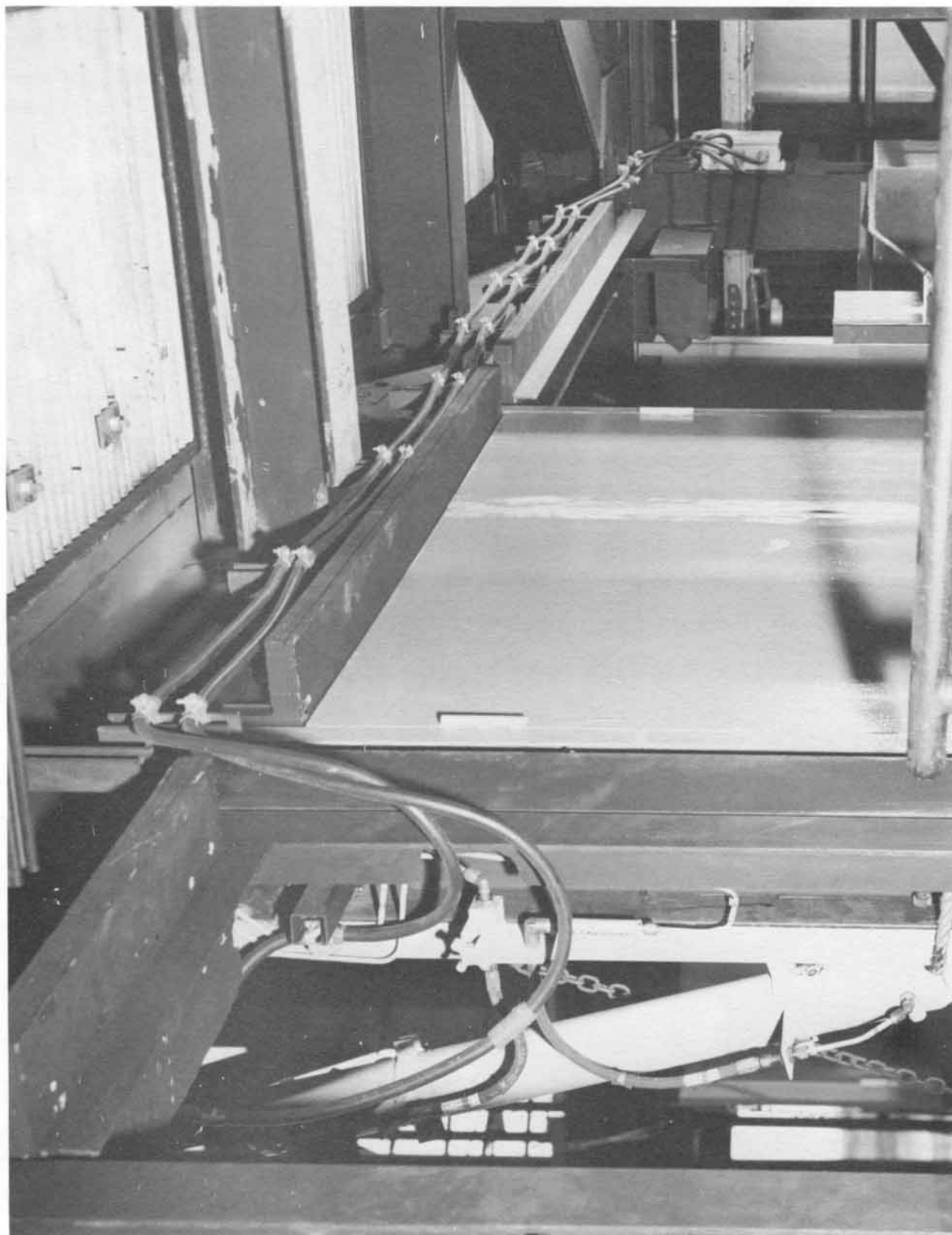


Looking up between Column K to B at diesel enclosure door (Neg. No. 68069A dated 4-27-61).

LEVEL 6



Collimator and work platforms (Neg. No. 53915A dated 8-16-60).

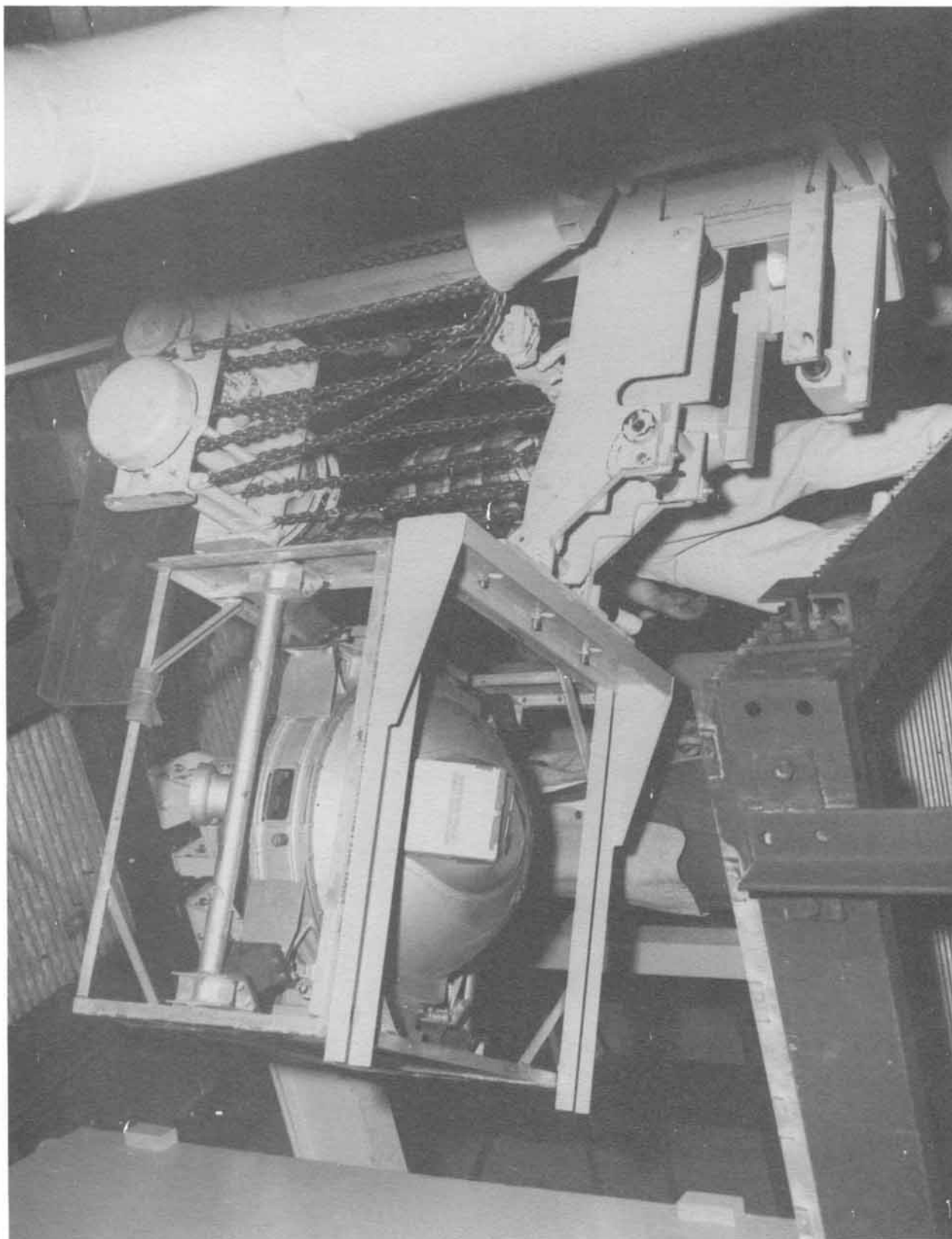


Cables from J Box, Column K upper to W/ P 2-D (Neg. No. 56695A dated 10-10-60).



AIG handling unit Column J (Neg. No. 61628A dated 1-5-61).

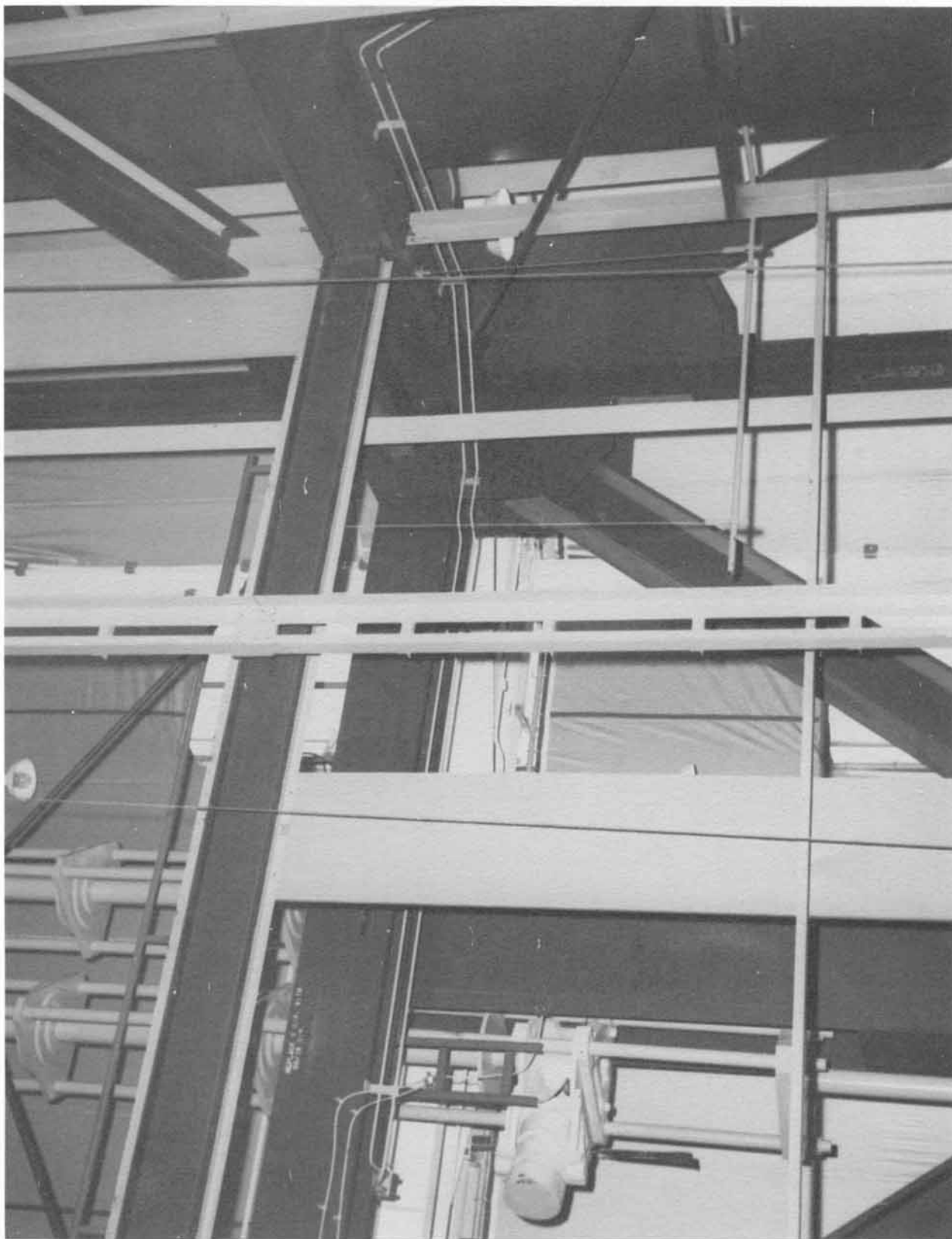




AIG handling unit removing pod equipment (Neg. No. 61678A dated 1-5-61).



SIG handling unit loading equipment into pod (Neg. No. 61681A dated 1-5-61).



Vertical crib lock tubing, east (Neg. No. 64935A dated 2-27-61).

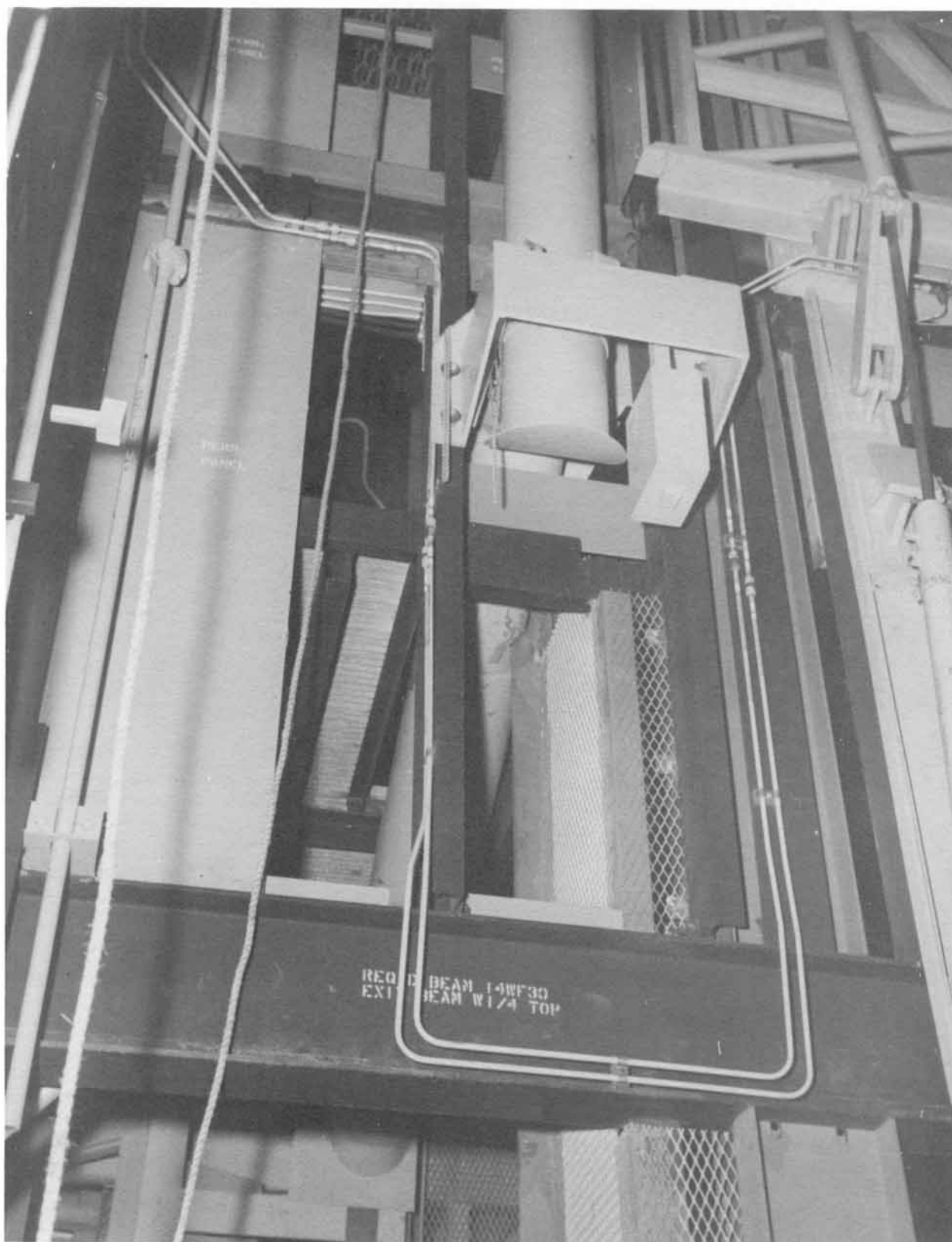


Work platform tubes, north (Neg. No. 66231A dated 3-23-61).



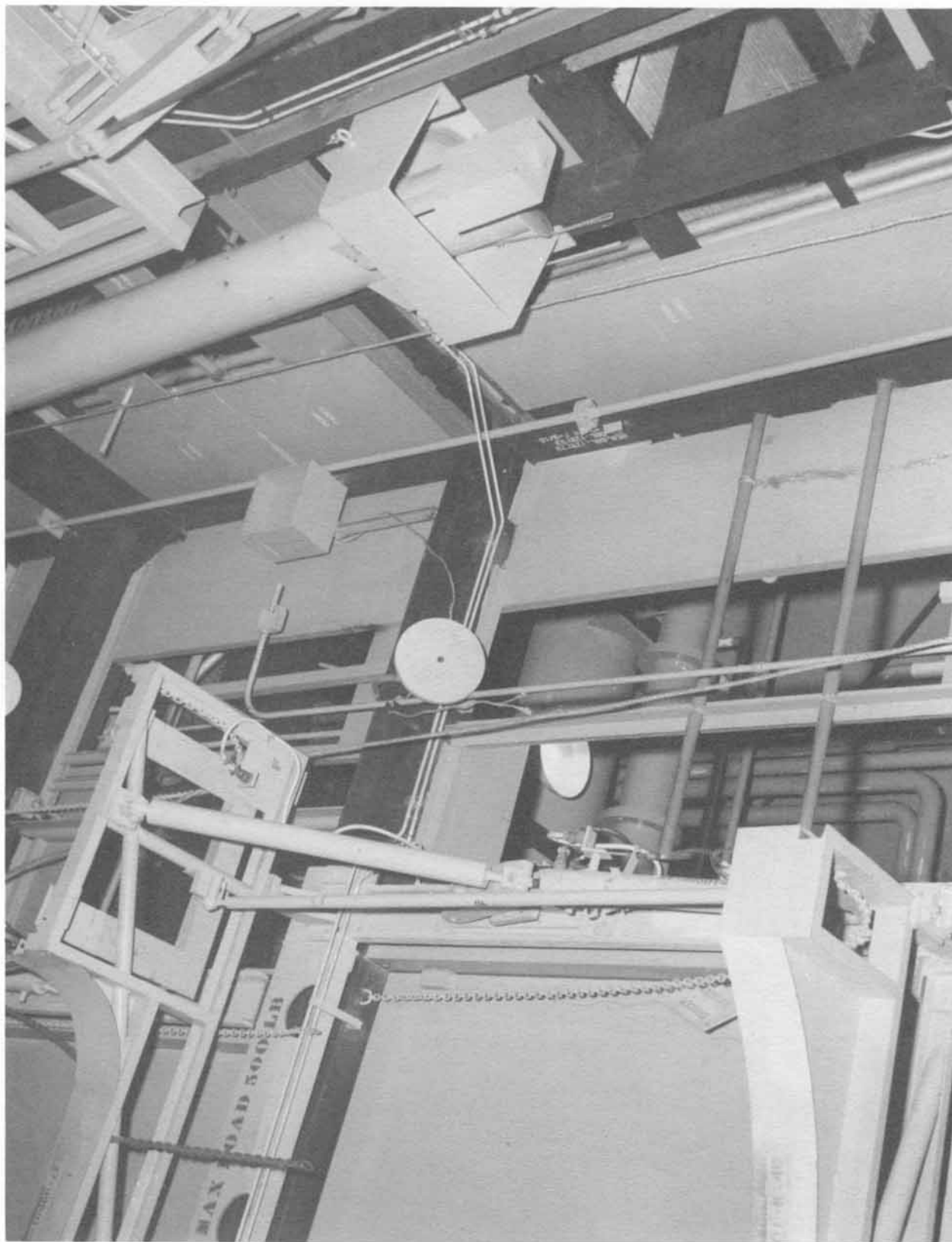
\ Work platform tubing, north (Neg. No. 66232A dated 3-23-61).



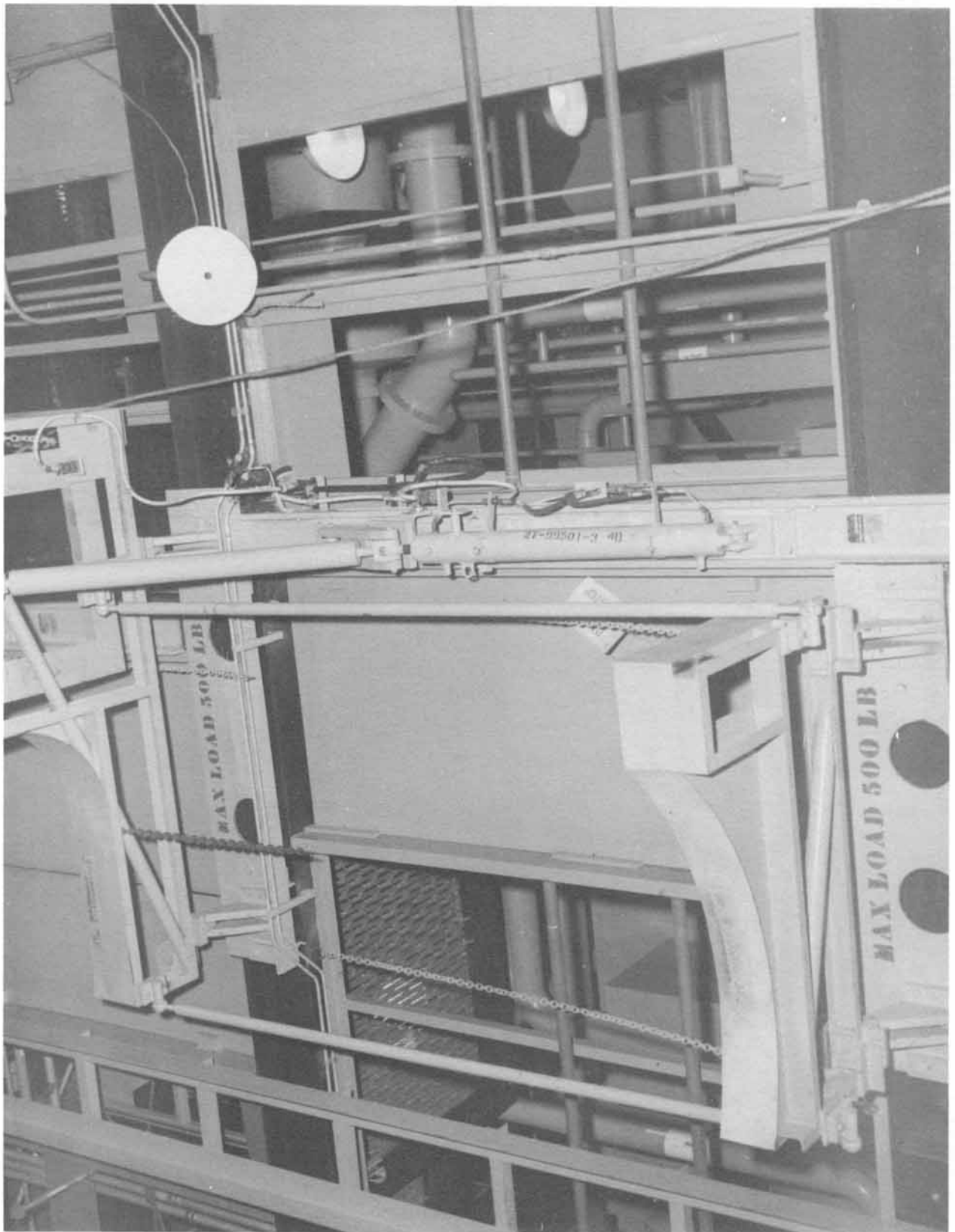


Work platform tubing, north (Neg. No. 66233A dated 3-23-61).

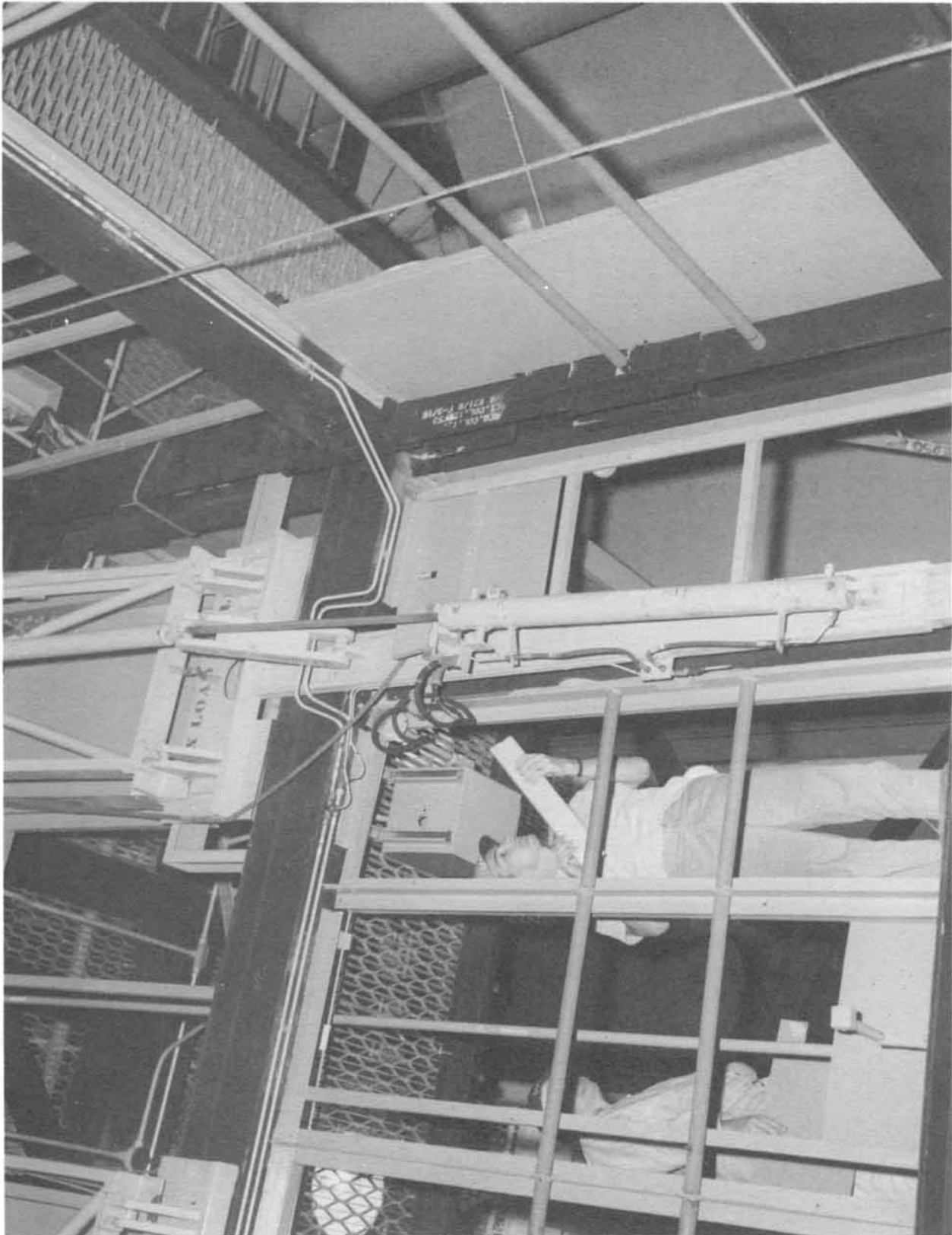




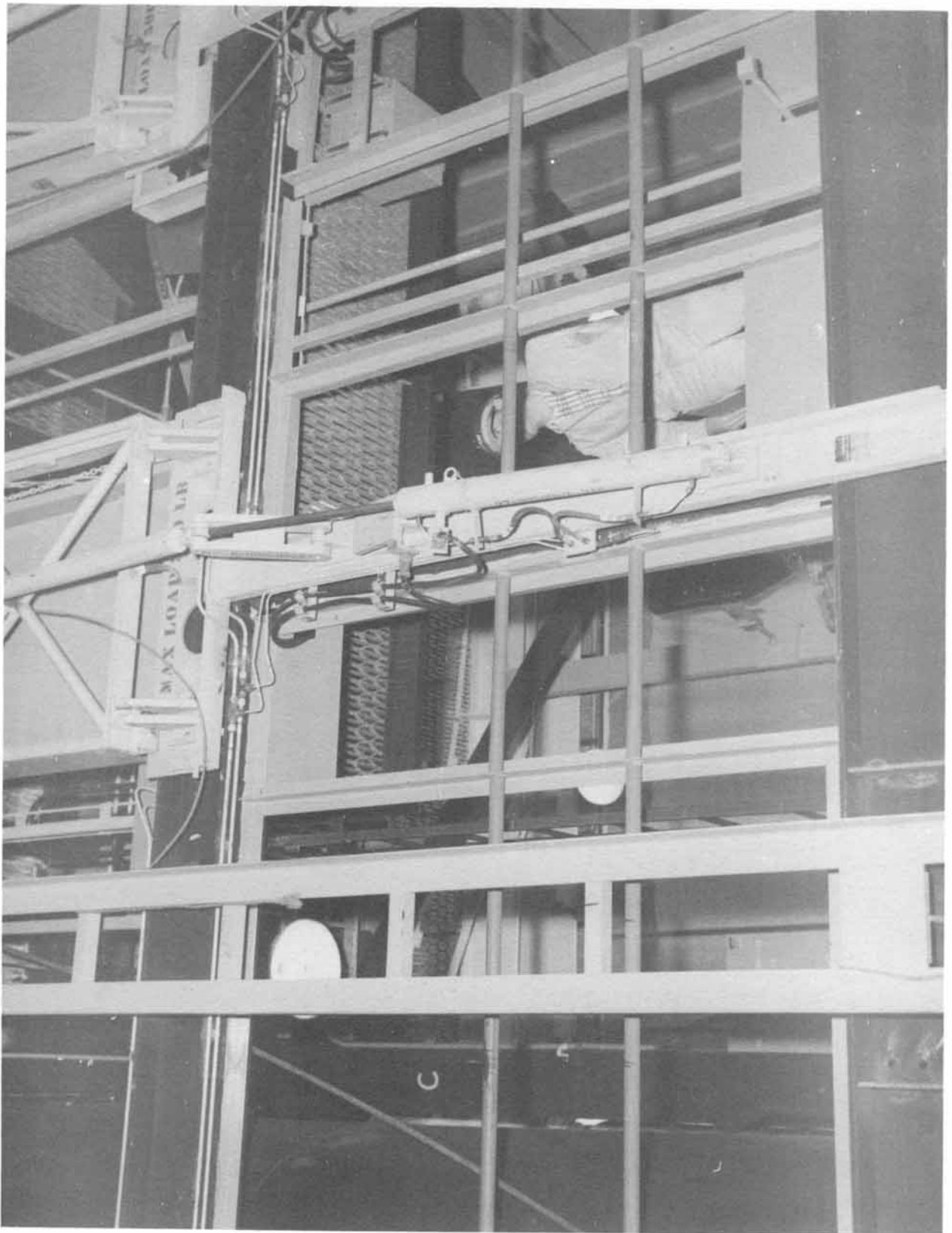
Work platform tubing, west (Neg. No. 66234A dated 3-23-61).



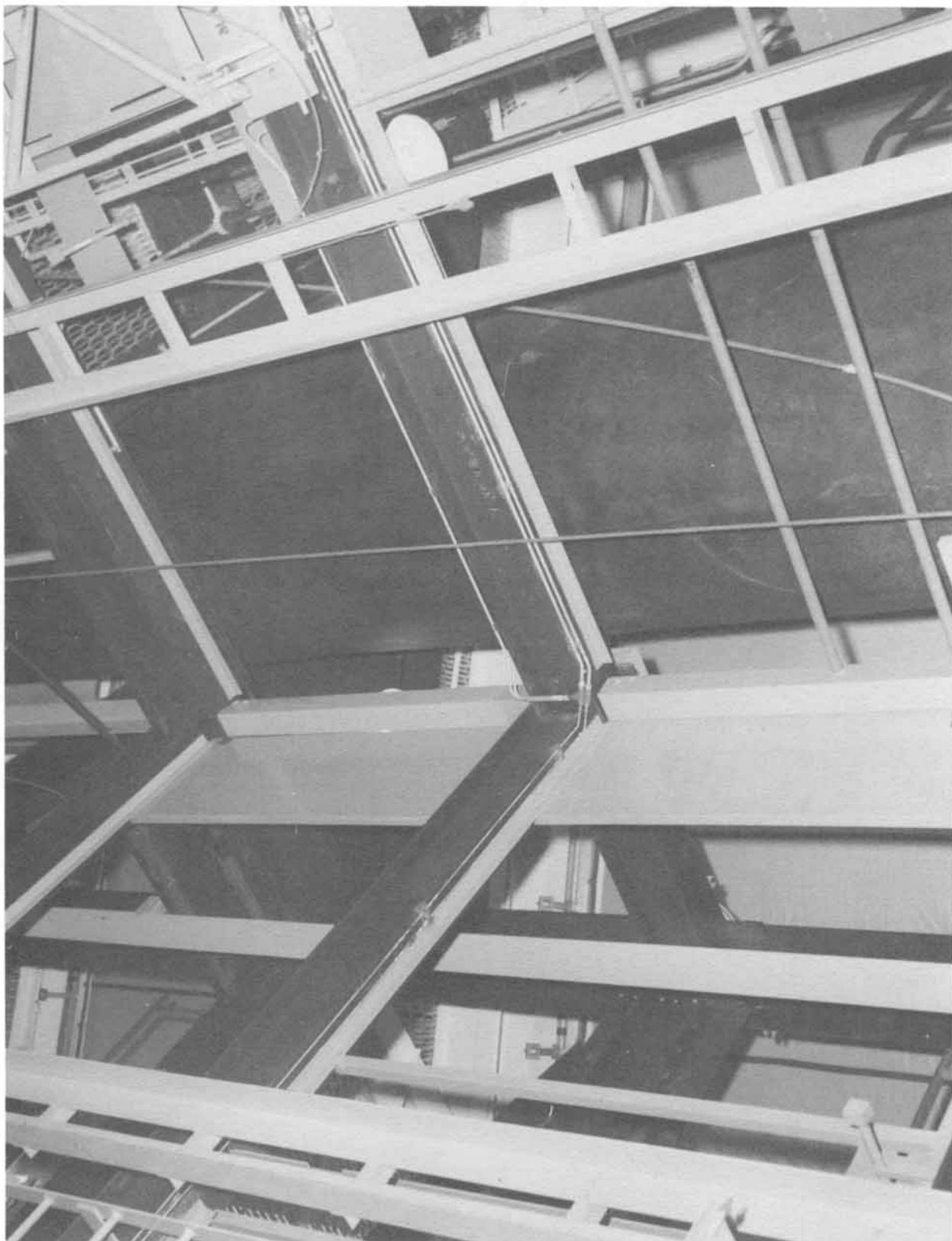
Work platform tubing, west (Neg. No. 66235A dated 3-23-61).



Work platform tubes, south (Neg. No. 66236A dated 3-23-61).

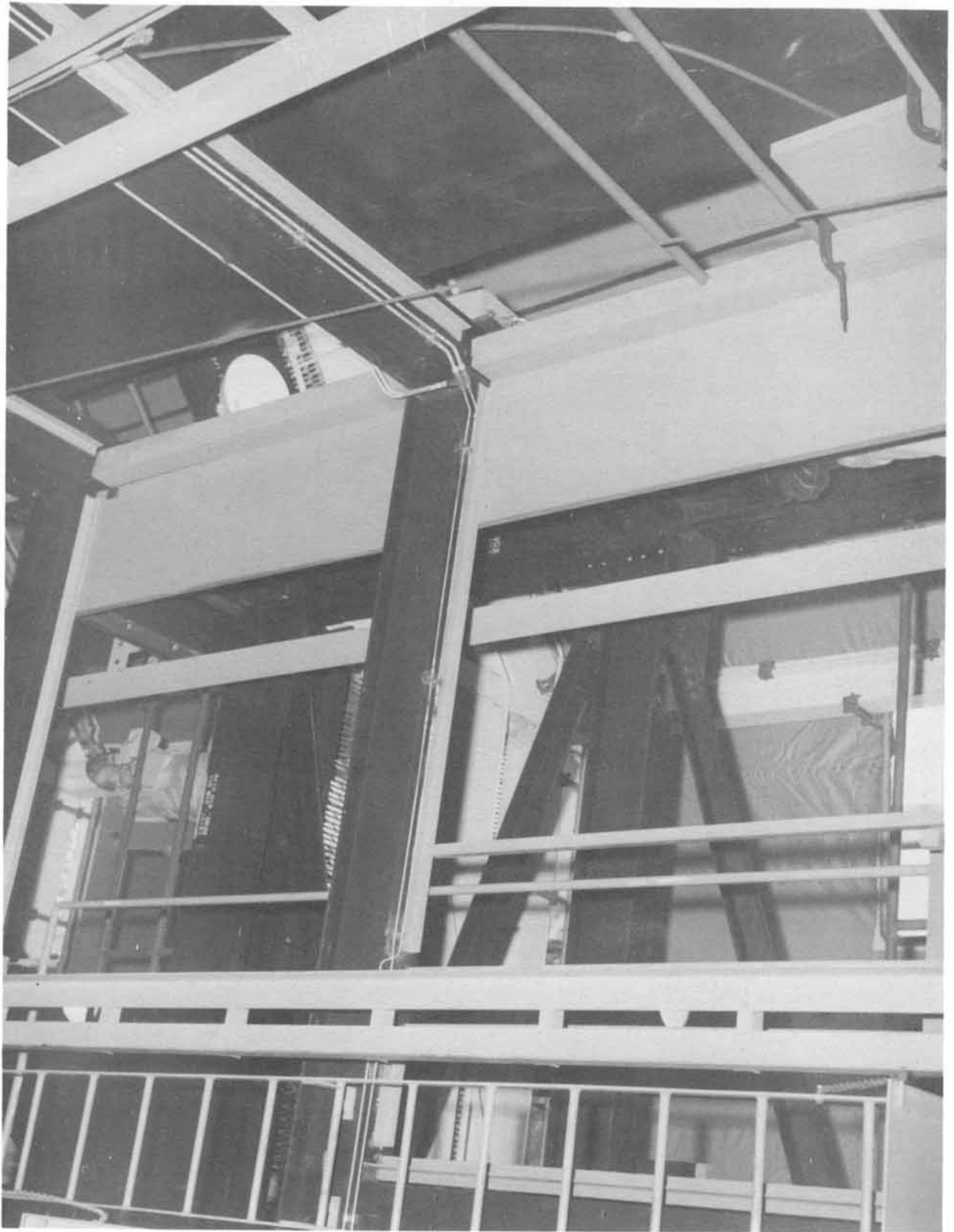


Work platform tubing, south side (Neg. No. 66237A dated 3-23-61).



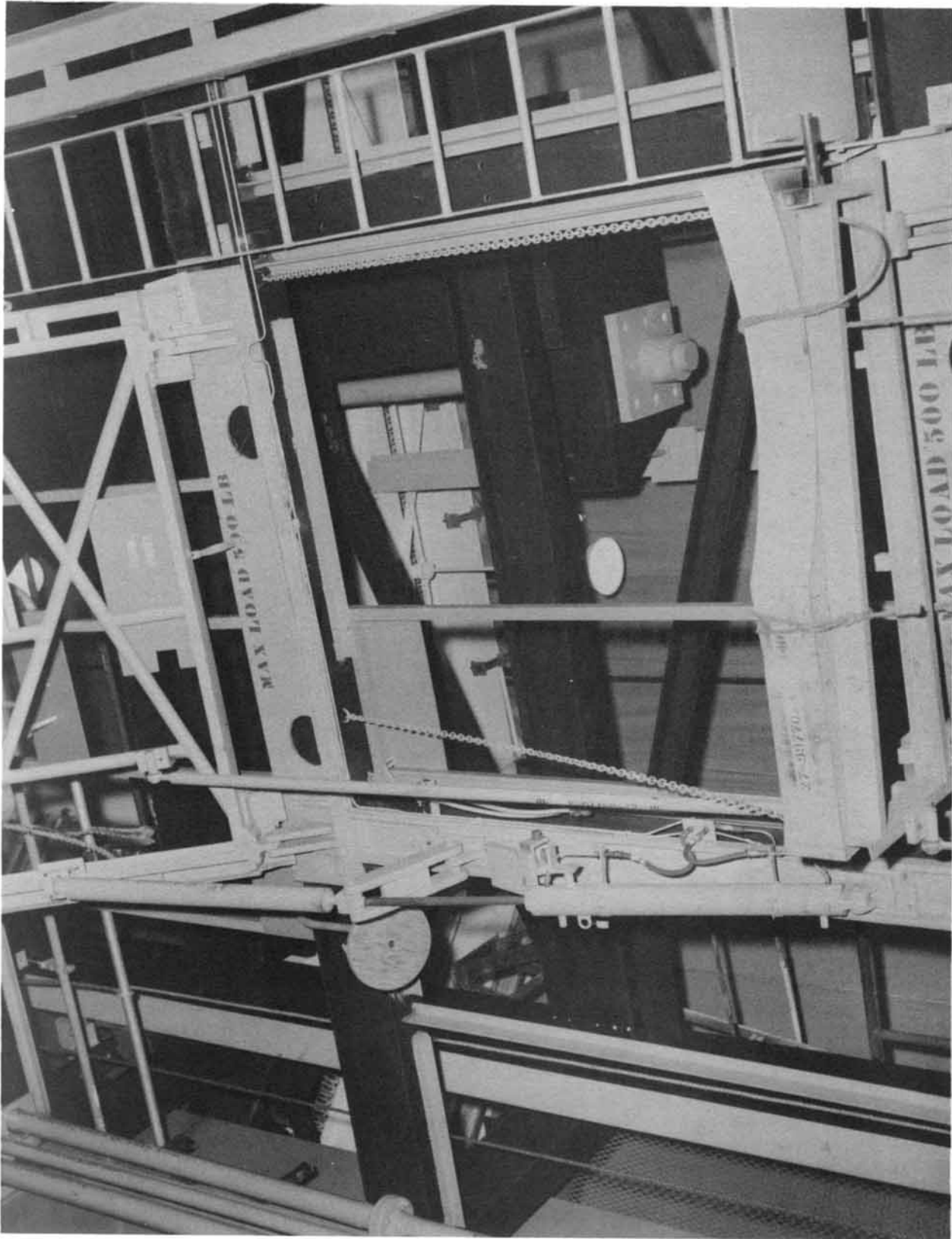
Work platform tubing, southeast (Neg. No. 66238A dated 3-23-61).



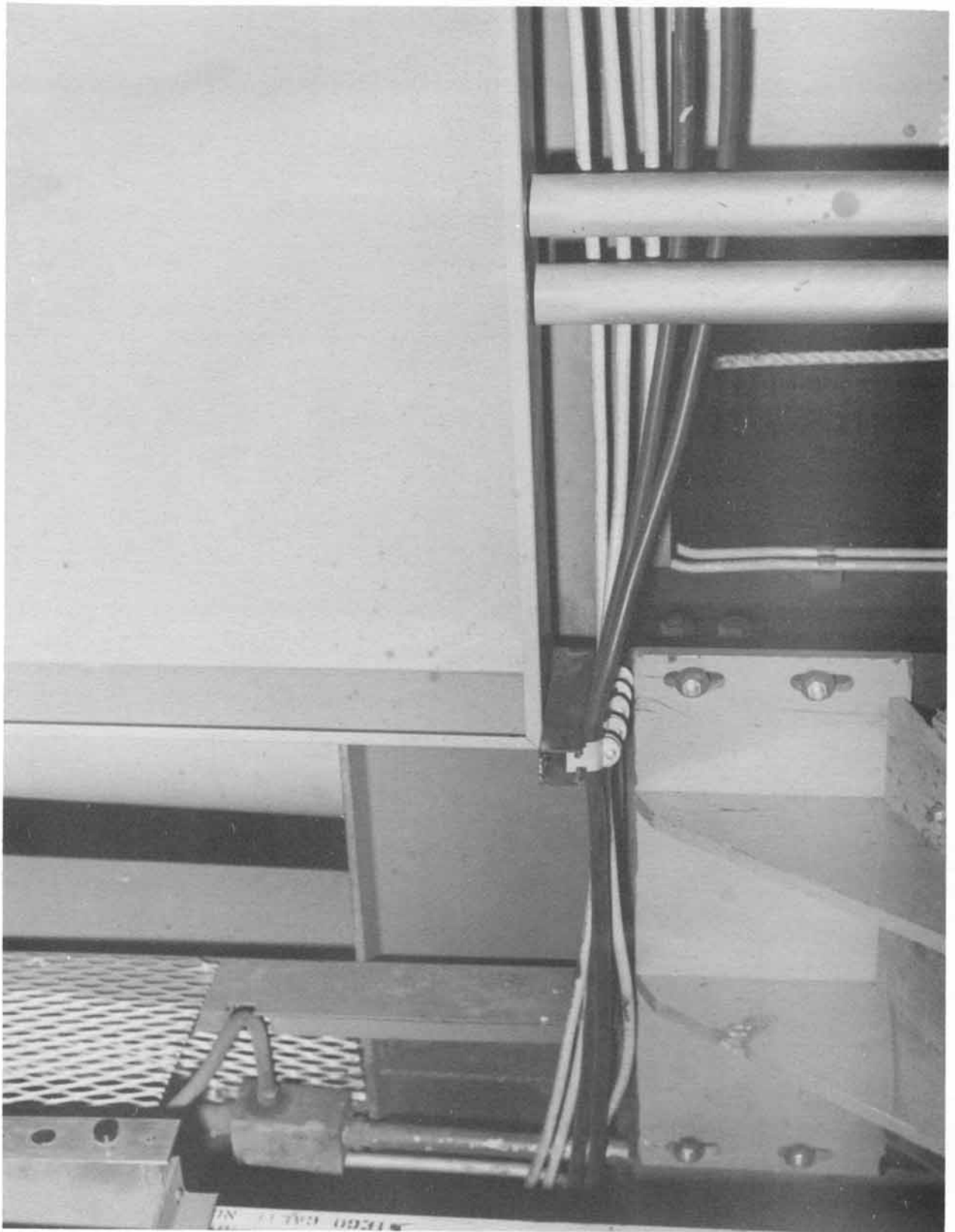


Work platform tubes, southeast corner (Neg. No. 66239A dated 3-23-61).

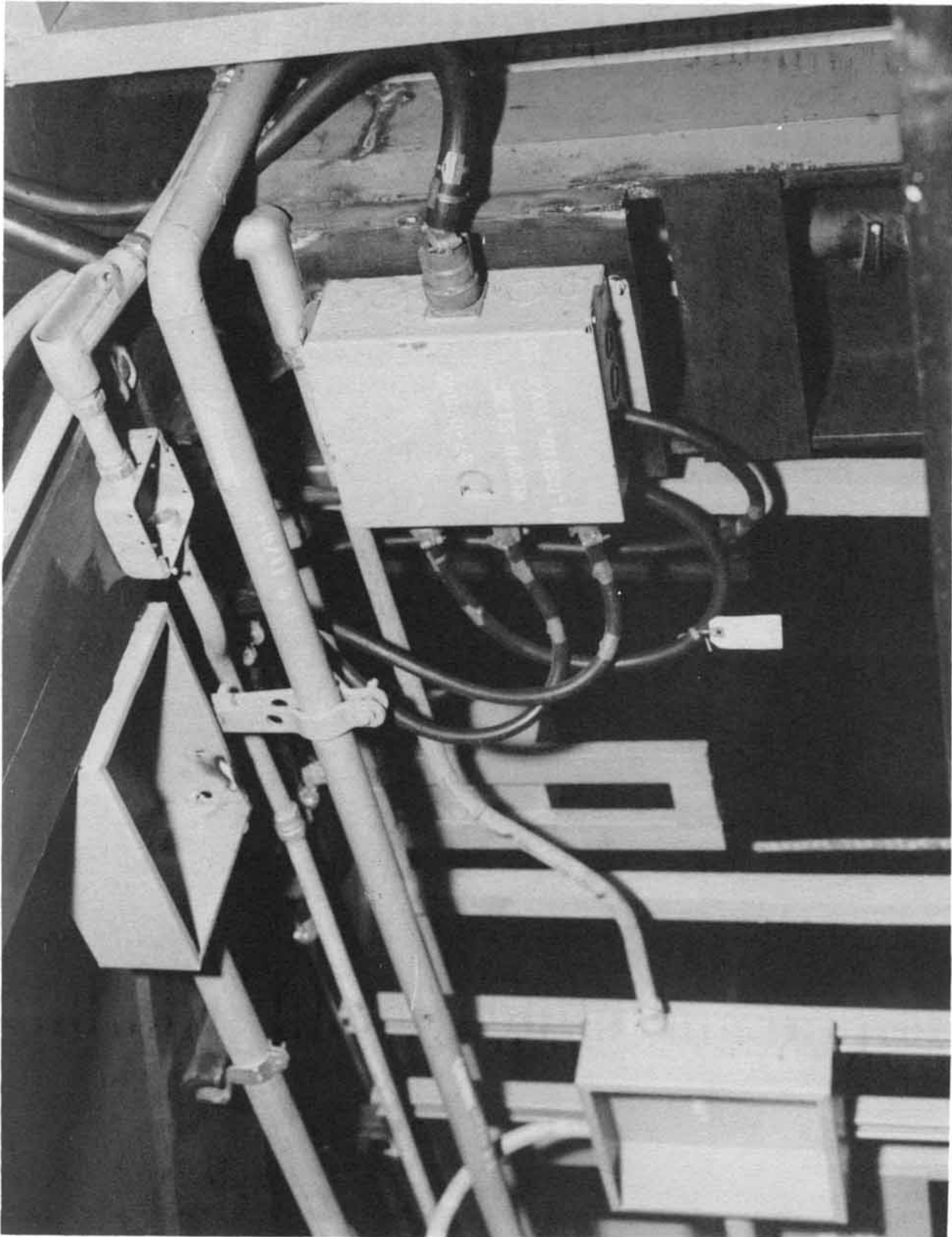




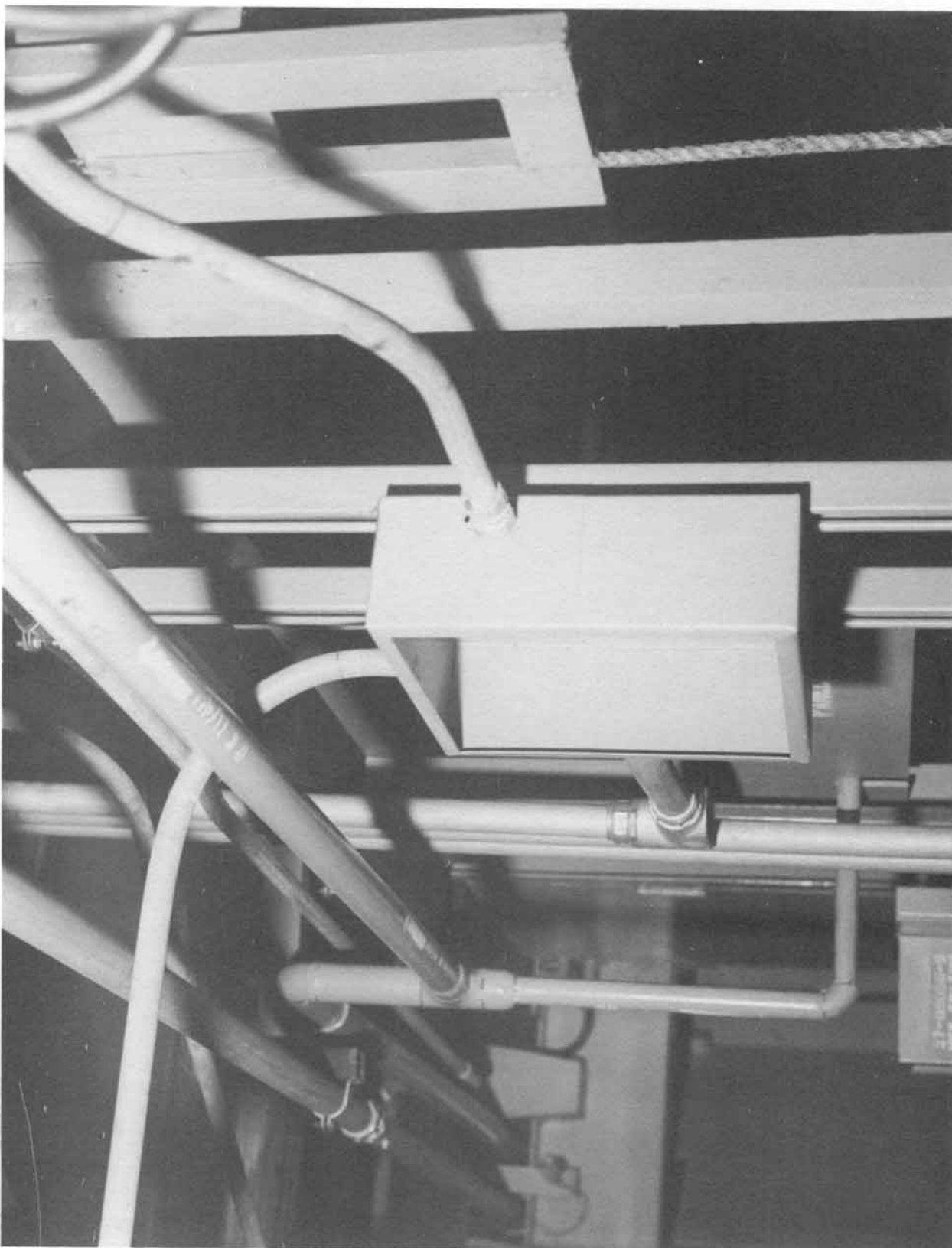
Work platform tubing, east side (Neg. No. 66240A dated 3-23-61).



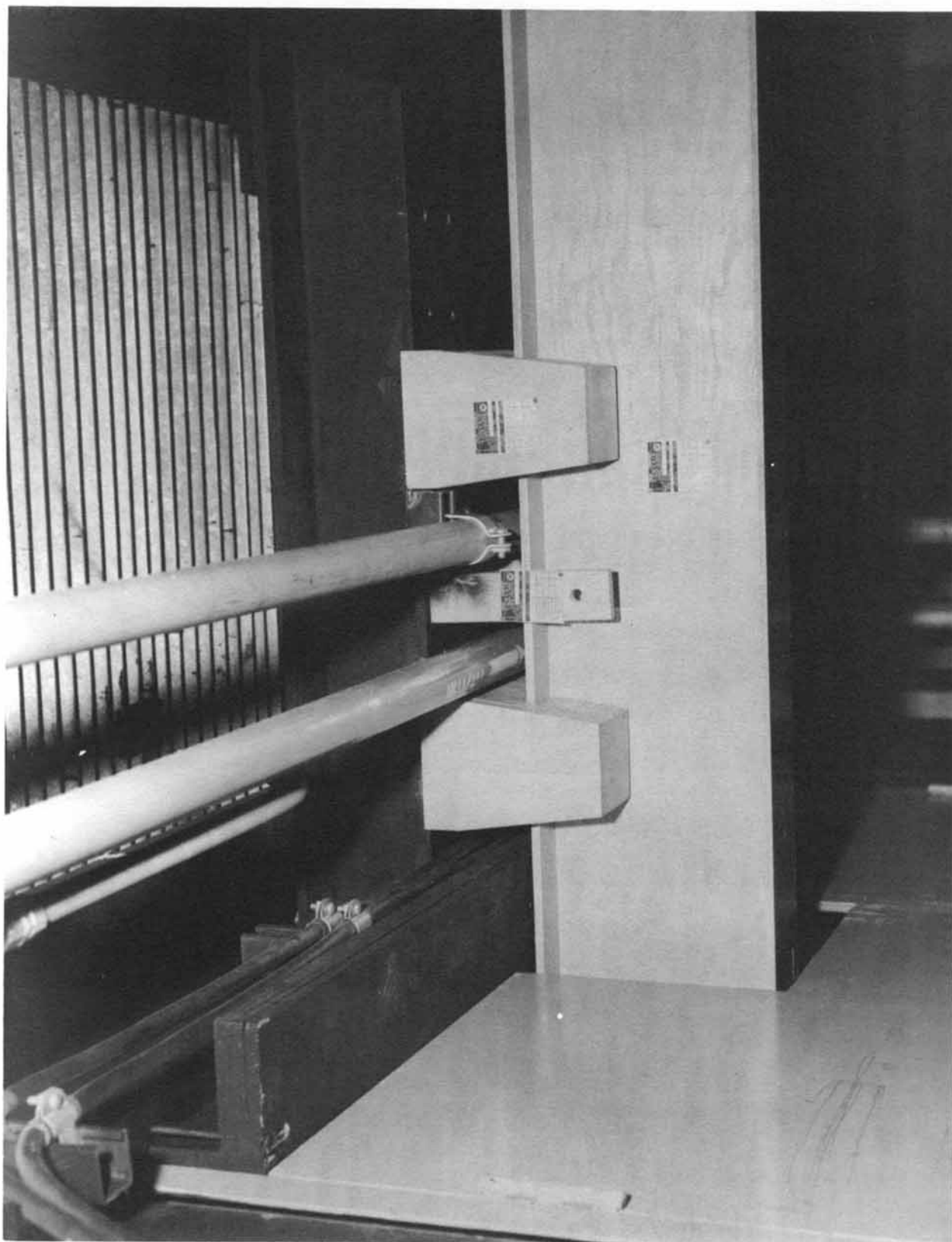
Cable routing near column sight tube (Neg. No. 67332A dated 4-14-61).



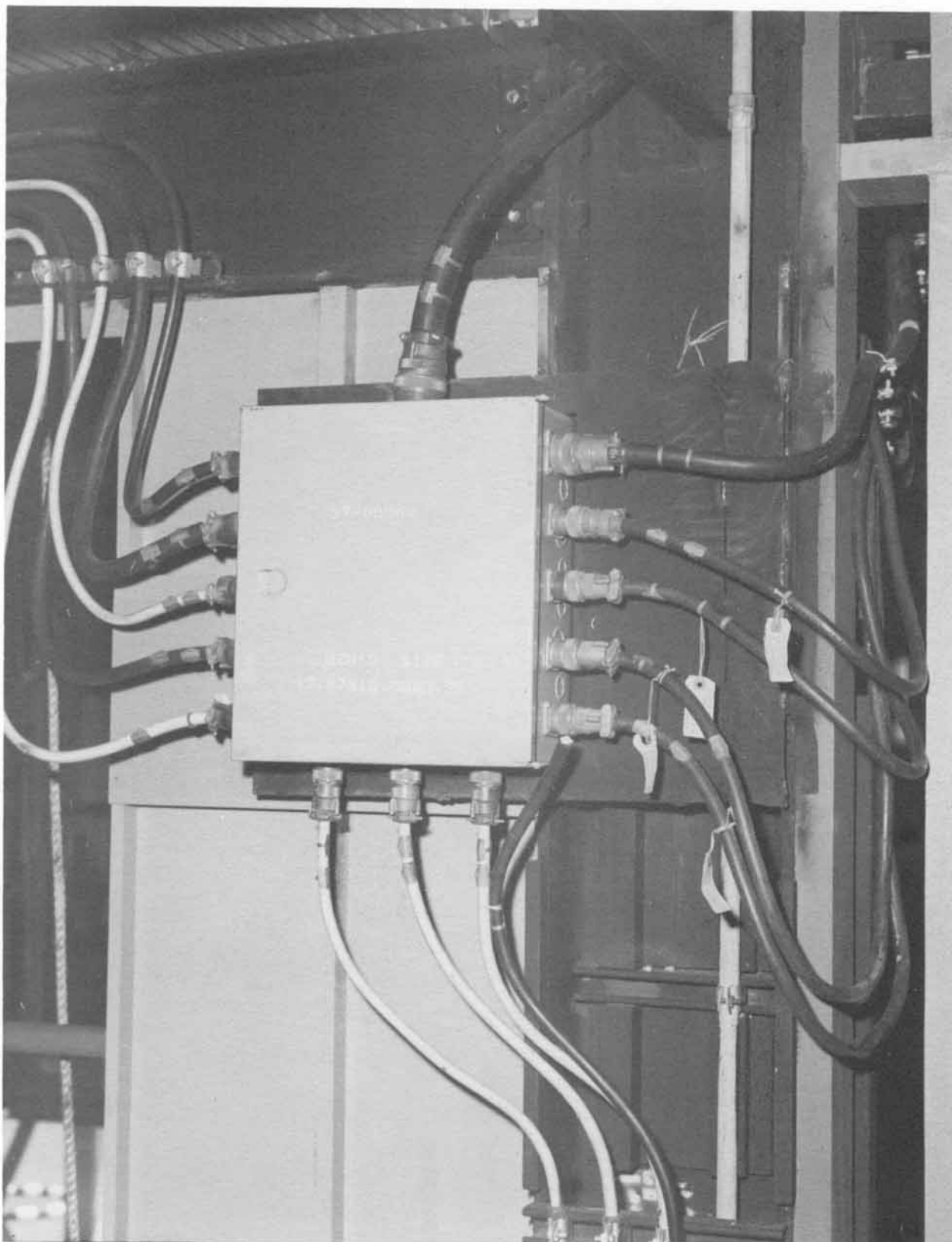
J Box 27-09943 at Column K (Neg. No. 67333A dated 4-14-61).



Cable routing, Column K to J (Neg. No. 67334A dated 4-14-61).

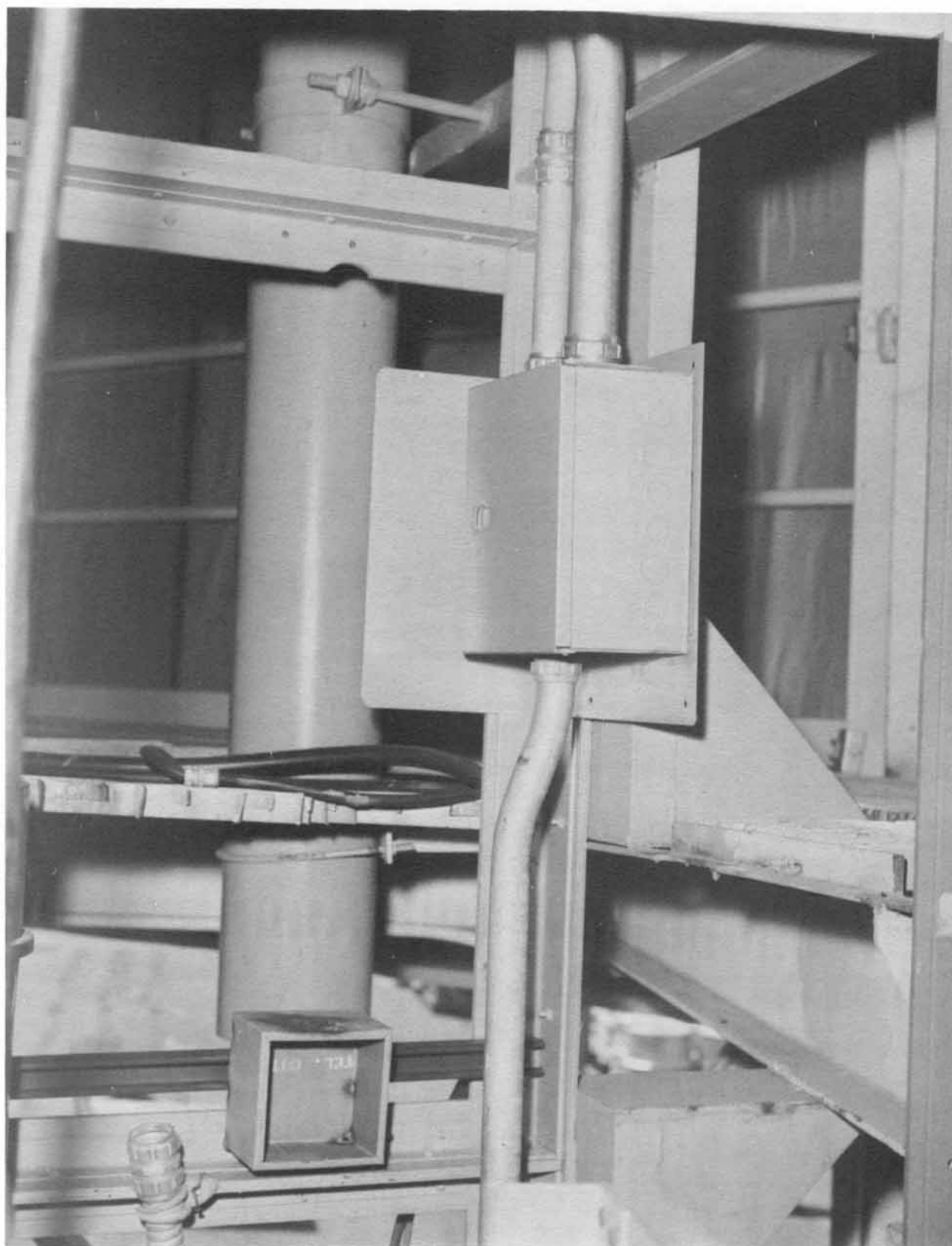


AIG pod handling and conduit (Neg. No. 67335A dated 4-14-61).

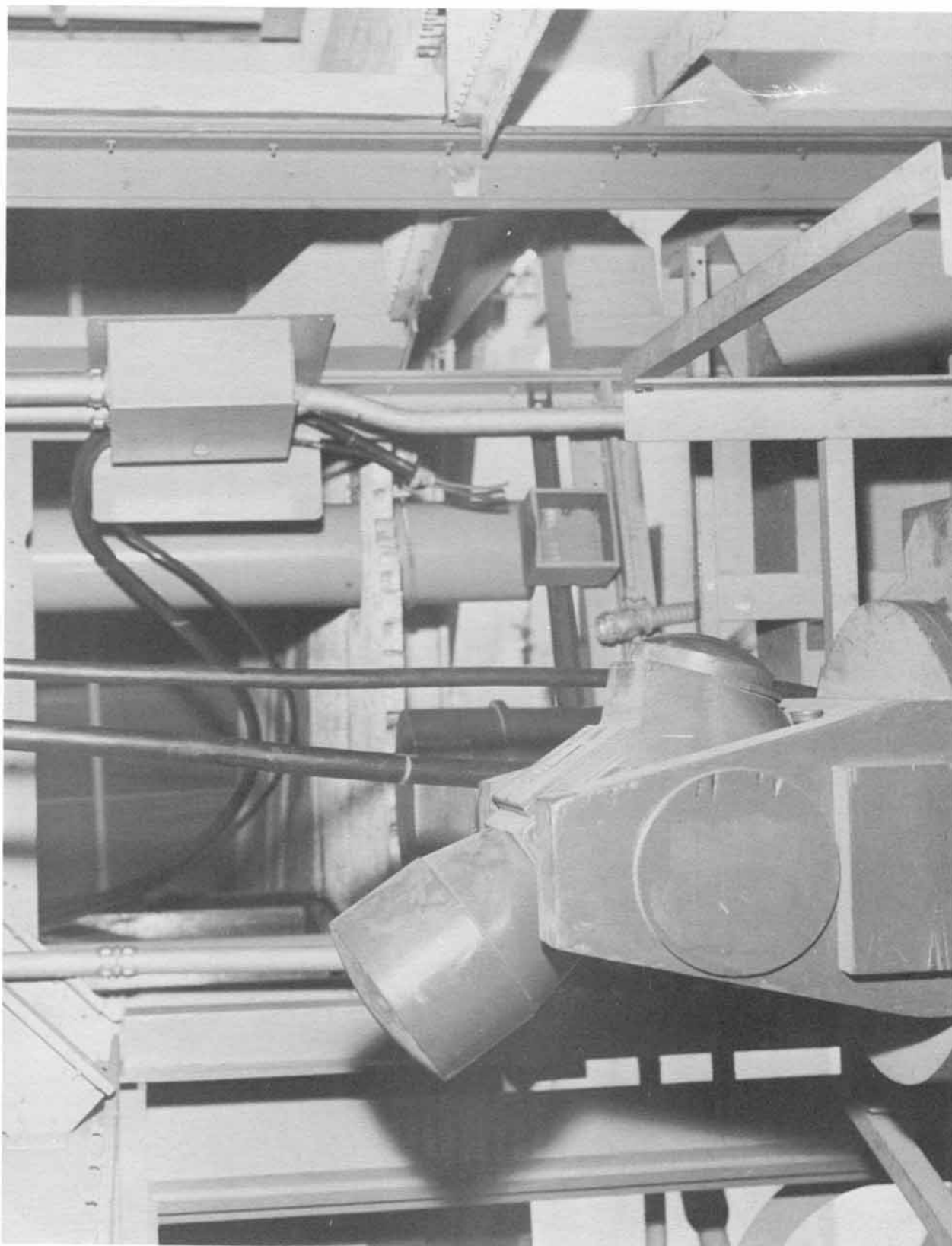


J Box 27-09944 at Column K (Neg. No. 67336A dated 4-14-61).

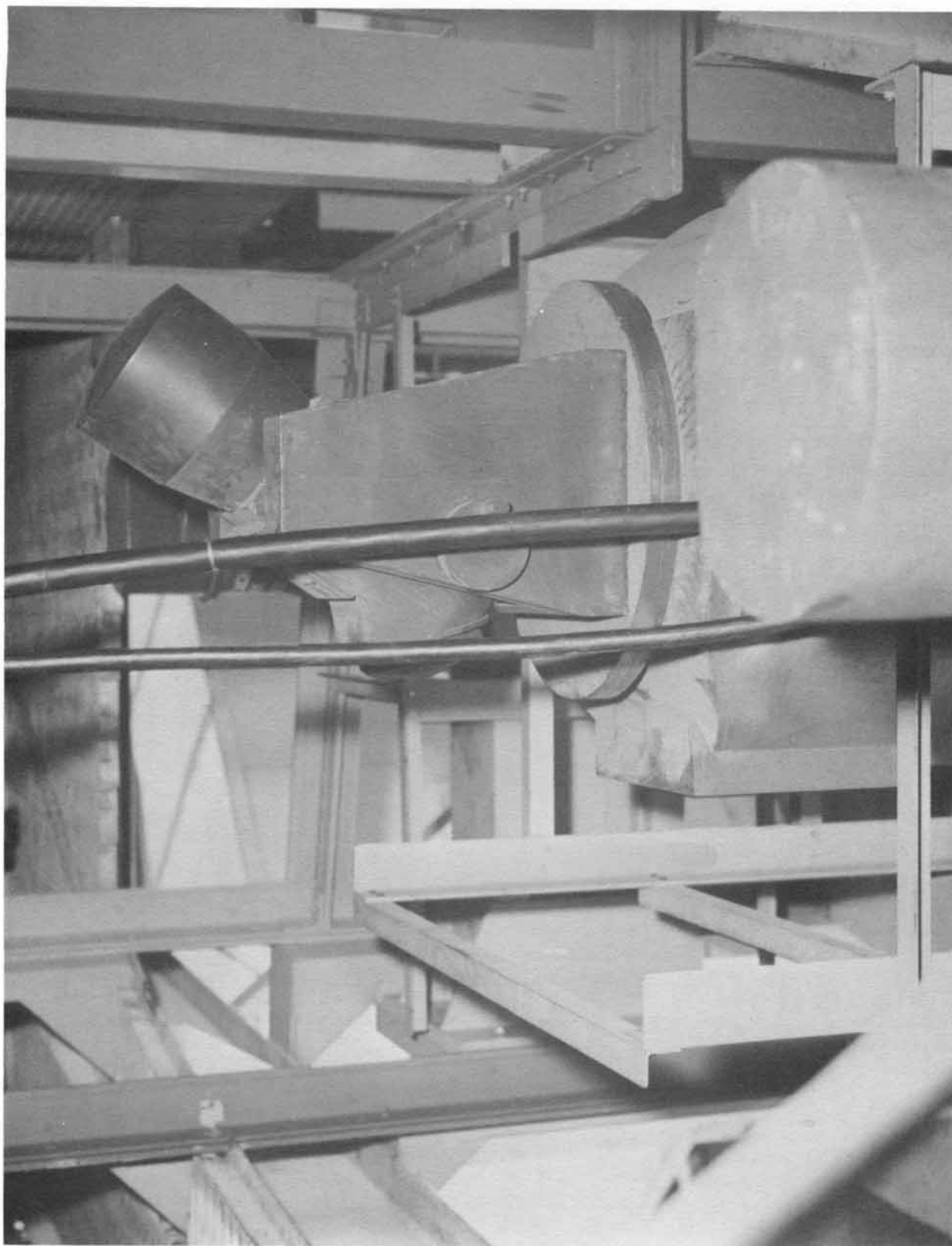




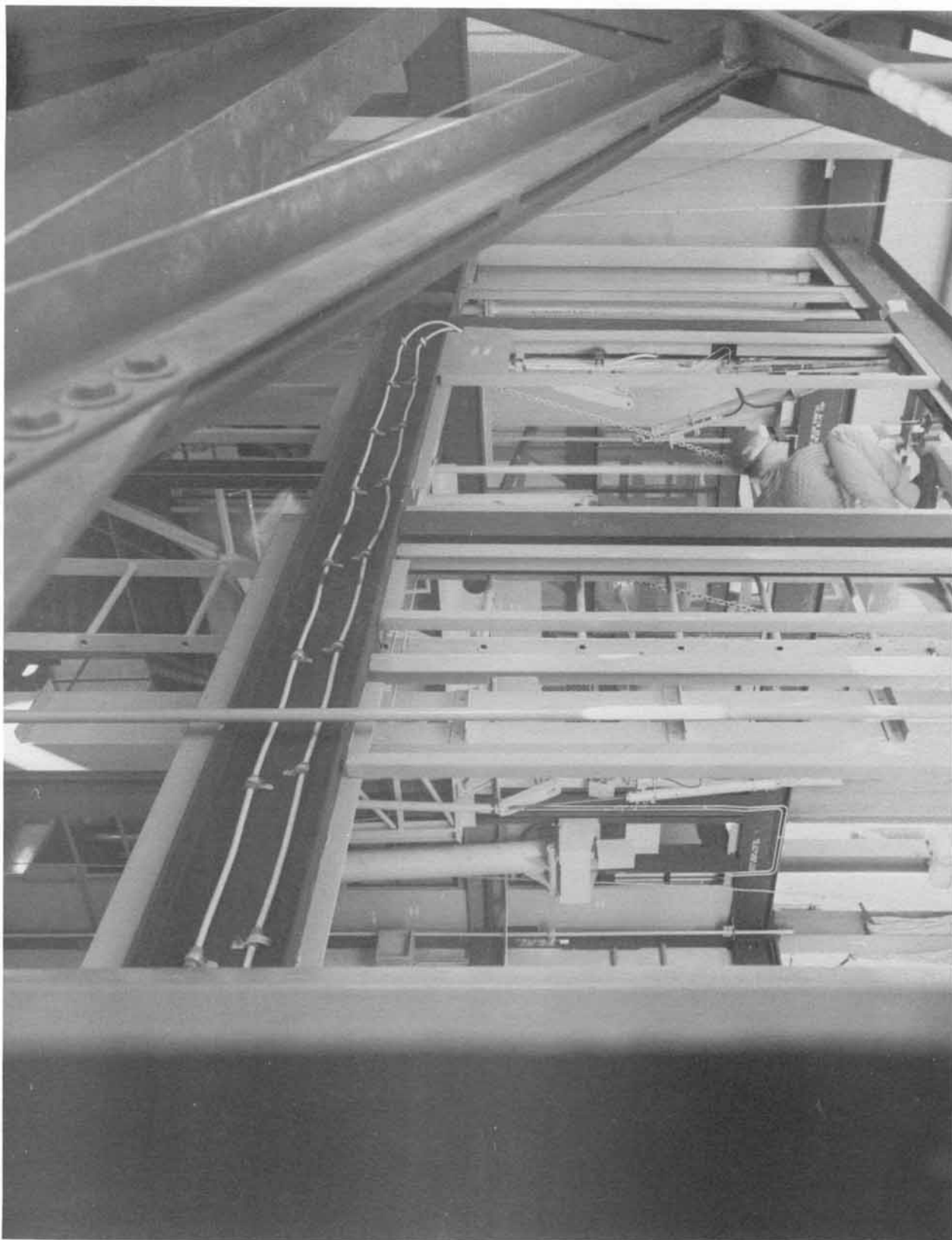
Collimator J Box (Neg. No. 67356A dated 4-14-61).



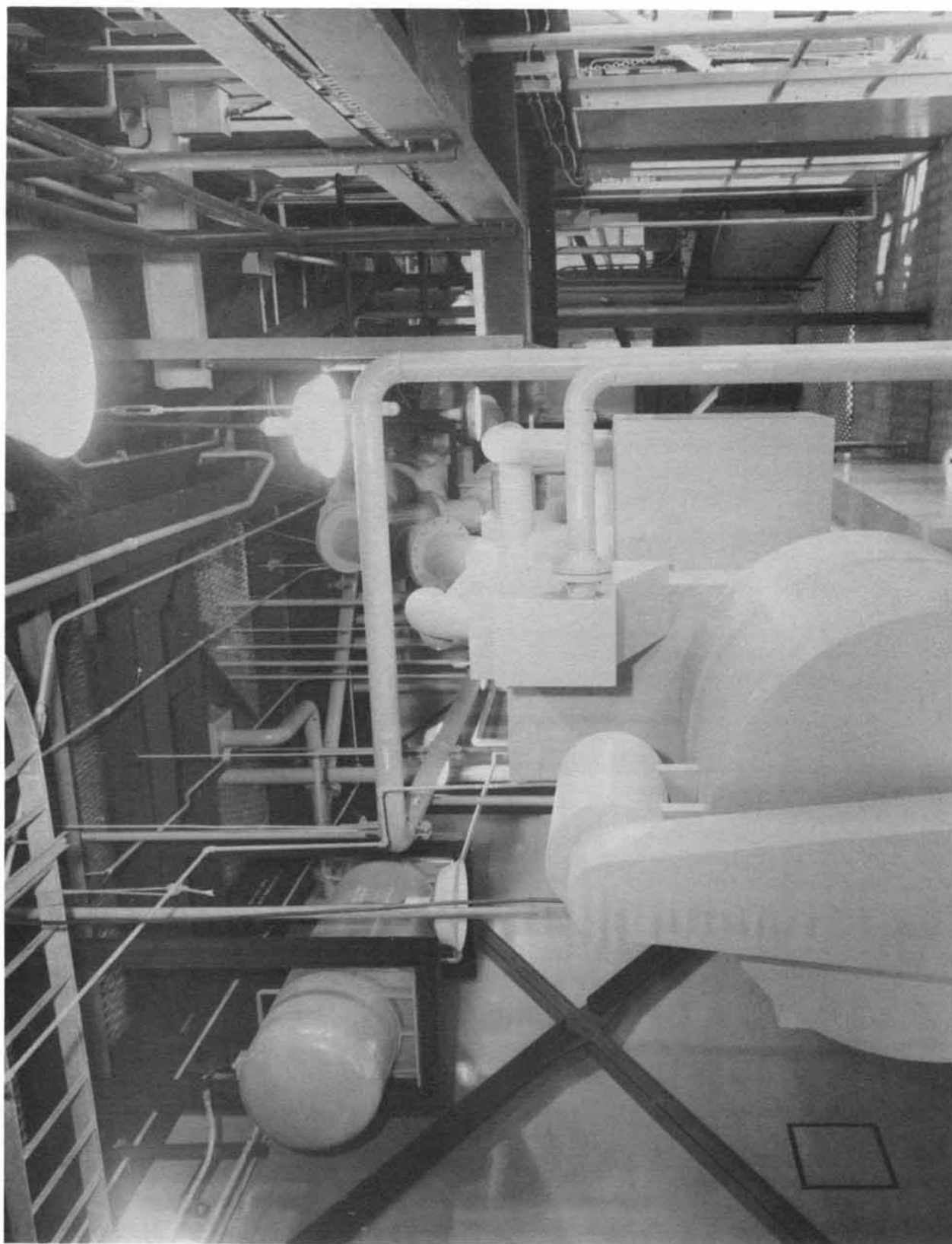
Collimator equipment, looking west (Neg. No. 67357A dated 4-14-61).



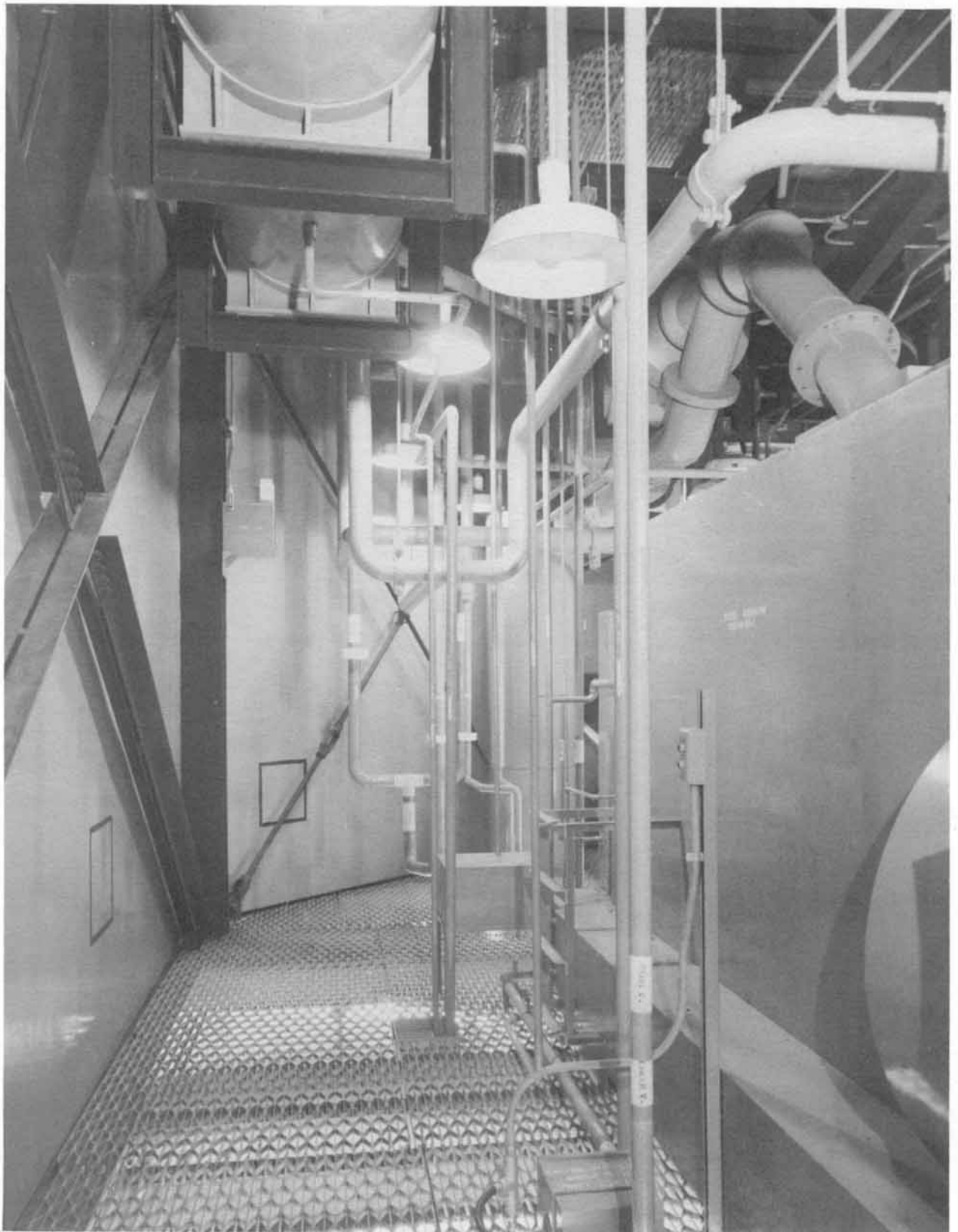
Collimator equipment, looking east (Neg. No. 67358A dated 4-14-61).



Looking north from Column D at missile enclosure panels (Neg. No. 68070A dated 4-27-61).

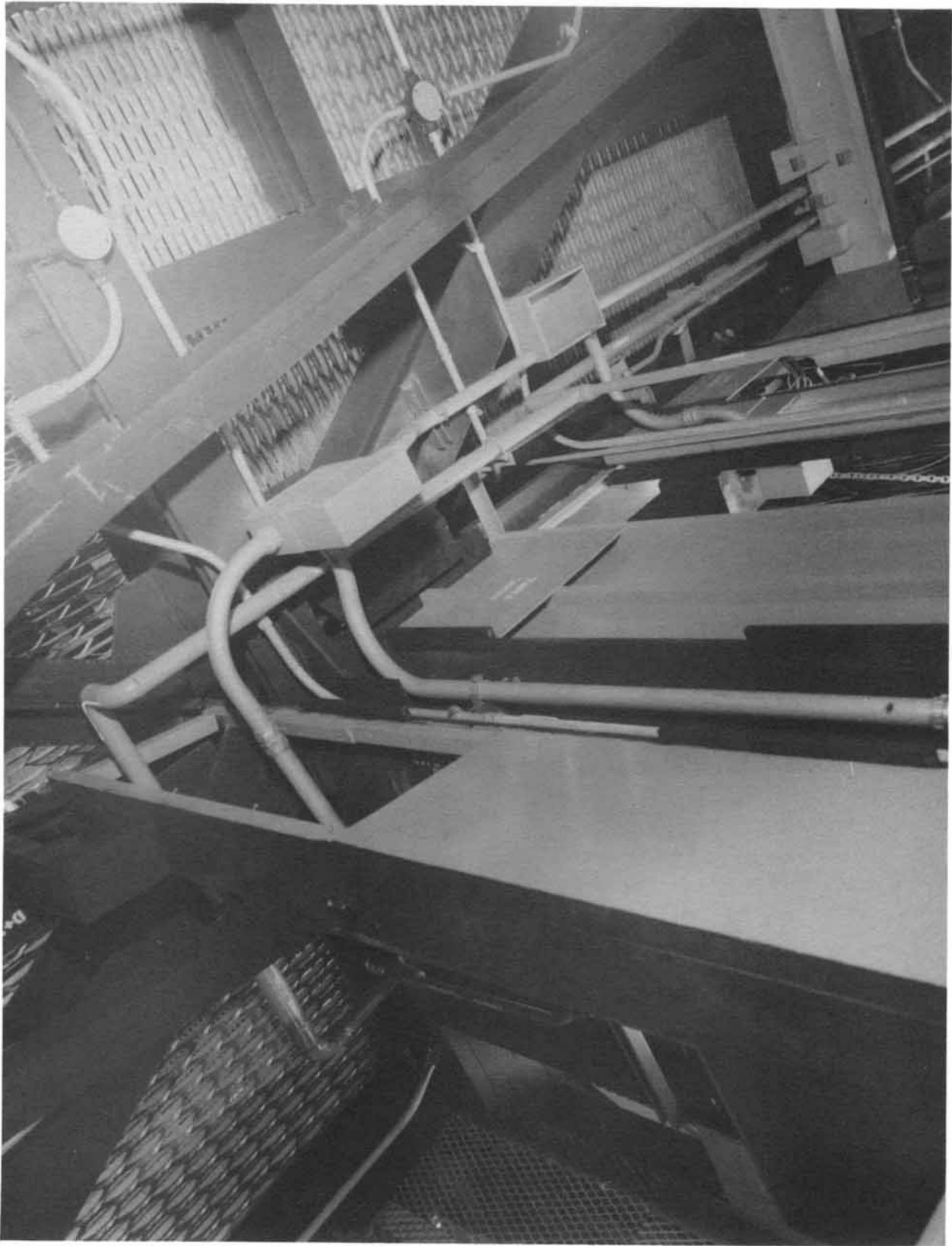


Looking north from Column D (Neg. No. 68071A dated 4-27-61).

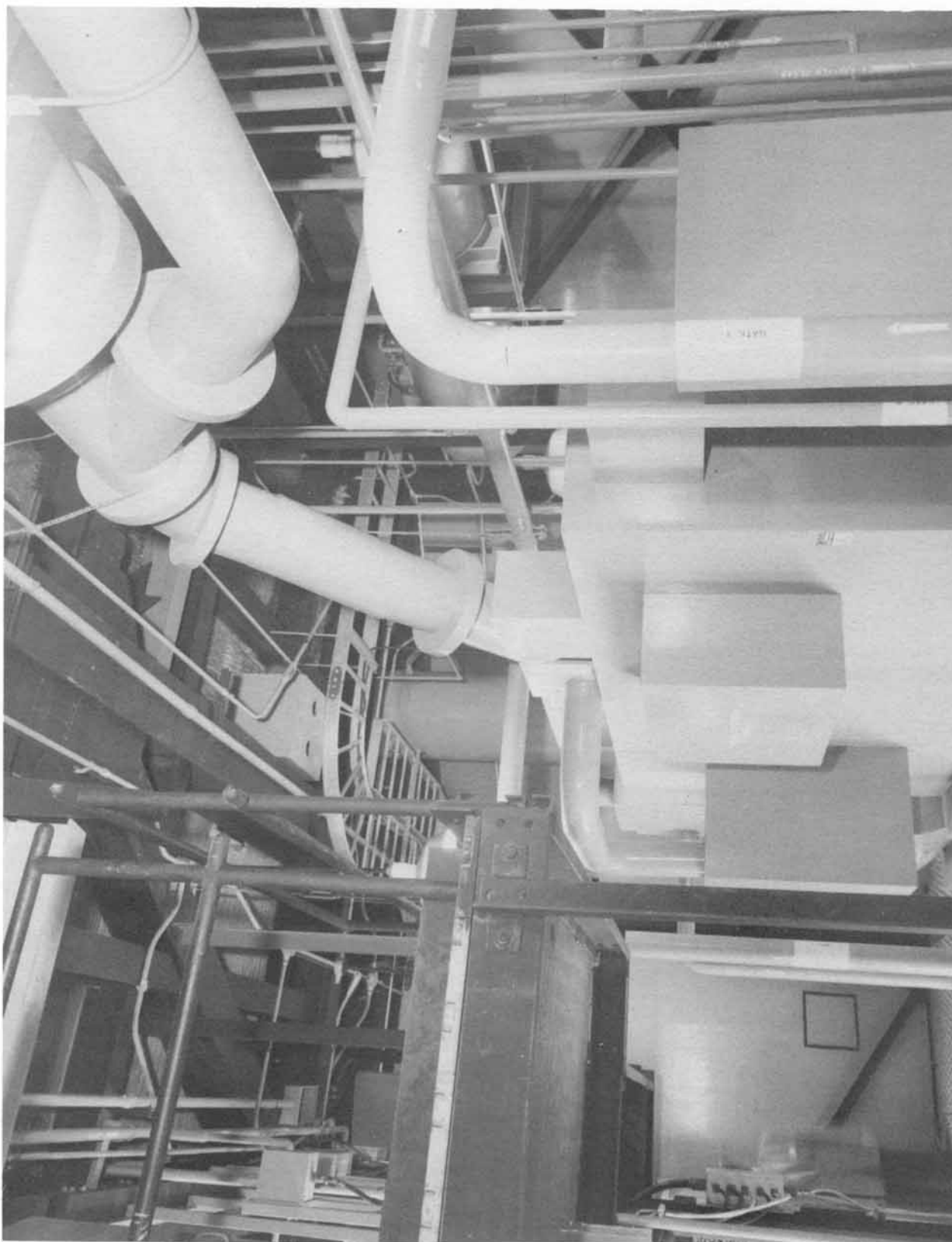


Looking north from Column E to Column F (Neg. No. 68072A dated 4-27-61).

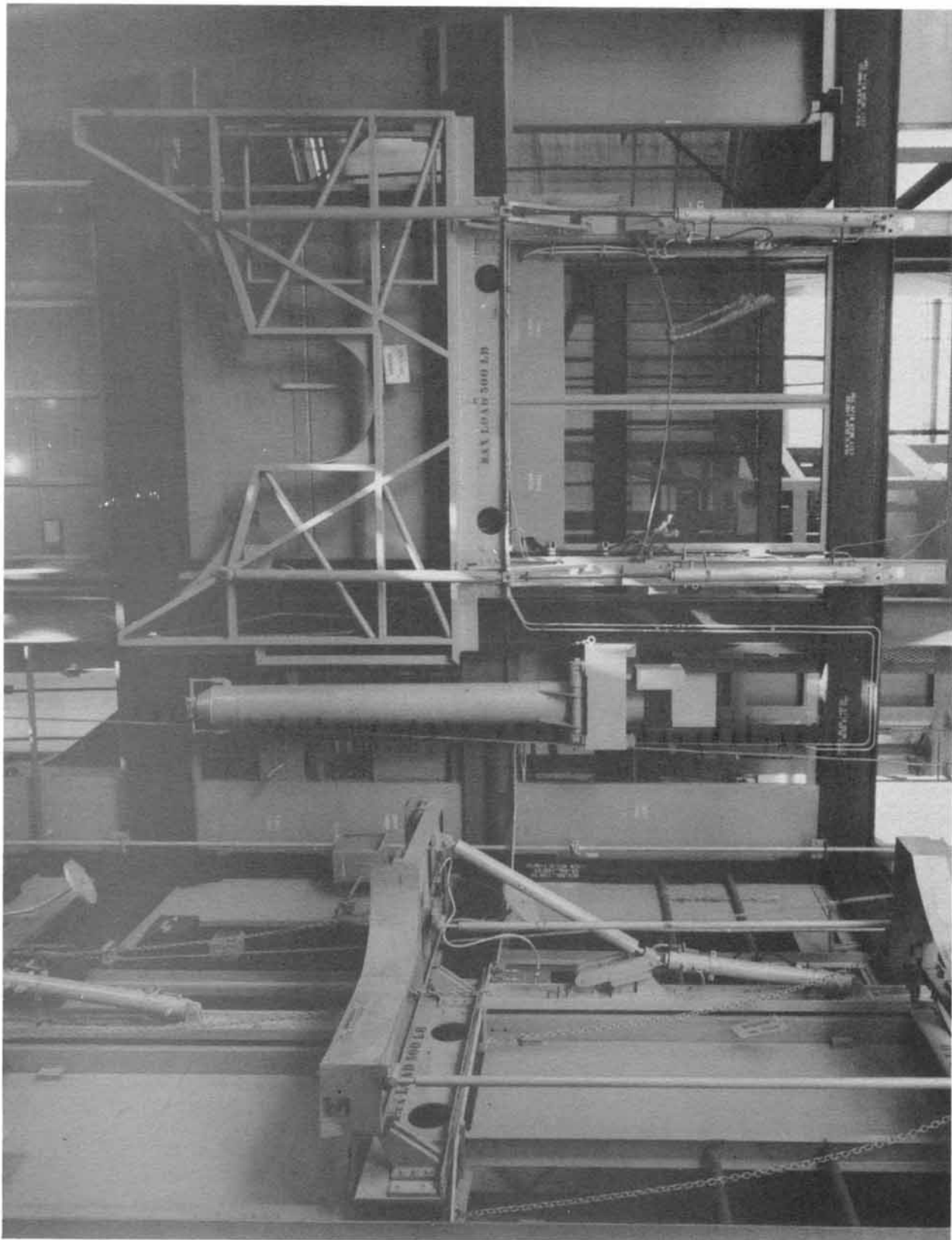




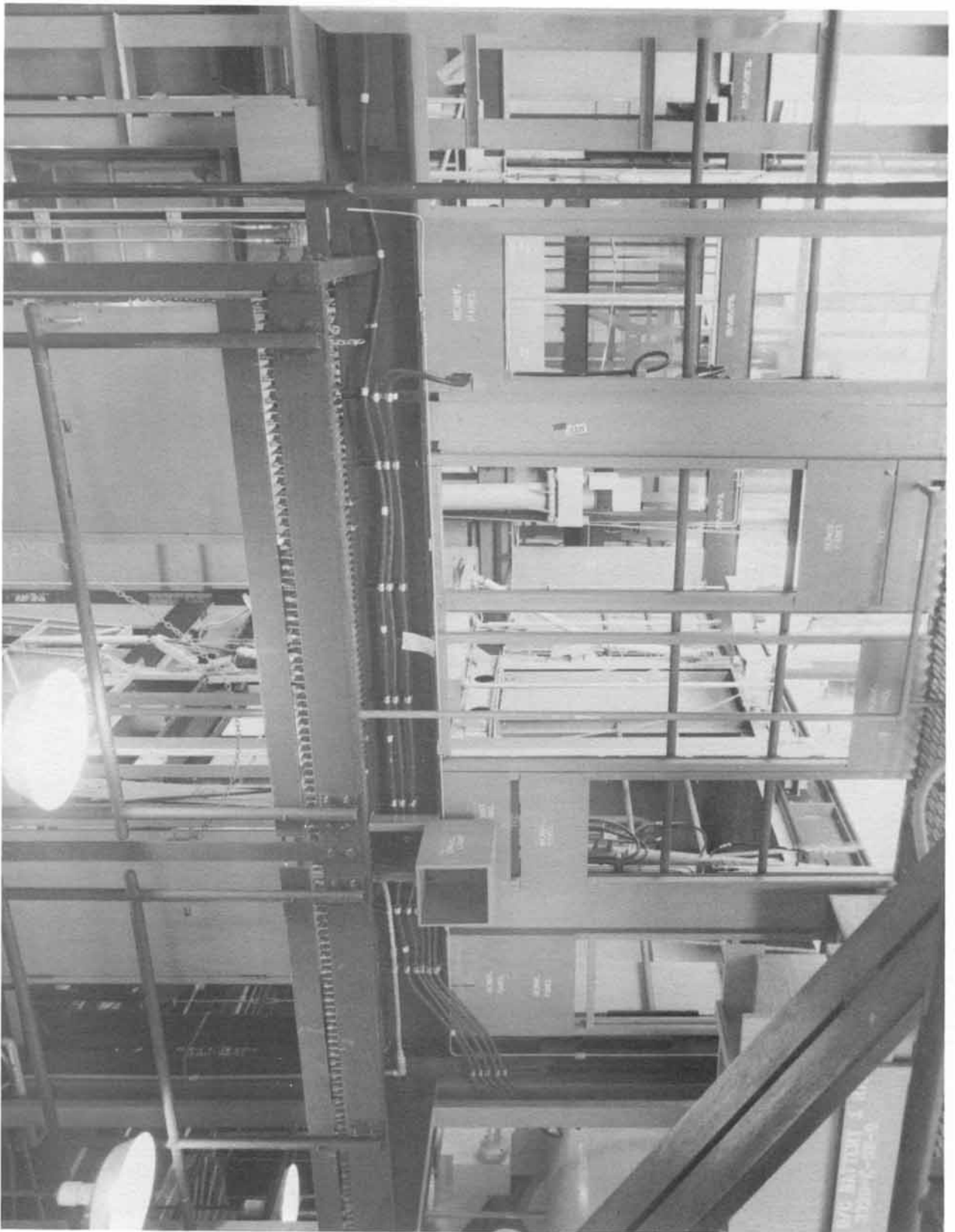
Looking up from Column J (Neg. No. 68073A dated 4-27-61).



Looking south from Column J toward Column E (Neg. No. 68074A dated 4-27-61).



Looking north across missile enclosure (Neg. No. 68075A dated 4-27-61).

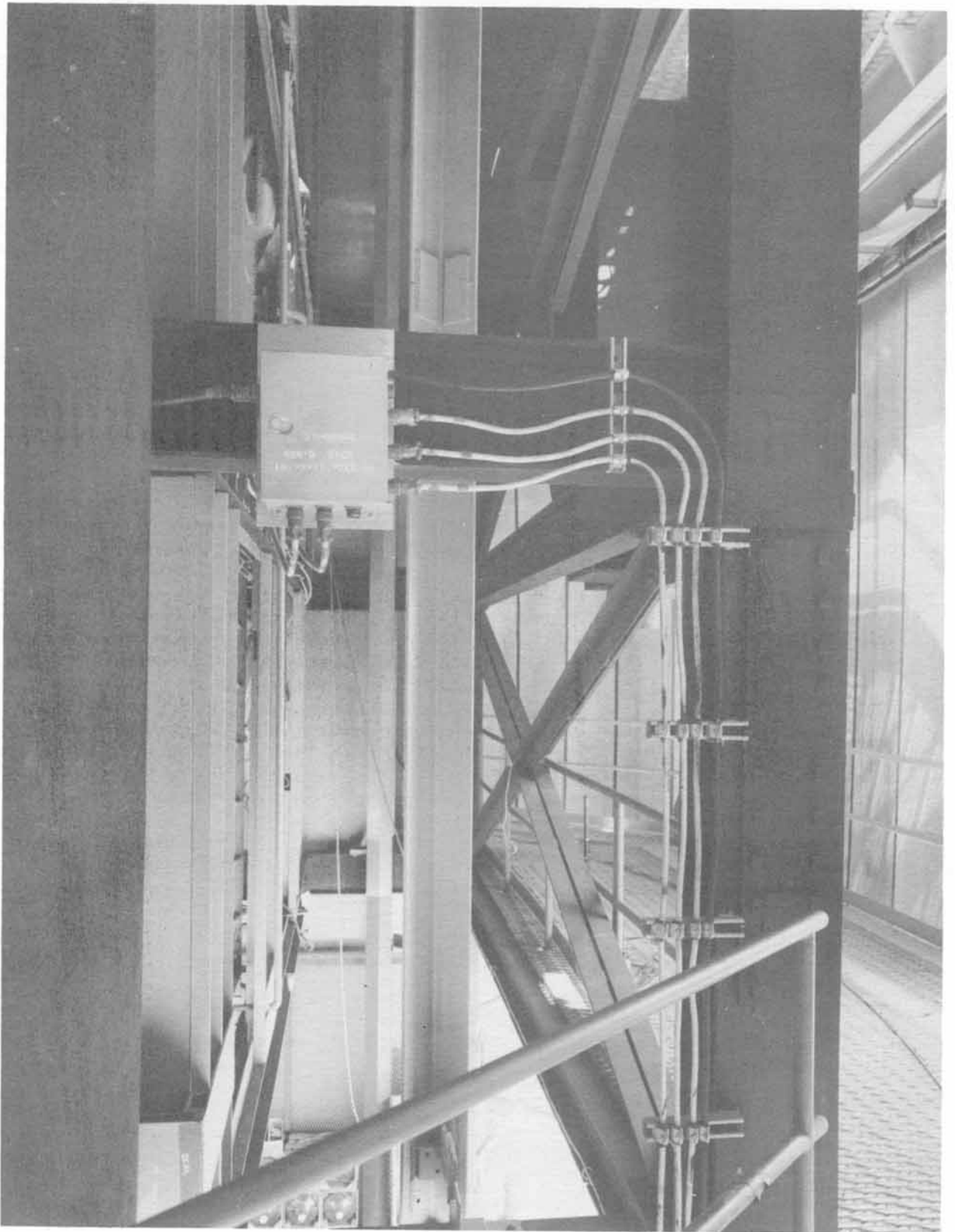


Looking north from Column C (Neg. No. 68076A dated 4-27-61).



Looking up and west from near Column D (Neg. No. 68077A dated 4-27-61).

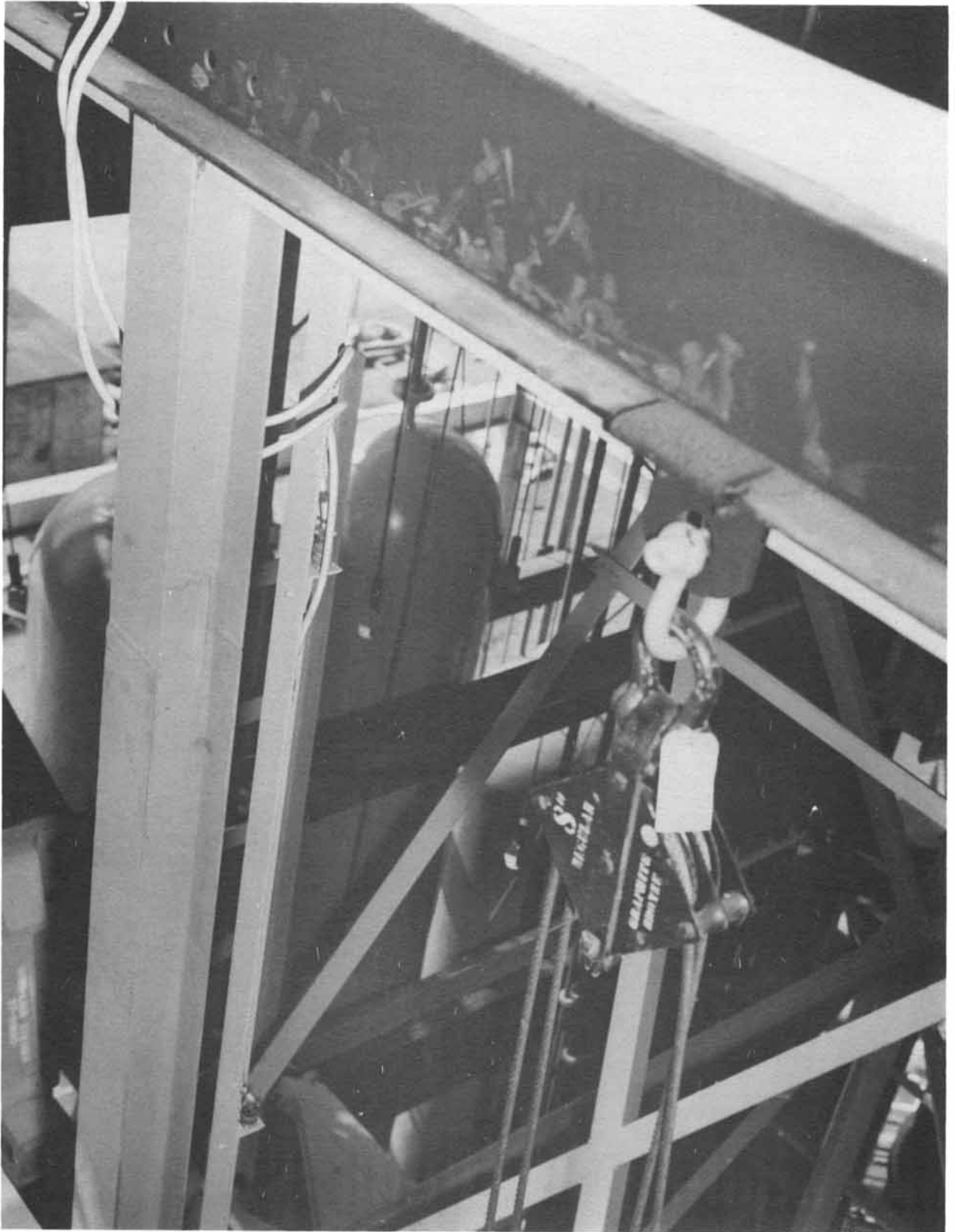




J Box 27-09945 at Column B (Neg. No. 68078A dated 4-27-61).



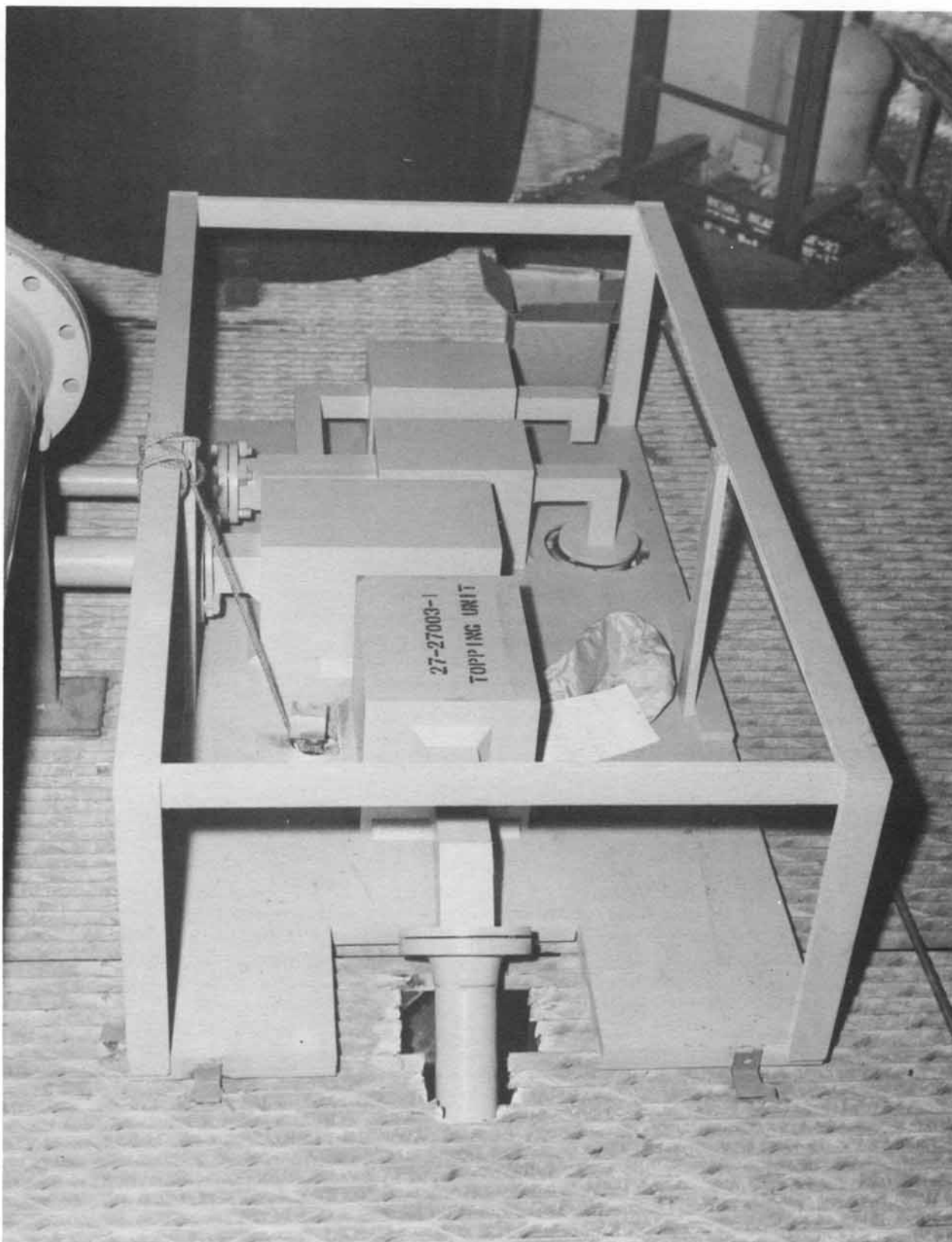
LEVEL 7



Cables and guide rail switches, east side (Neg. No. 55997A dated 9-29-60).



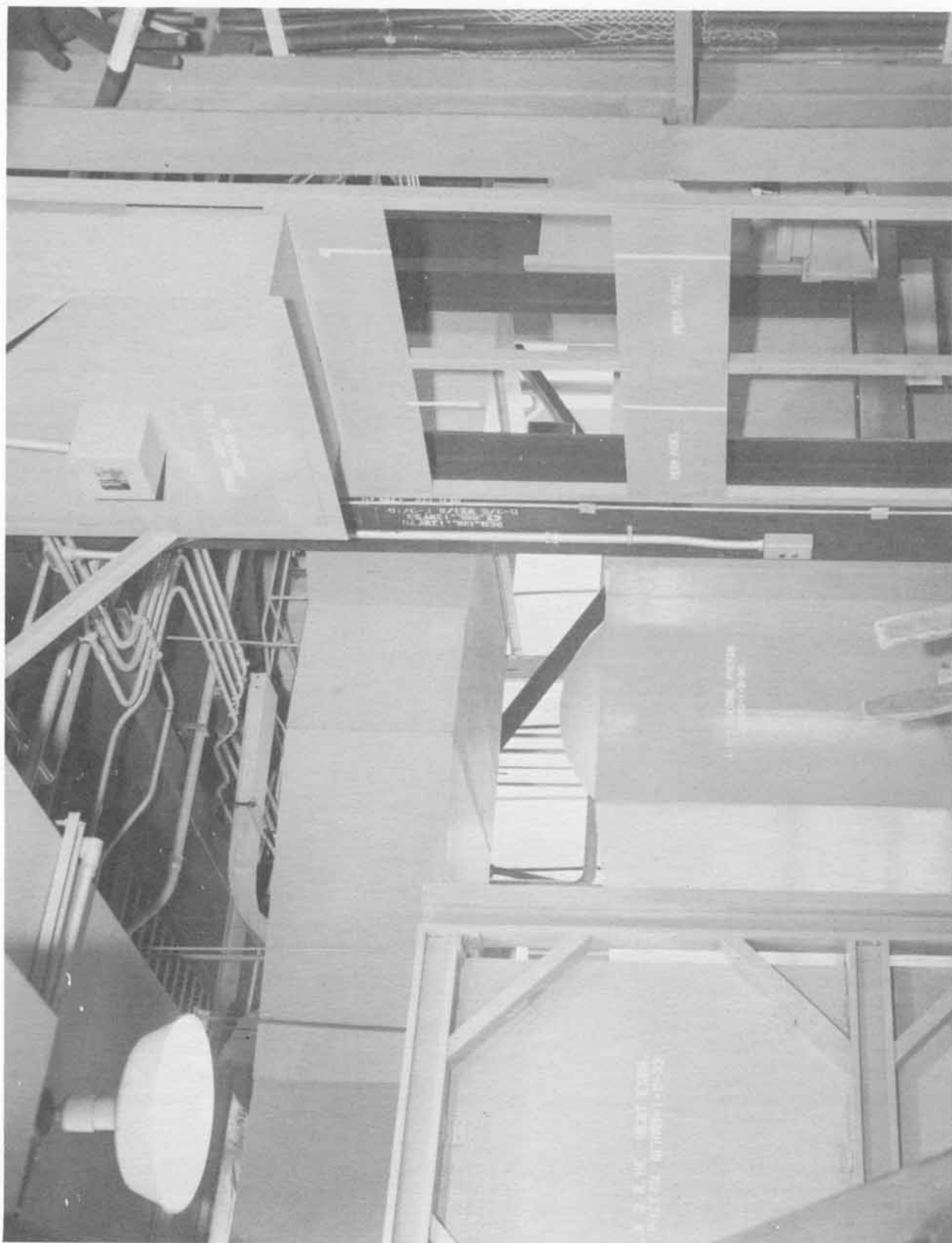
Guide rail cables, west side (Neg. No. 67361A dated 4-14-61).



LO<sub>2</sub> topping unit (Neg. No. 67362A dated 4-14-61).

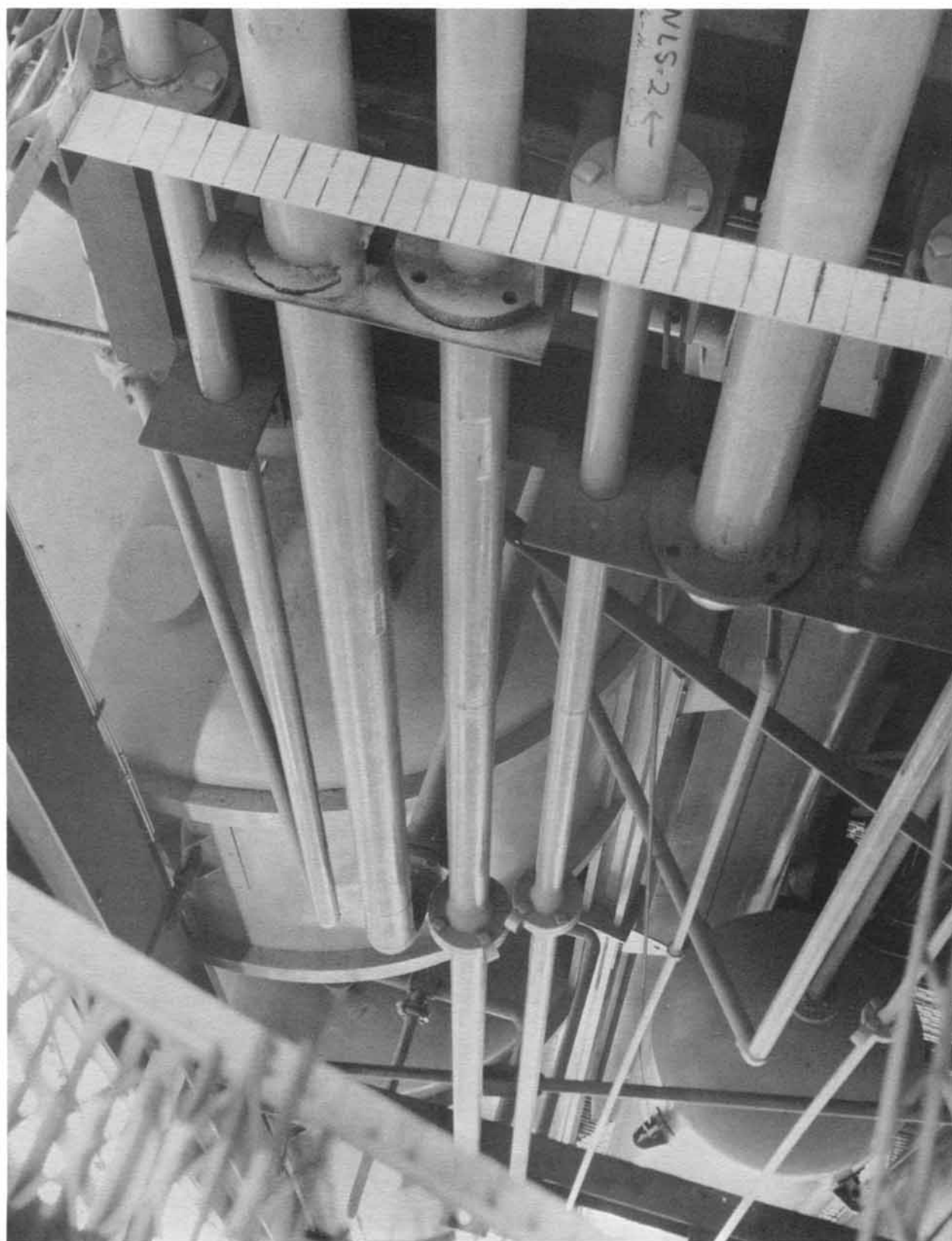


Looking from east side to west side (Neg. No. 68038A dated 4-26-61).

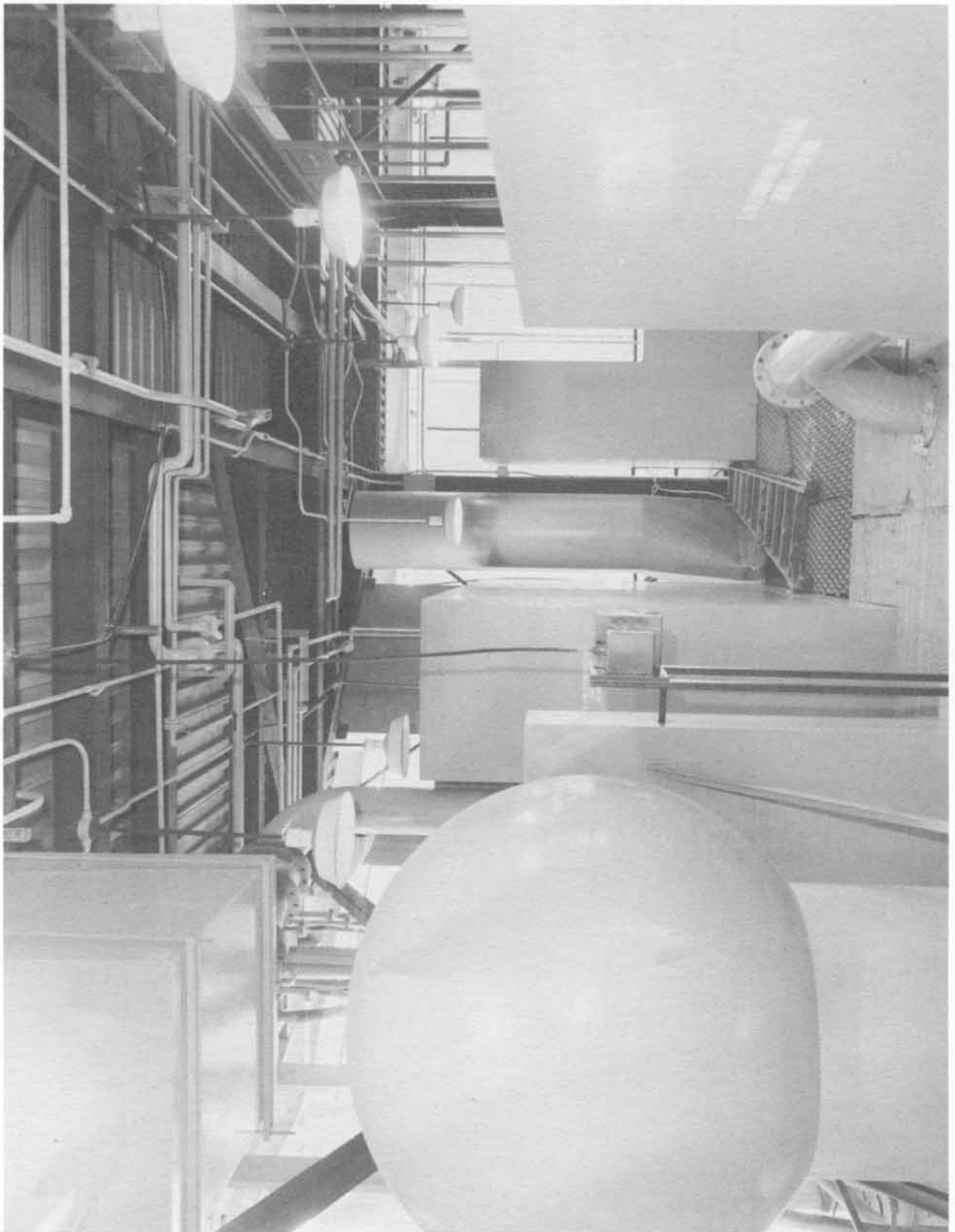


Looking from Column C toward Column K (Neg. No. 68040A dated 4-26-61).

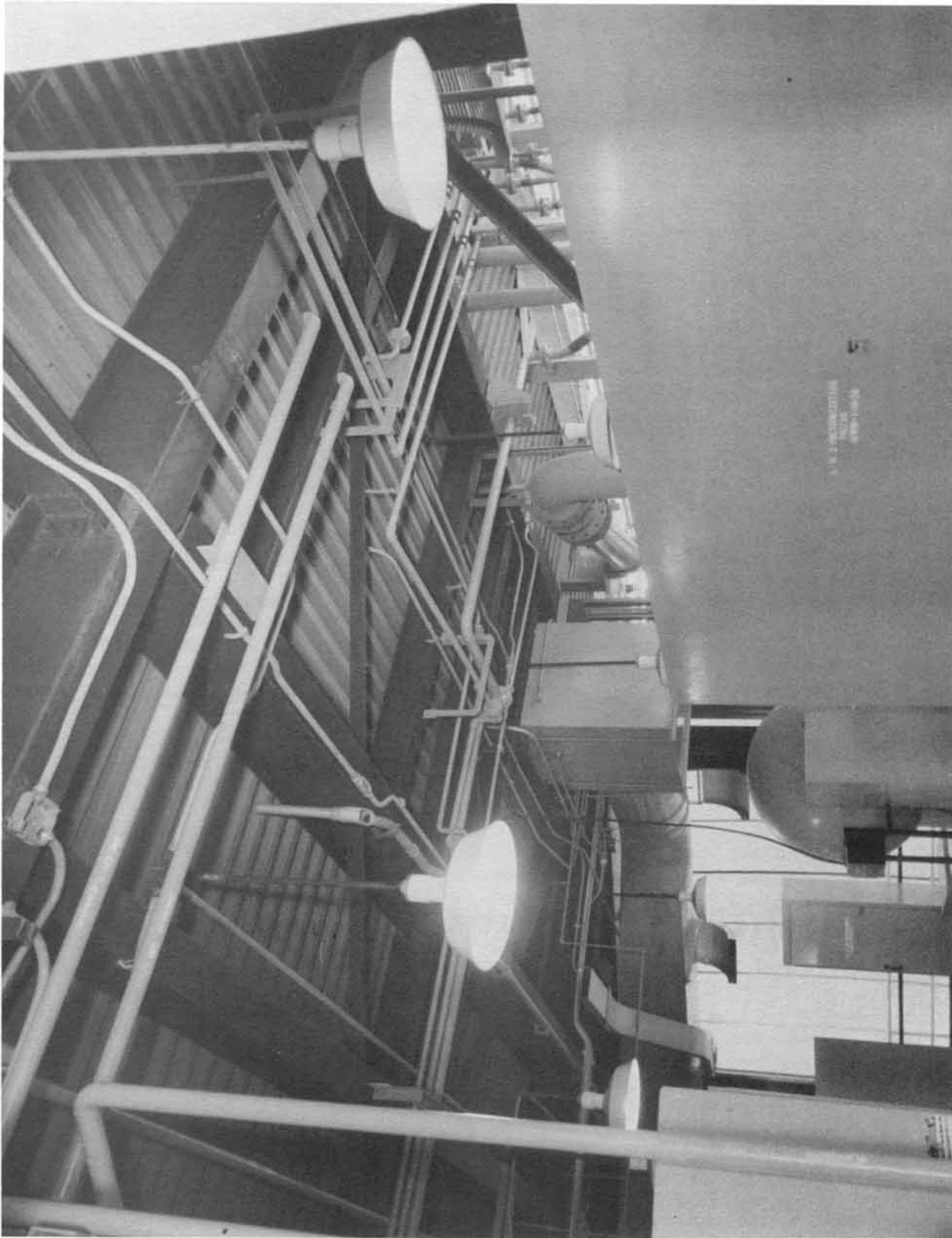




Looking down at HE and LN<sub>2</sub> lines, south side (Neg. No. 68041A dated 4-26-61).

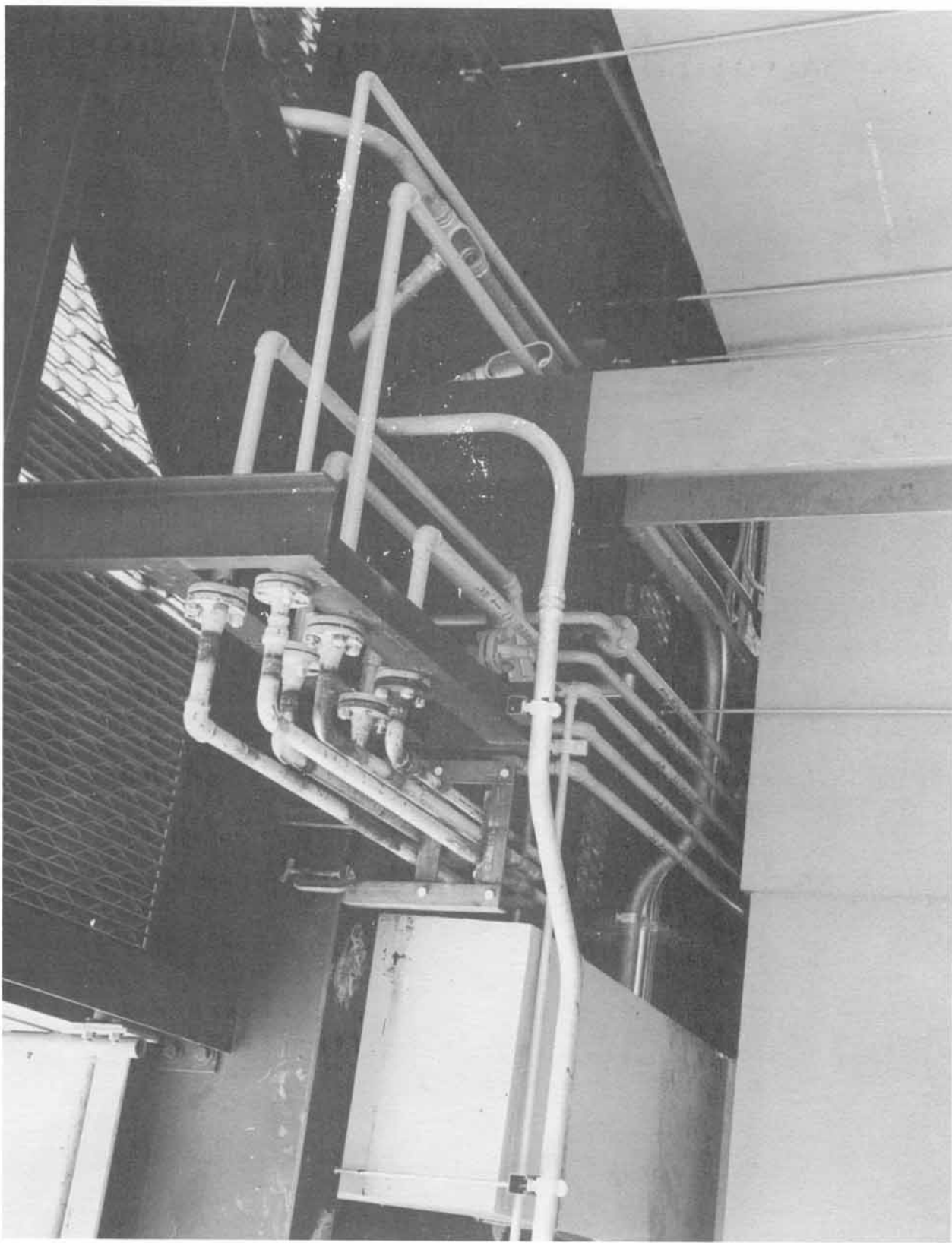


Looking from Column D toward Column F - J (Neg. No. 68042A dated 4-26-61).

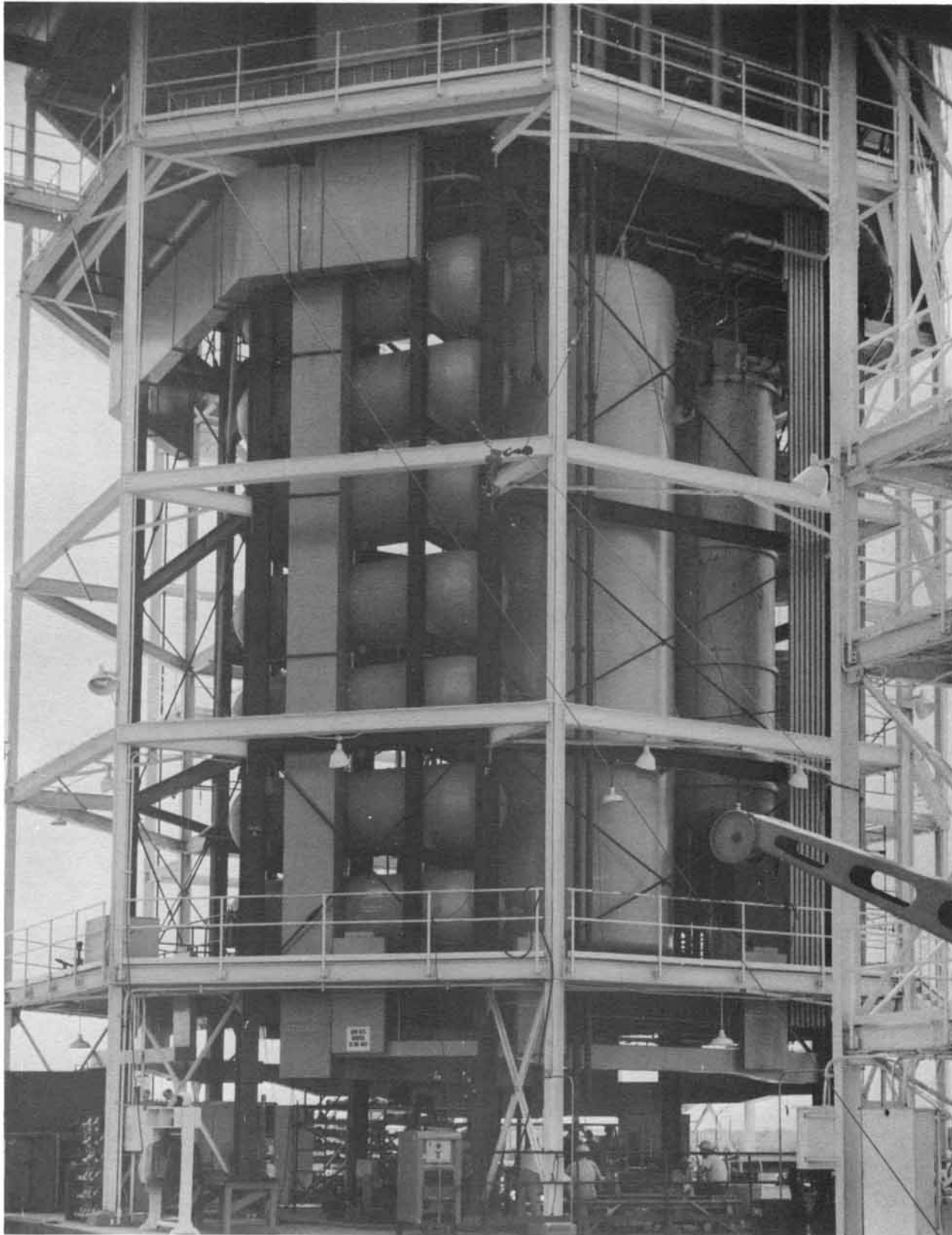


Looking from Column G toward Column E - K (Neg. No. 68043A dated 4-26-61).



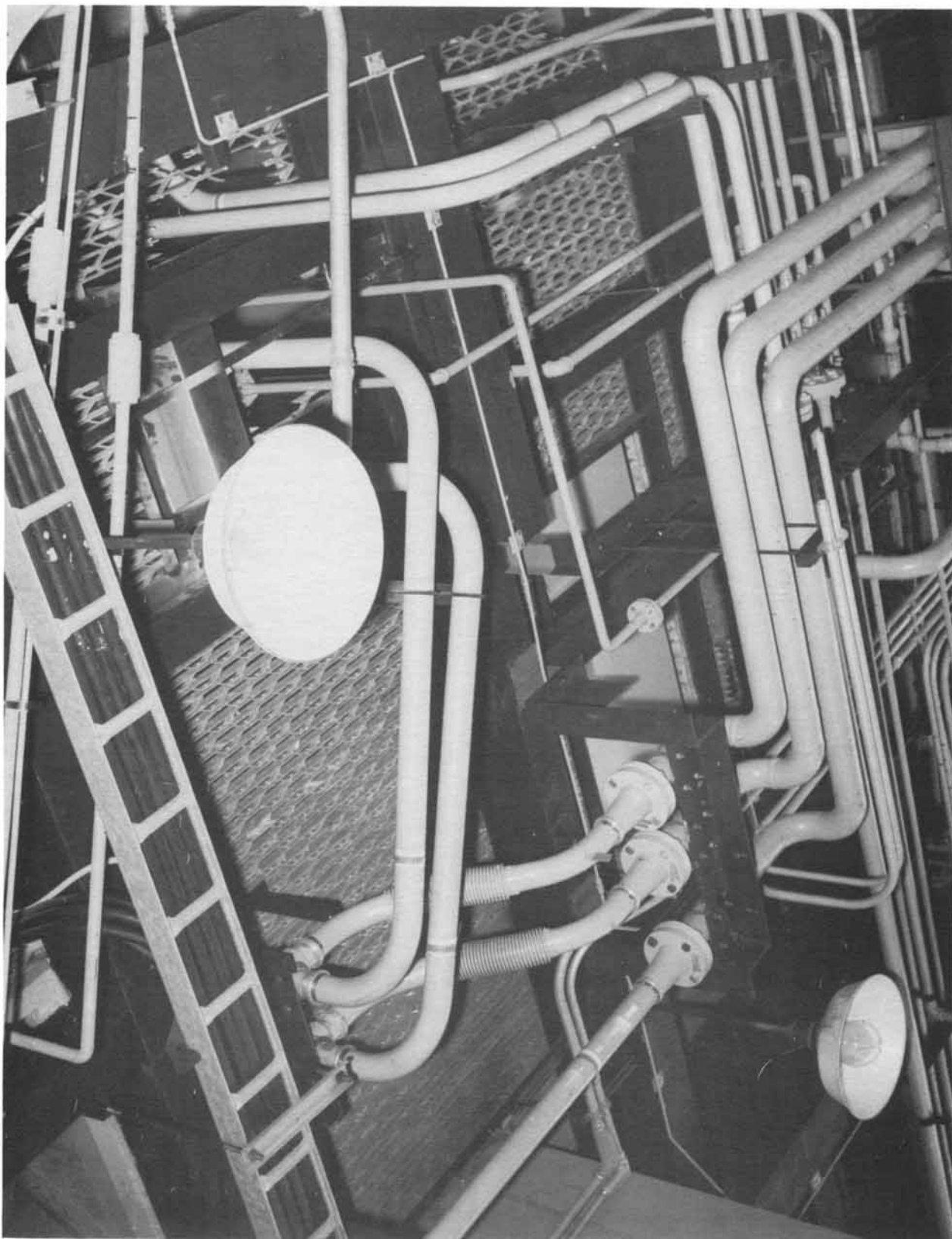


Silo floor FAC GSE, interface Quad 2 (Neg. No. 53914A dated 8-16-60).

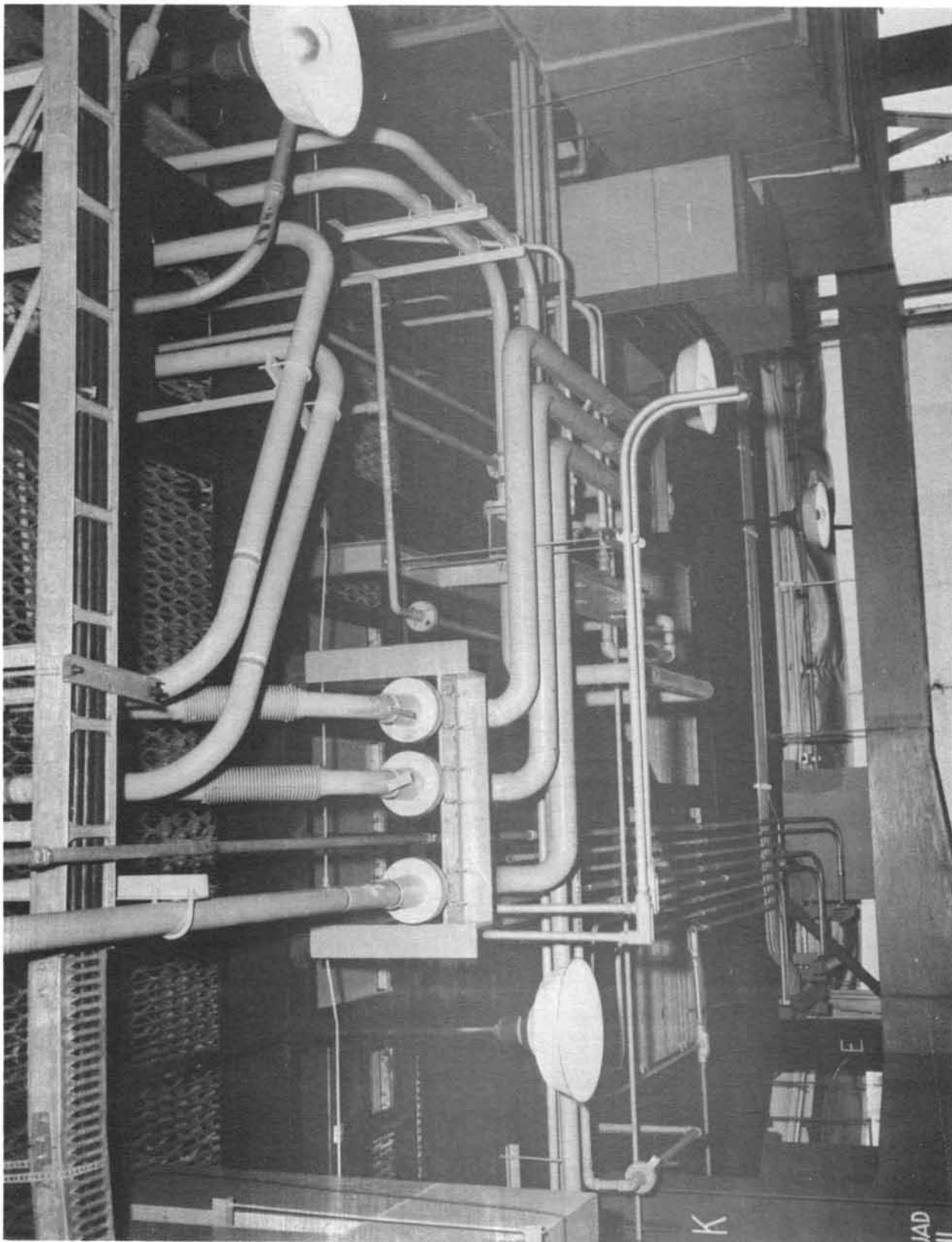


Tank farm from ground (Neg. No. 53923A dated 8-16-60).

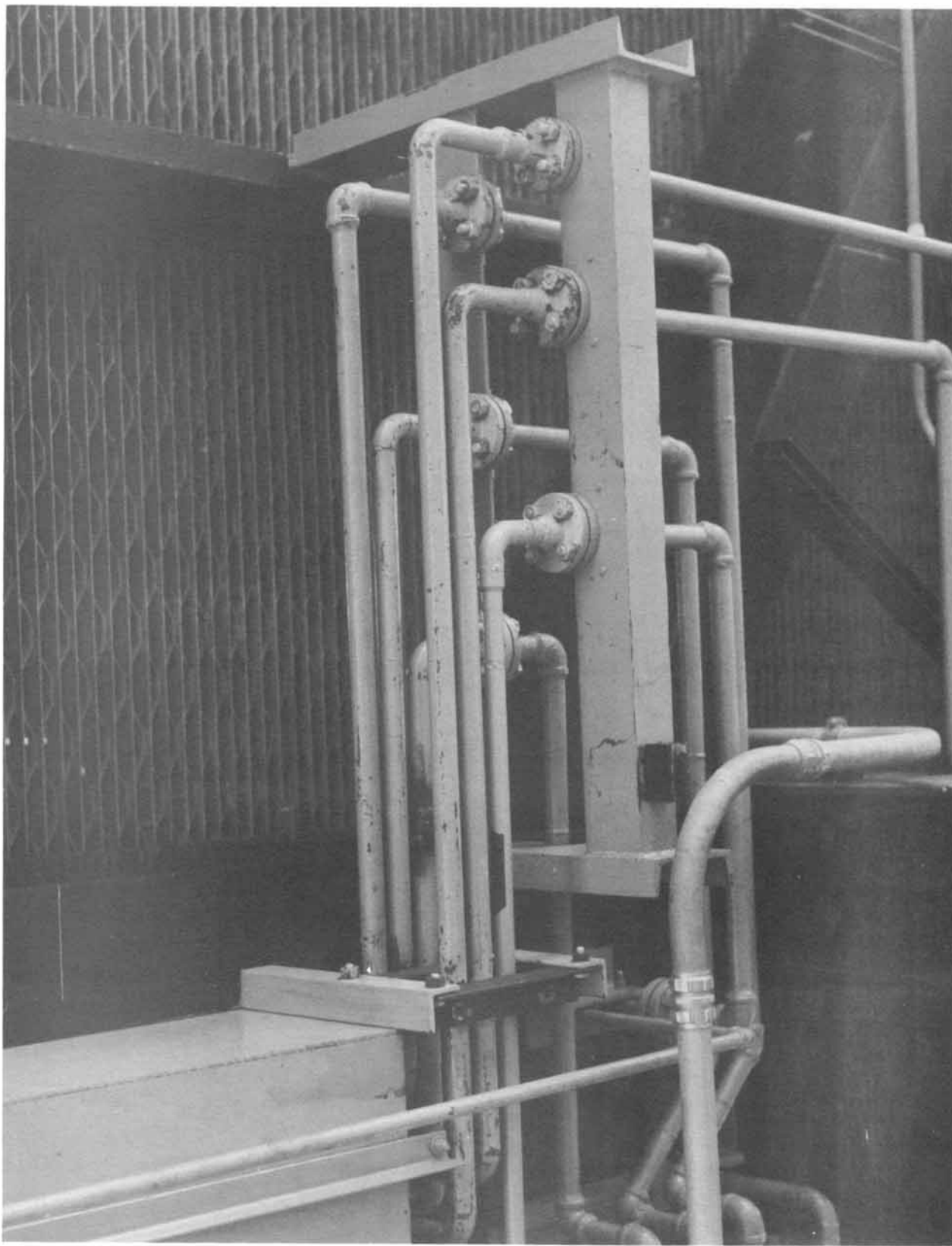




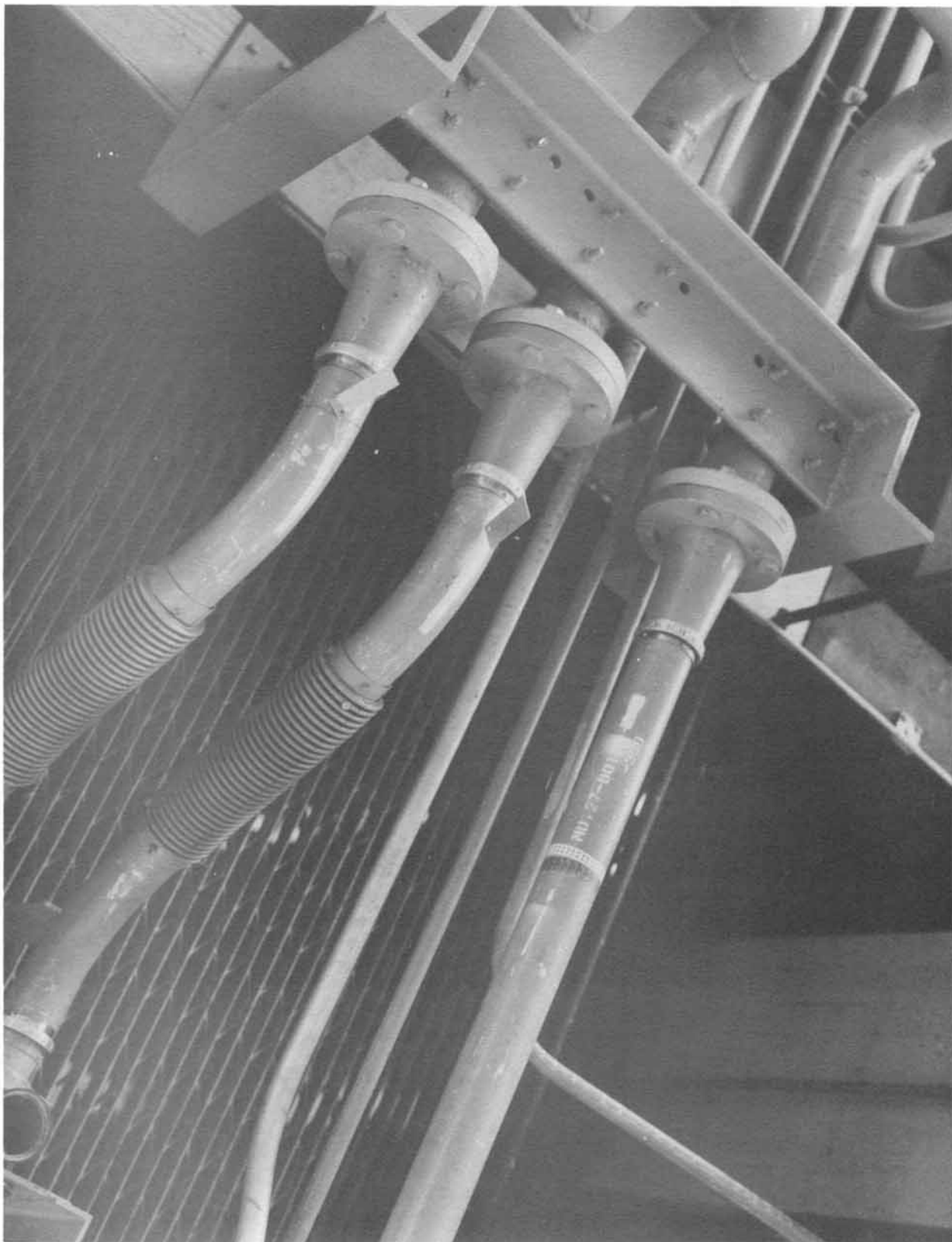
Silo floor FAC GSE interface Quad 4 (Neg. No. 58761A dated 11-15-60).



Below Level 8, AGE facility interfaces (Neg. No. 63314A dated 1-27-61).



Pressurization control unit facility interface at Column J below Level 8  
(Neg. No. 67365A dated 4-14-61).

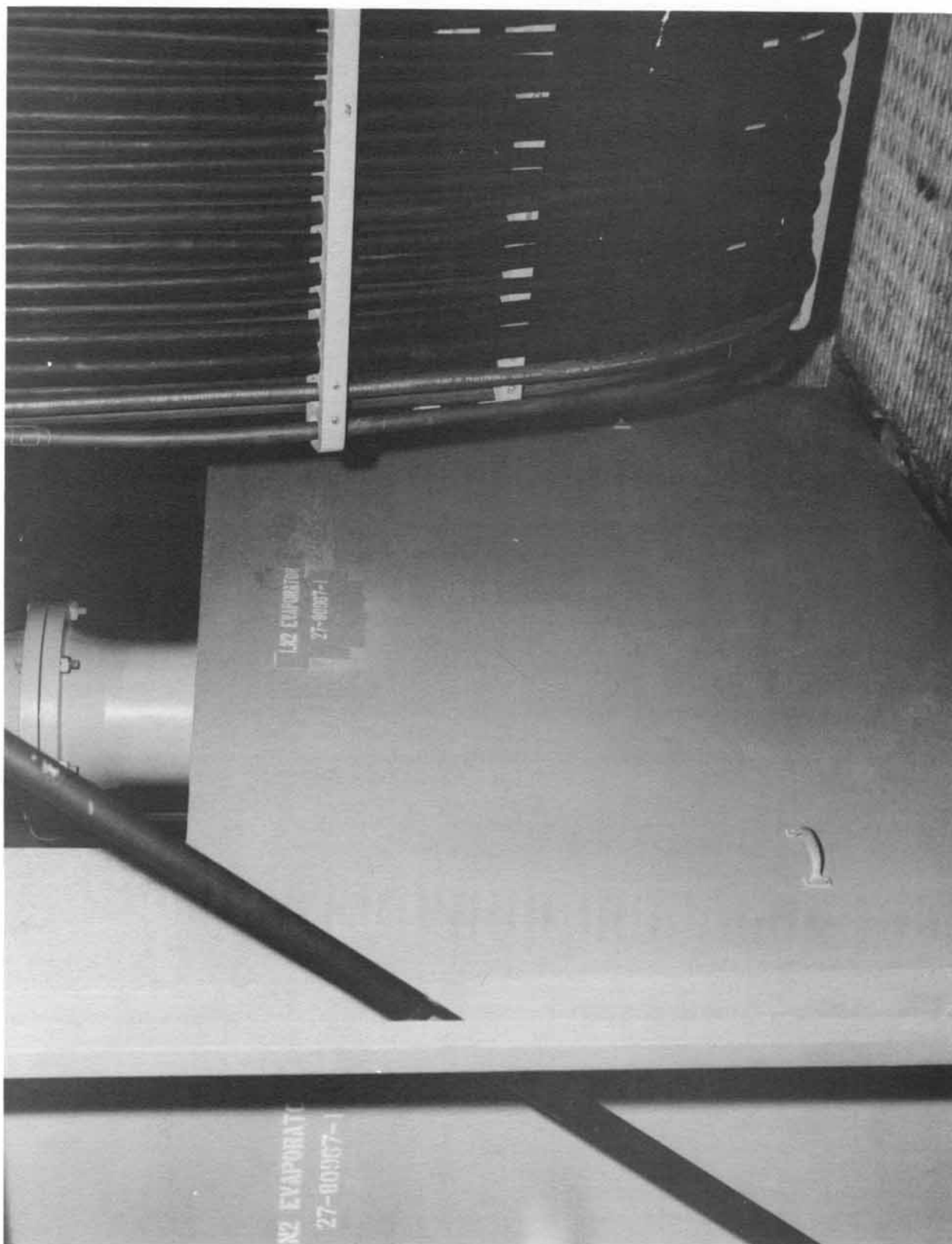


Power distribution unit facility interface Quad 3 below Level 8 (Neg. No. 67366A dated 4-14-61).



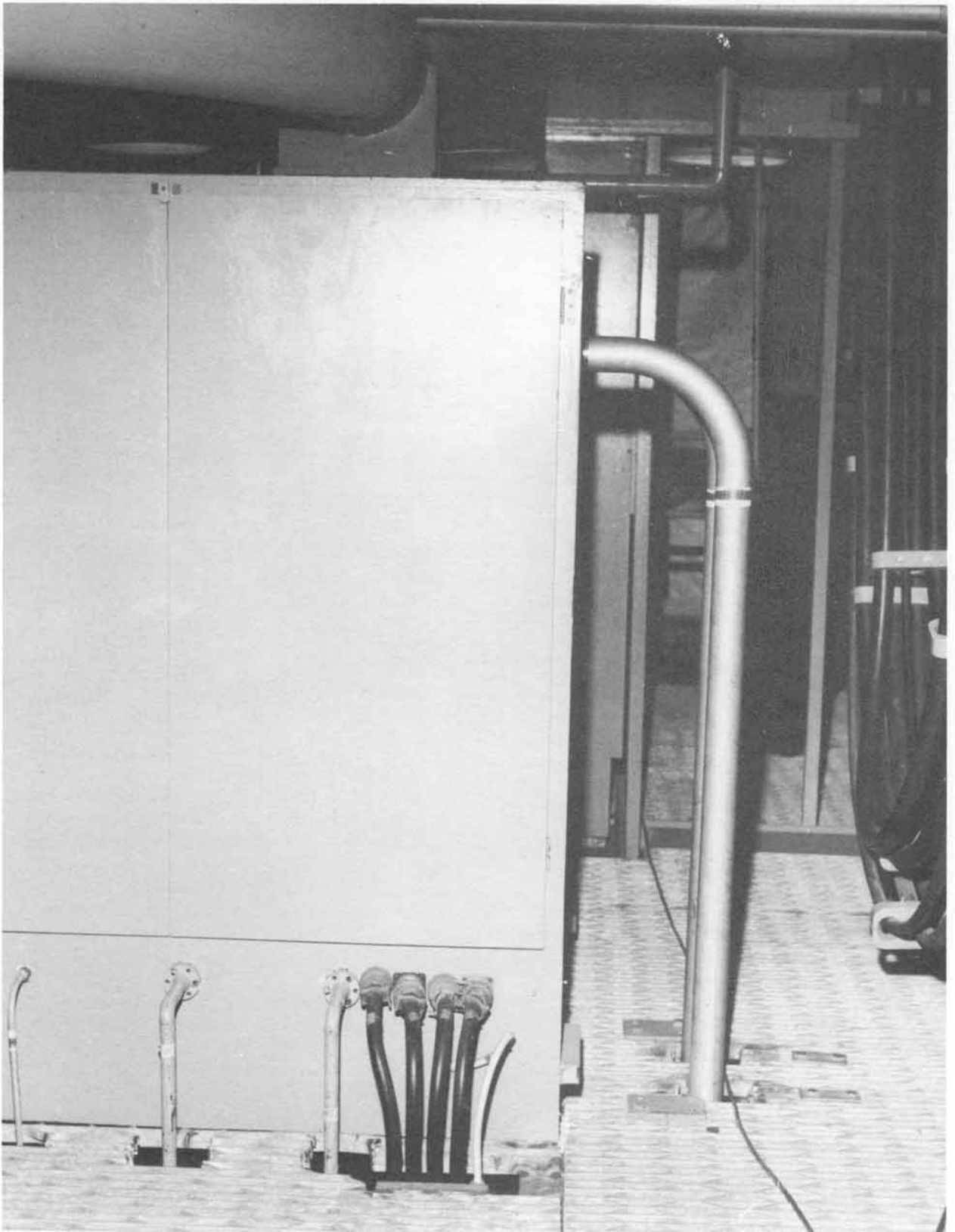
Pressurization control unit facility interface Quad 3 below Level 8 (Neg. No. 67367A dated 4-14-61).



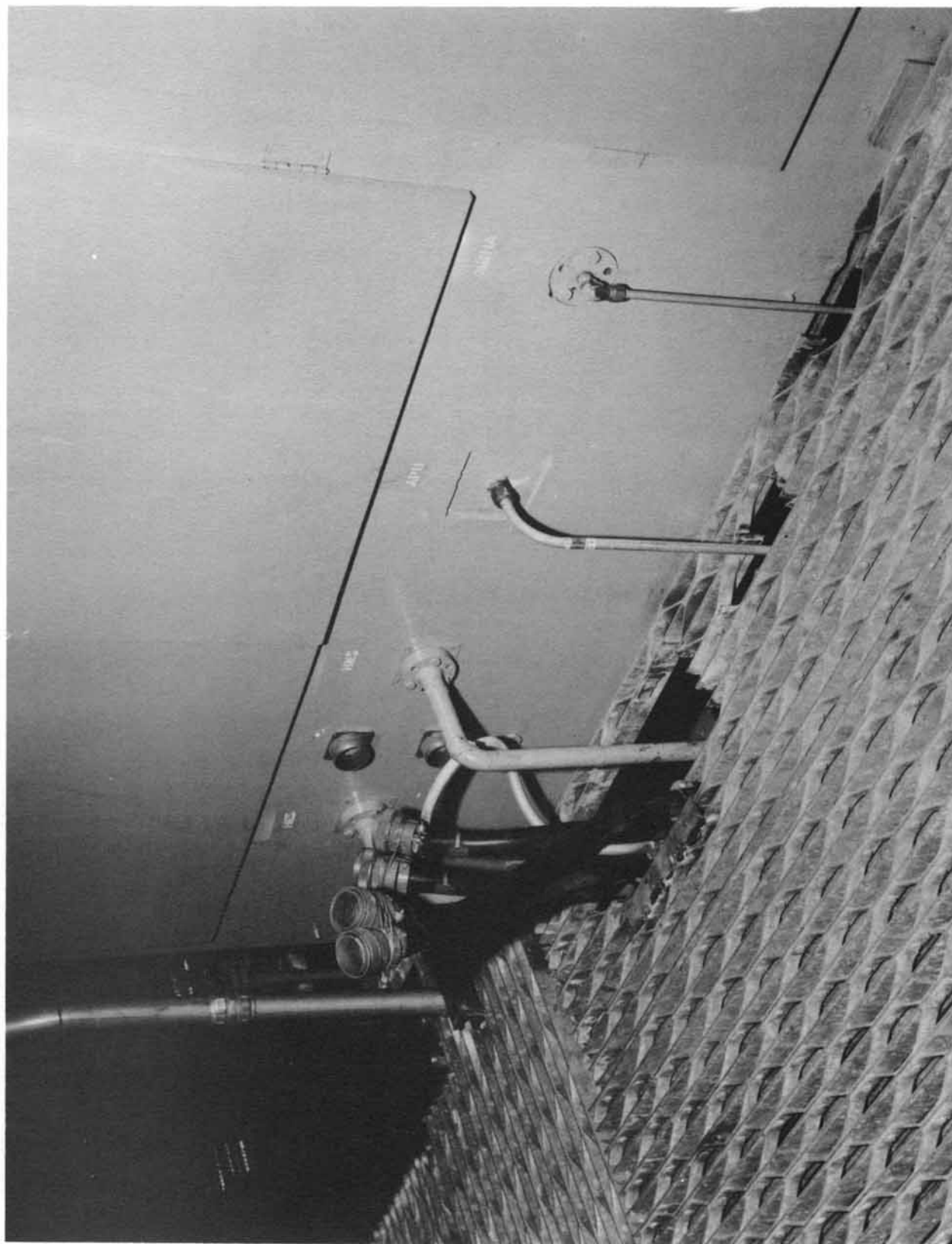


View of Quad 3 side of LN<sub>2</sub> evaporator tank (Neg. No. 67568A dated 4-19-61).

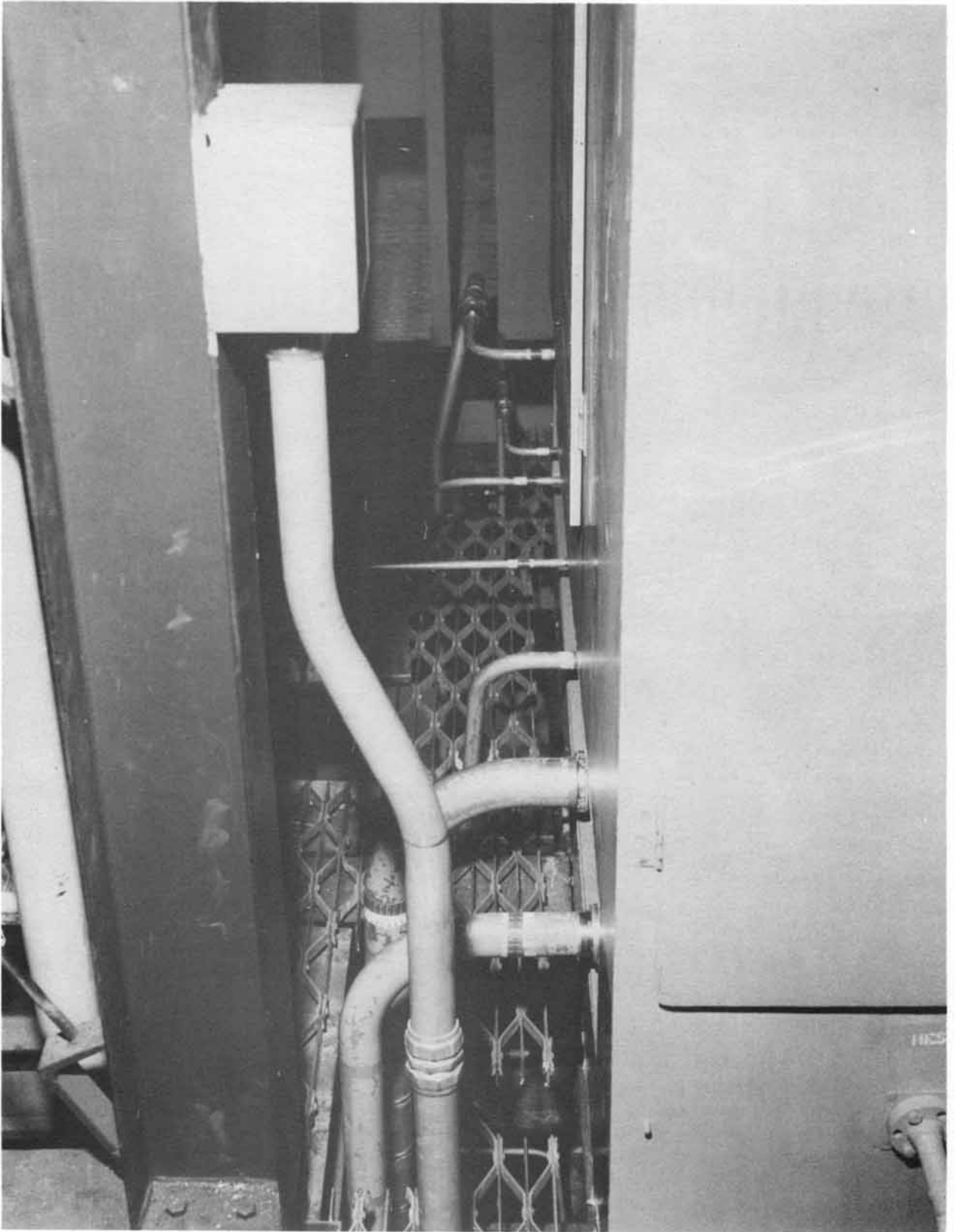




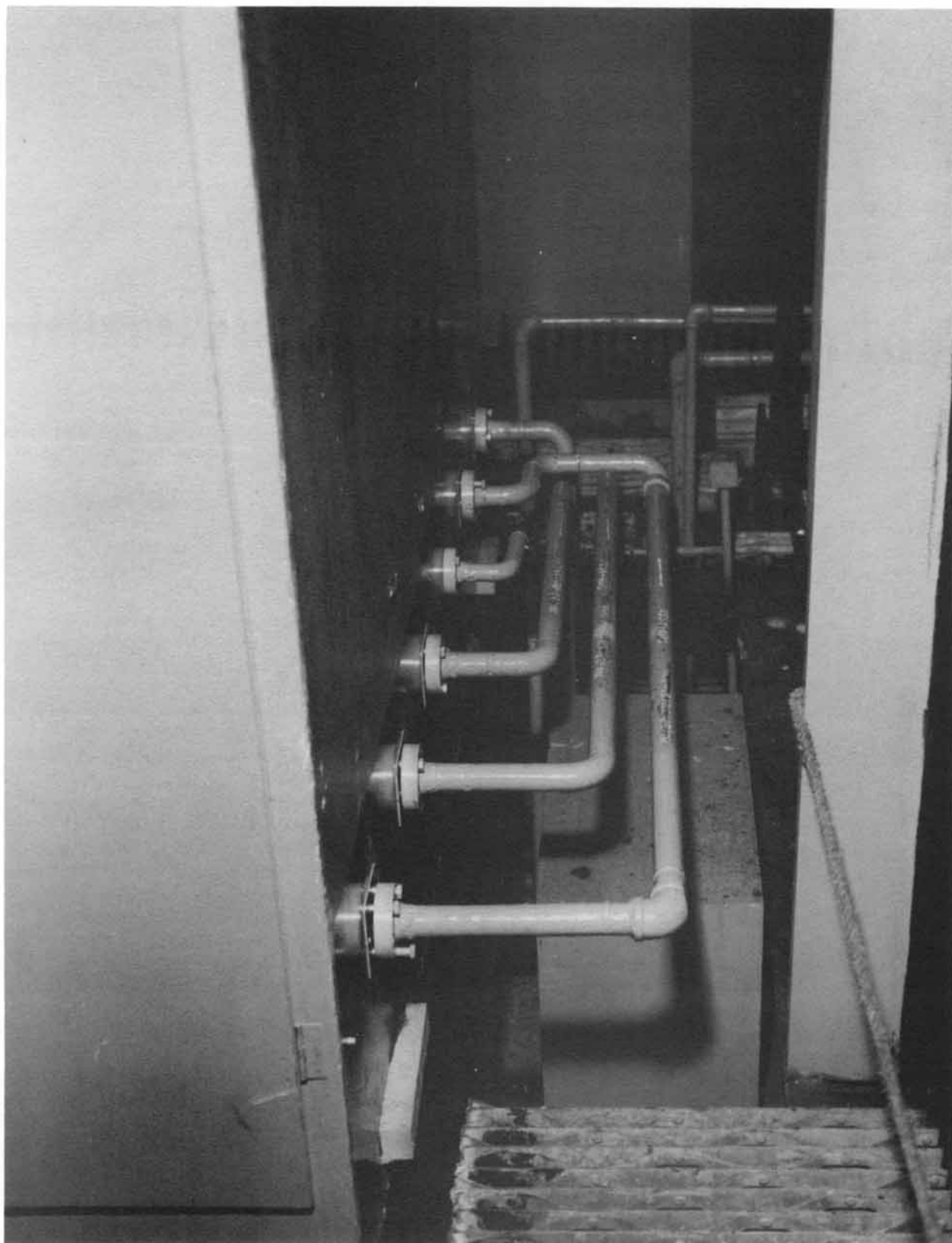
Pipe and tubing on west end of PCU (Neg. No. 67569A dated 4-19-61).



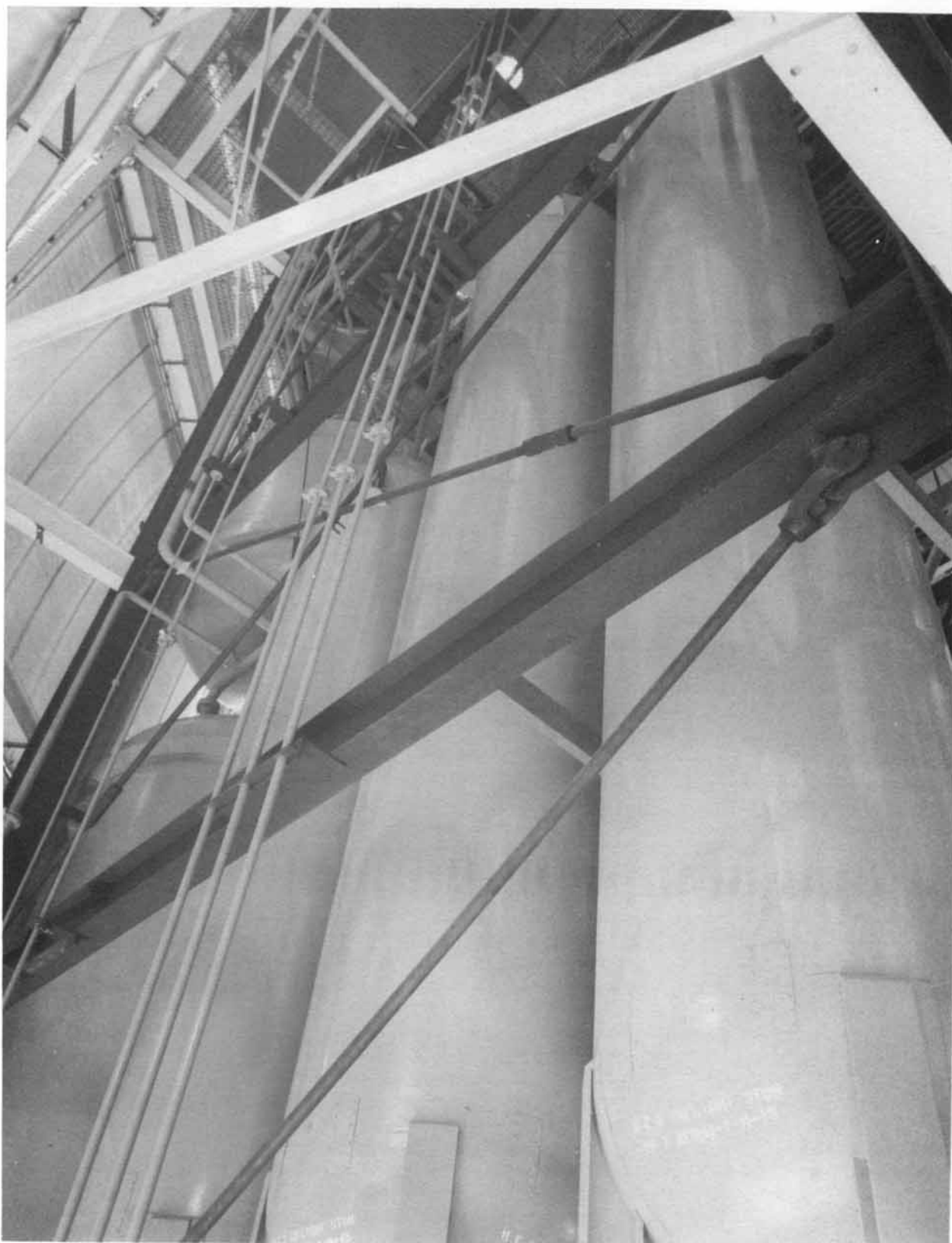
East side of interconnects of PDU (Neg. No. 67570A dated 4-19-61).



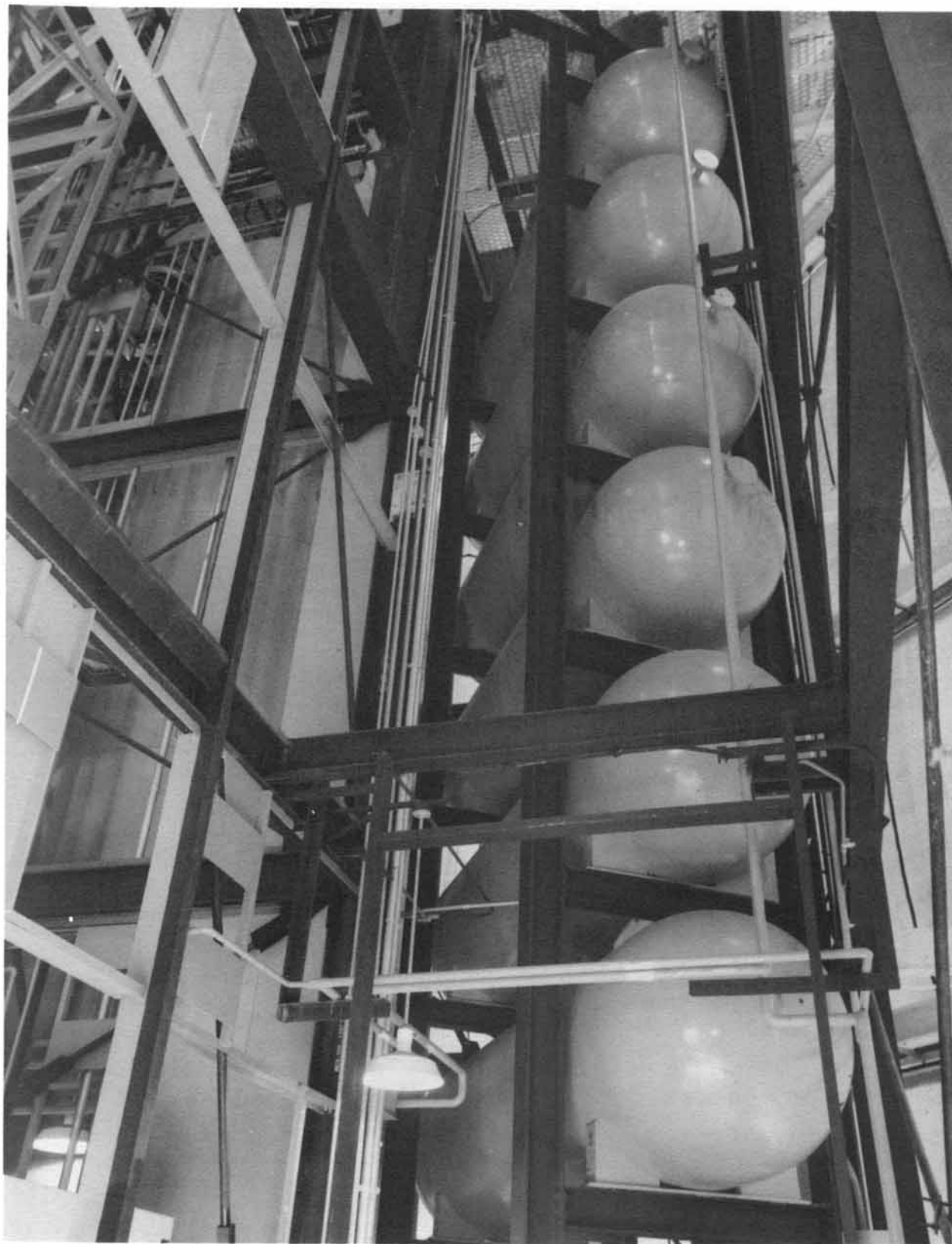
South interconnects on PDU (Neg. No. 67571A dated 4-19-61).



North interconnects on PDU (Neg. No. 67572A dated 4-19-61).



Helium tank farm viewed from Column C (Neg. No. 68079A dated 4-27-61).



GN<sub>2</sub> tanks viewed from Column H (Neg. No. 68080A dated 4-27-61).

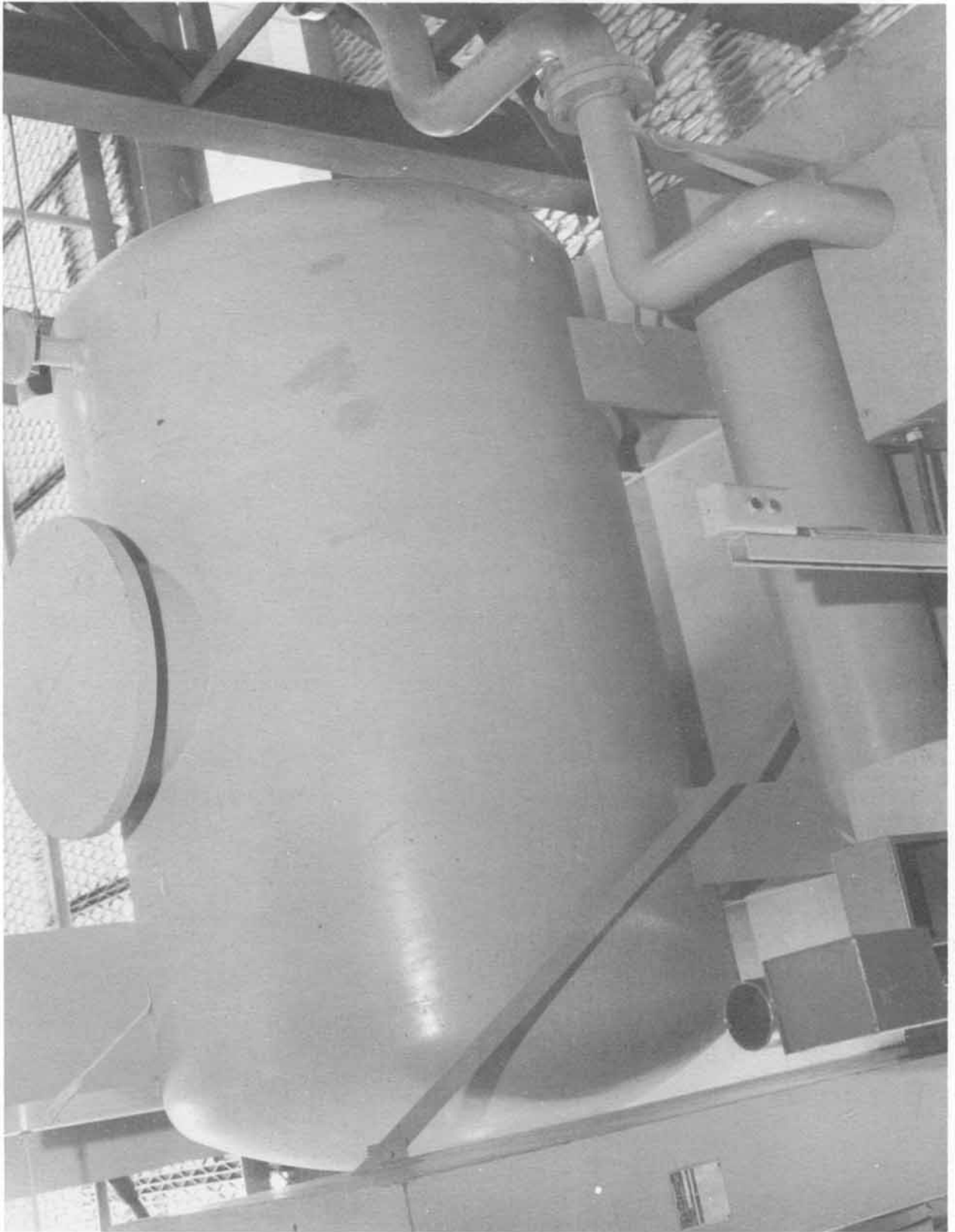




LN<sub>2</sub> evaporator viewed from the west side (Neg. No. 68081A dated 4-27-61).



Looking up to Level 7 from near Column K (Neg. No. 68082A dated 4-27-61).



Looking down on fuel load prefab (Neg. No. 68083A dated 4-27-61).