

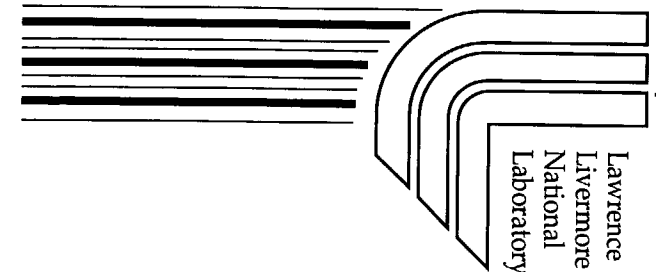
**Plutonium Immobilization
Project Ceramic Prototype
Test Facility Conceptual
Design Layout (FY00
Milestone 6.2.5)**

J.C. Marra

September 27, 2000

U.S. Department of Energy

Lawrence
Livermore
National
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FMD Program

Plutonium Immobilization
Project

Lawrence Livermore National Laboratory

October 11, 2000
PIP 00-121LTR

William J. Danker
Immobilization Project Leader
Office of Materials and Immobilization, NN-62
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585

Dear Mr. Danker:

Subject: Close-out of FY00 Milestone 6.2.5

Enclosed is a copy of the WSRC Letter Report entitled *Ceramic Prototype Test Facility Conceptual Design Layout*. Transmission of this report to you fulfills FY00 milestone 6.2.5 titled "Final CPTF Design Started".

This letter report confirms the start of design for the CPTF with the conceptual design described in the report. This conceptual design defines the equipment components to be installed and the configuration of this installation. Work is underway to complete the details of this design to satisfy the milestone in December for design completion. In the meantime, long lead equipment has been ordered consistent with this conceptual design and the design information developed during process development and the design and construction of the PuCTF at LLNL.

If you or your staff have any questions regarding this evaluation, please contact me, or Guy Armantrout.

Sincerely yours,

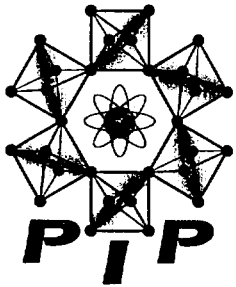


Thomas H. Gould, Manager
Plutonium Immobilization Project

Attachment



Fissile Materials Disposition Program



**Plutonium Immobilization Project
Ceramic Prototype Test Facility
Conceptual Design Layout
(FY00 Milestone 6.2.5)**

September 27, 2000

Westinghouse Savannah River Company

Plutonium Immobilization Project

**Lawrence Livermore National Laboratory
Livermore, California 94550**



TO: G. A. Armantrout, LLNL

FROM: J. C. Marra, SRT *James C. Marra*

DATE: September 27, 2000

Ceramic Prototype Test Facility Conceptual Design Layout – (U)

Attached are a text explanation of the Ceramic Prototype Test Facility (CPTF) conceptual design layout, a series of conceptual drawings of the CPTF ceramic process system, and a general assembly drawing of the CPTF attritor mill. This documentation satisfies the milestone 6.2.5 "Final CPTF Design Started."

This conceptual layout information will be used to initiate final design of CPTF. The enclosed conceptual design is based on a previous baseline of concentrating on direct mill feed to the press with a potential off-line granulator. As discussed at the September 12, 2000 CPTF layout meeting, we have agreed to move the granulator to a more in-line position while still maintaining the capability for direct feeding of milled powder to the press. Several footnotes are included in the text to identify likely changes to the conceptual design based on the September 12 discussions. These items will be worked during the final design effort and will be incorporated into the final design after the necessary reviews and approvals.

Please call me if you have any questions.

cc: (w/o general assembly drawing)
T. H. Gould, WSRC/LLNL
S. L. Tibrea, WSRC, 773-A
E. P. Maddux, WSRC, 703-45A
G. R. Donham, WSRC, 723-A
J. W. Congdon, WSRC, 773-A
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K. C. Neikirk, WSRC, 723-A
G. T. Chandler, WSRC, 773-A

Ceramic Prototype Test Facility Conceptual Design Layout

The text and attached drawings are provided to convey a conceptual Ceramic Prototype Test Facility (CPTF) layout. A finalized CPTF design layout will be used to place a contract with an Architect and Engineering (A&E) firm to construct the necessary support structures for the CPTF equipment. The following equipment (see referenced item number) is shown in the attached drawings in a vertical stack configuration:

- Weight loss feed hopper (11) to dispense product to the attritor mill.^[A]
- Union Process HSA-20 attritor mill (9), to include a tank maintenance area (8) and an overhead hoist (16) for removing the agitator from the tank to relocate the device to a maintenance location (14).
- Weight loss hopper (7) for collecting and weighing the discharged milled powders from the attritor.
- Weight loss type screw feeder (17) to provide a metered discharge of product to the press die cavity for direct feed powder.
- 30-ton press (4) to form the product into the required puck configuration for handling and sintering.
- Robot (2) to handle formed pucks between the press and the furnace trays.
- Stacking and unstacking (S.U.S) equipment (5) for indexing trays during puck loading by the robot.
- Linear transport system (1) to convey empty trays for reloading and transporting the puck loaded trays to the furnace for sintering. It utilizes a linear synchronous motor, controls, payload cart, and rail system between the furnace and S.U.S.
- CM Furnaces, Inc furnace (6) to sinter the pressed powders.

Also included in the CPTF are the following items:

- Granulator (15) in an off-line position to allow granulation testing of milled powders prior to puck pressing operations.^[B]
- Dumbwaiter (3) to elevate powders and tools to the proposed upper level in a safe manner.
- Decking, ladder/stairs, and roof modification (13) to incorporate all proposed equipment and provide personnel access as required.^[C]

A subcontractor shall provide design and construct the following items:

1. Decking and Work Platform
 - To mount the Union Process HSA-20 attritor mill, associated controls and support equipment. See Elevation and Section A-A, Item (9). Dynamic loads for the attritor mill to be provided. Attritor mill mounting requirements are provided on the attached Union Process drawing, HSA20-A100, Rev 0, "HSA20T Attritor General Assembly".
 - To mount a hoist (16) required for agitator maintenance.
 - To mount the mill feed hopper (11) and provide a work platform with access ladder/stairs.

- Load requirements will be provided to the A&E and include the attritor mill, attritor local controls, mill feed weigh hopper, attritor maintenance hoist within the mock glove box, workbench(s), tools, product for milling, miscellaneous materials, and personnel. Subcontractor to determine additional loading due to subcontractor designed items mounted to the decking.
2. Roof extension.^[C]
 - See Elevation, Section A-A and Section E-E, Item (13)
 - Allow personnel access to the attritor feed hopper (11), to load the hopper with powders to be milled.
 3. Weight loss hopper support and rail system ^[D]
 - Allow the weigh hopper to be directly below the discharge valve of the attritor mill during direct feed operation to the press and be relocated above the granulator on a rail/trolley type system during granulator feed testing. See Section A-A Item (7)
 - System structure should be overhead supported (attritor level decking) to eliminate obstruction on the ground level.
 4. Dumbwaiter ^[E]
 - See Elevation, Item (3).
 - Payload shall be a minimum of 500 pounds.
 - Transport material from the ground level to the existing elevated platform level
 5. Ladder and/or stairs
 - A “Space Saver” stairway (~ 68 degree angle) shall be used to access the attritor level decking from the ground floor. It shall also be used to access the mill feed hopper work platform from the attritor level.

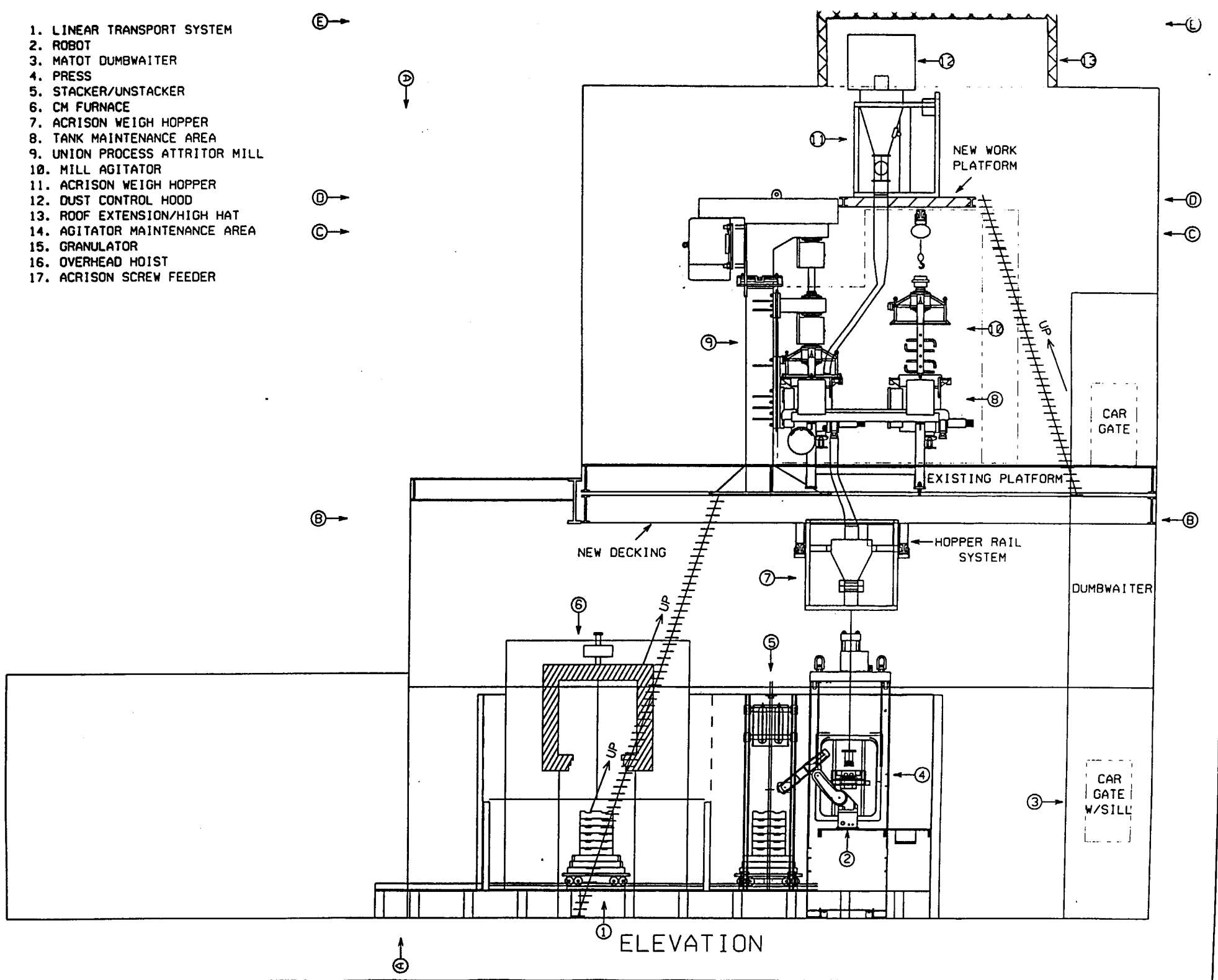
Footnotes

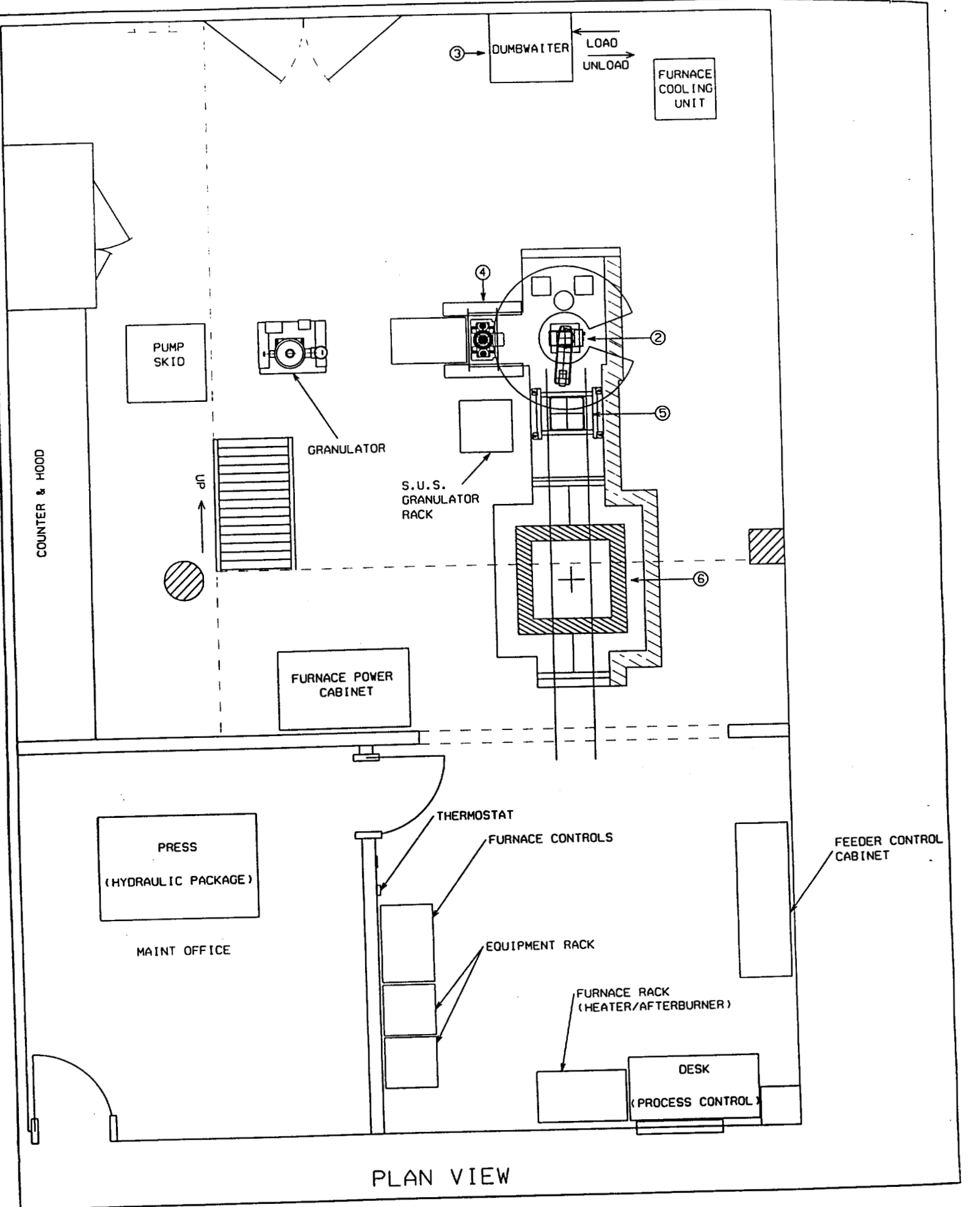
- A. Final details regarding the attritor feed hopper are being worked and will be finalized in the final CPTF design.
- B. The granulator is shown in an off-line position in this conceptual design. Efforts are ongoing to move the granulator to a more in-line position (representative of baseline process) and will be reflected in the CPTF final design.
- C. Details regarding a roof extension will be finalized in conjunction with the final CPTF design.
- D. It is anticipated that moving of the attritor discharge hopper will be eliminated and the capability to directly feed the granulator or the direct feed hopper will be used. This will facilitate powder transfer. Details will be provided in the final CPTF design.
- E. A hoist may be used in lieu of the dumbwaiter. This will be depicted in the CPTF final design.

Attachments

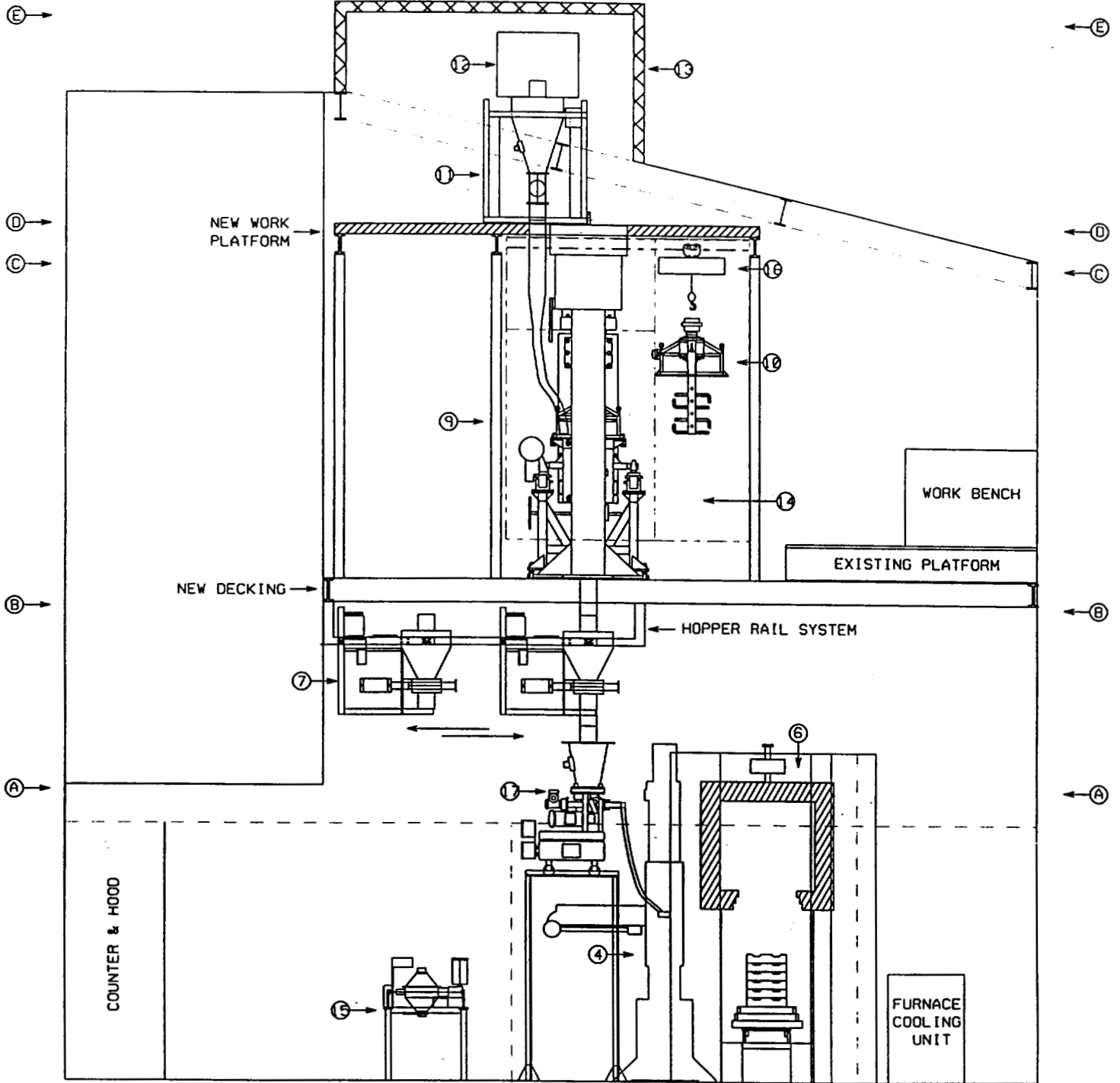
1. “CPTF Layout, Elevation”
2. “CPTF Layout, Plan View”
3. “CPTF Layout, Section A-A”
4. “CPTF Layout, Section B-B”
5. “CPTF Layout, Section C-C”
6. “CPTF Layout, Section D-D”
7. “CPTF Layout, Section E-E”
8. Union Process drawing number: HSA20-A100, Rev 0, “HSA20T Attritor General Assembly”

1. LINEAR TRANSPORT SYSTEM
2. ROBOT
3. MATOT DUMBWAITER
4. PRESS
5. STACKER/UNSTACKER
6. CM FURNACE
7. ACRISON WEIGH HOPPER
8. TANK MAINTENANCE AREA
9. UNION PROCESS ATTRITOR MILL
10. MILL AGITATOR
11. ACRISON WEIGH HOPPER
12. DUST CONTROL HOOD
13. ROOF EXTENSION/HIGH HAT
14. AGITATOR MAINTENANCE AREA
15. GRANULATOR
16. OVERHEAD HOIST
17. ACRISON SCREW FEEDER

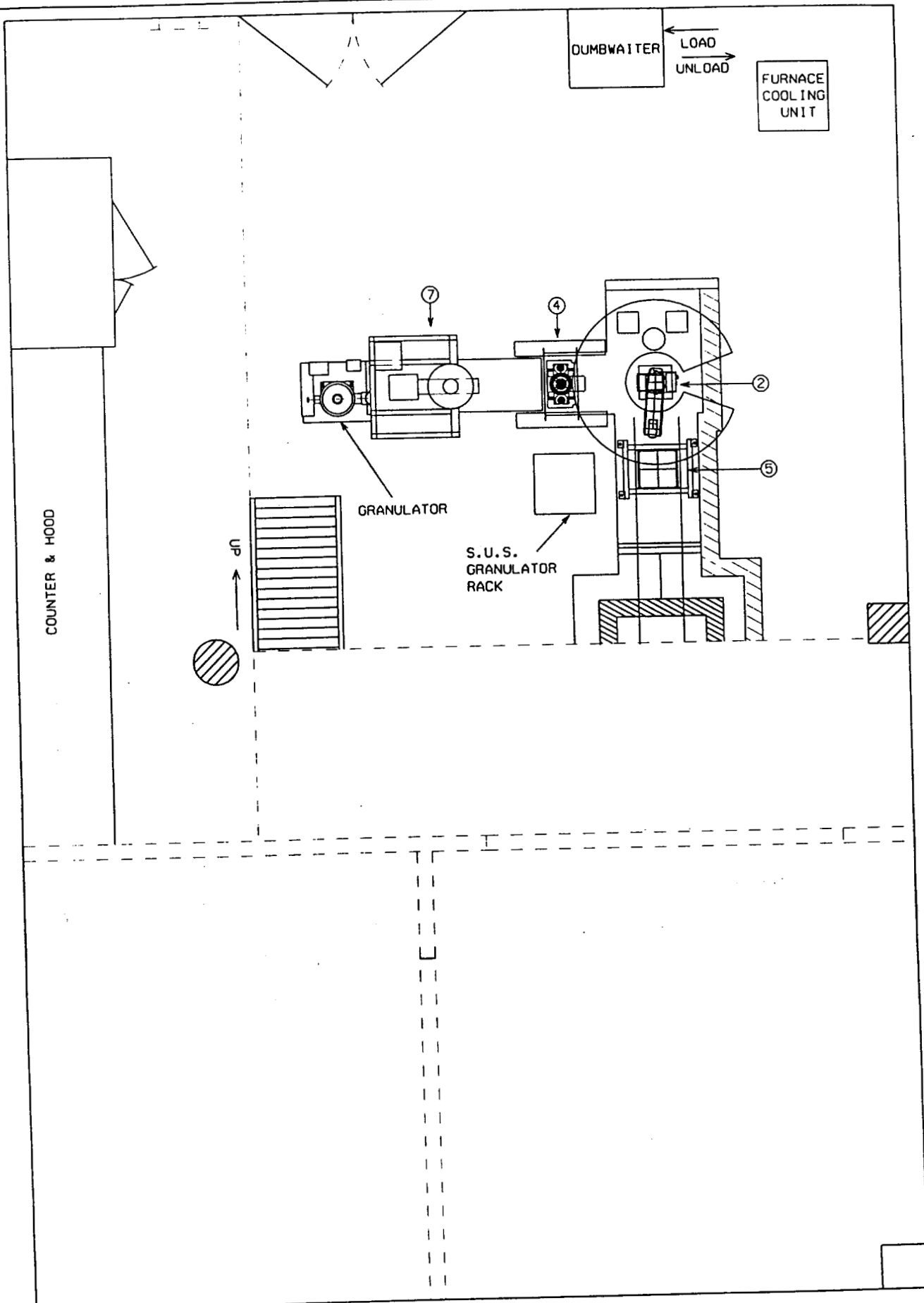




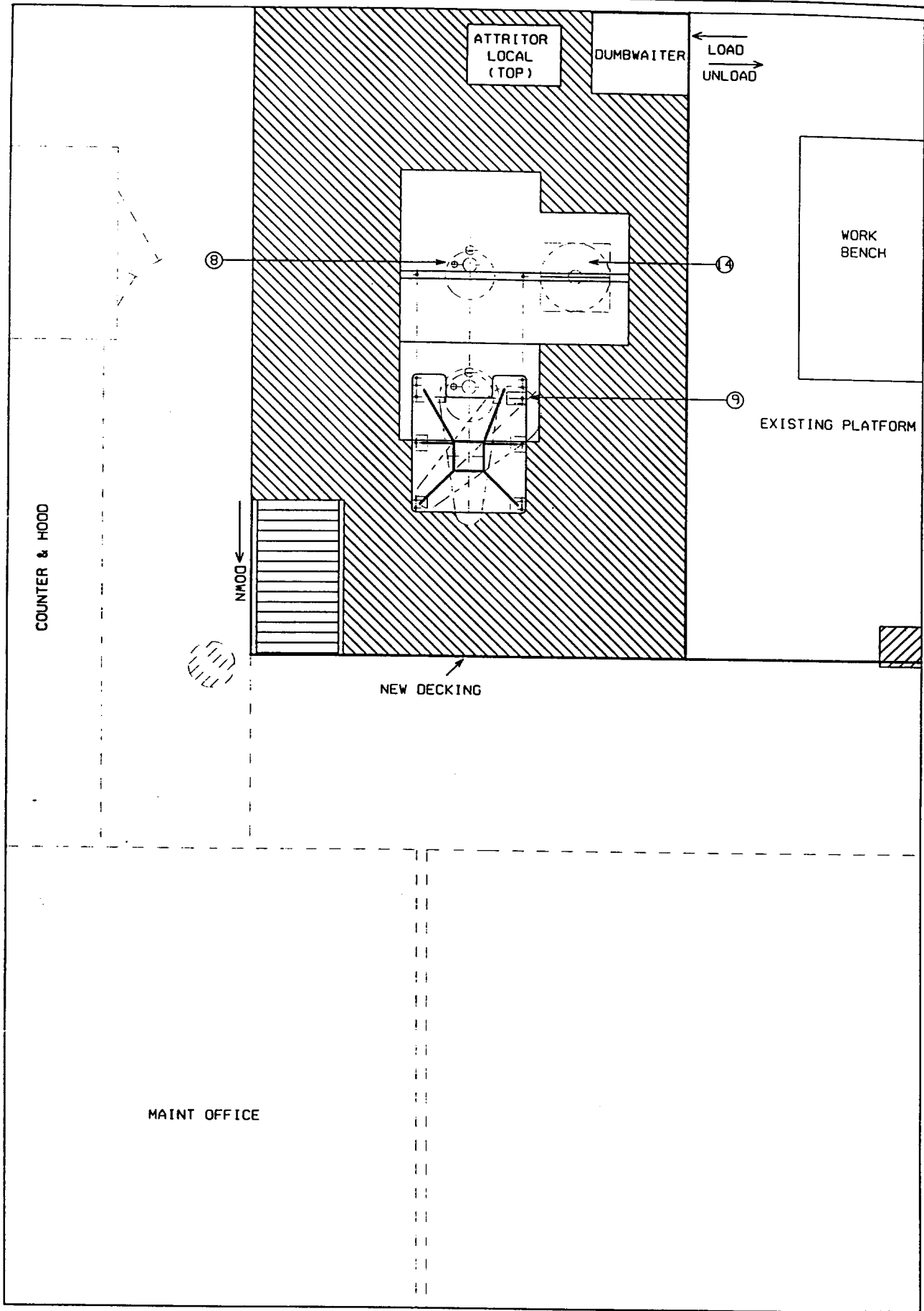
PLAN VIEW



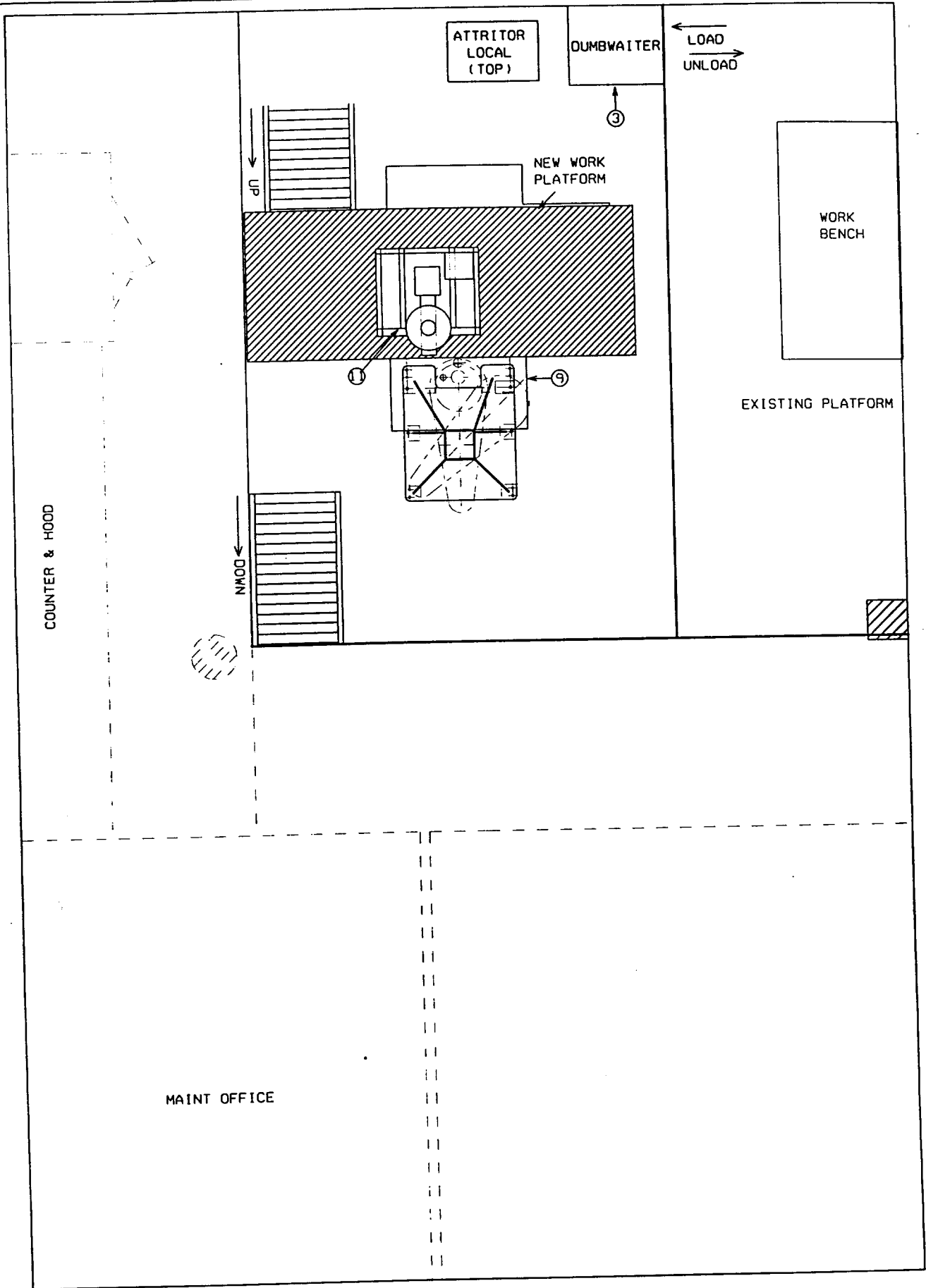
SECTION A-A



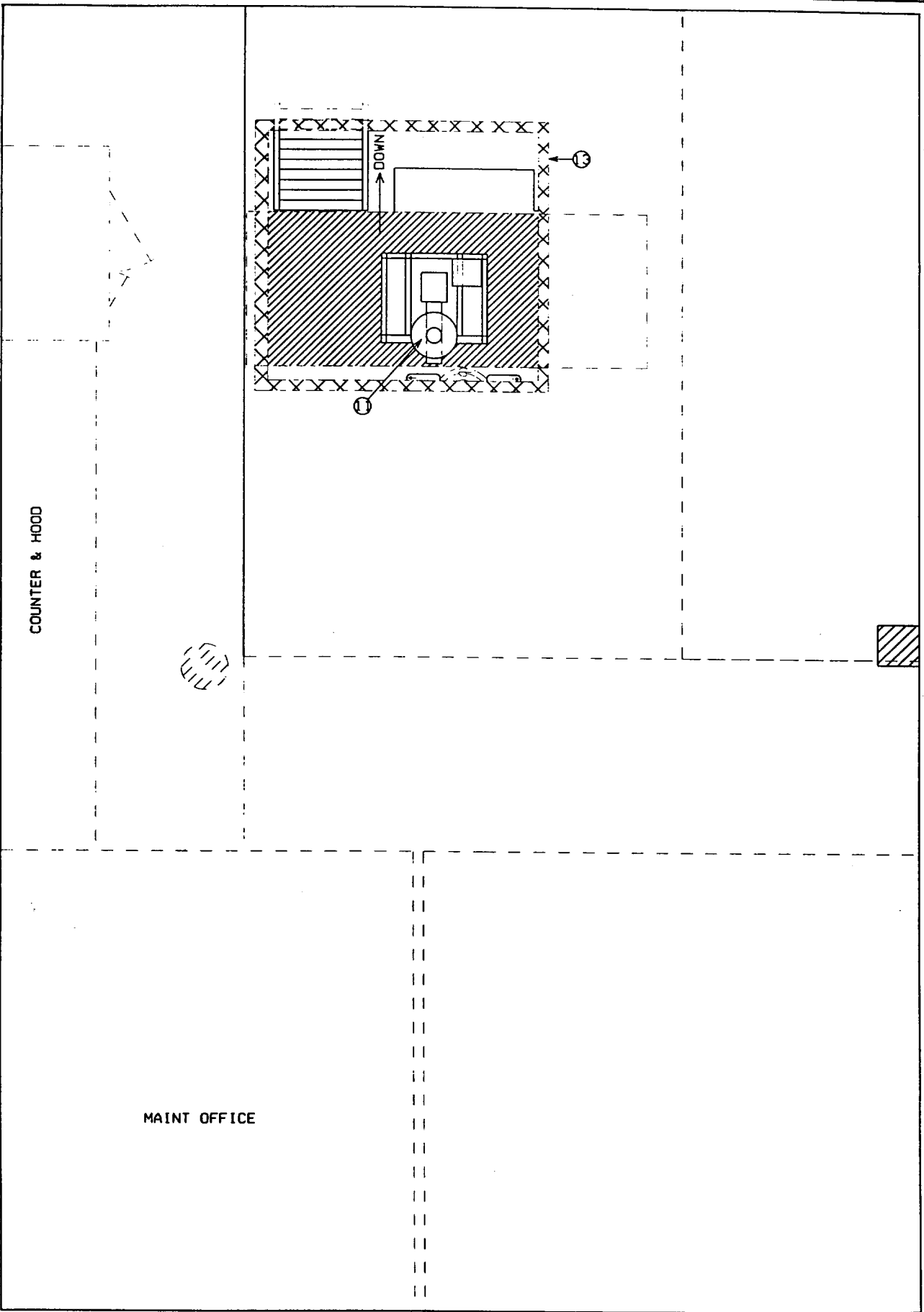
SECTION B-B



SECTION C-C



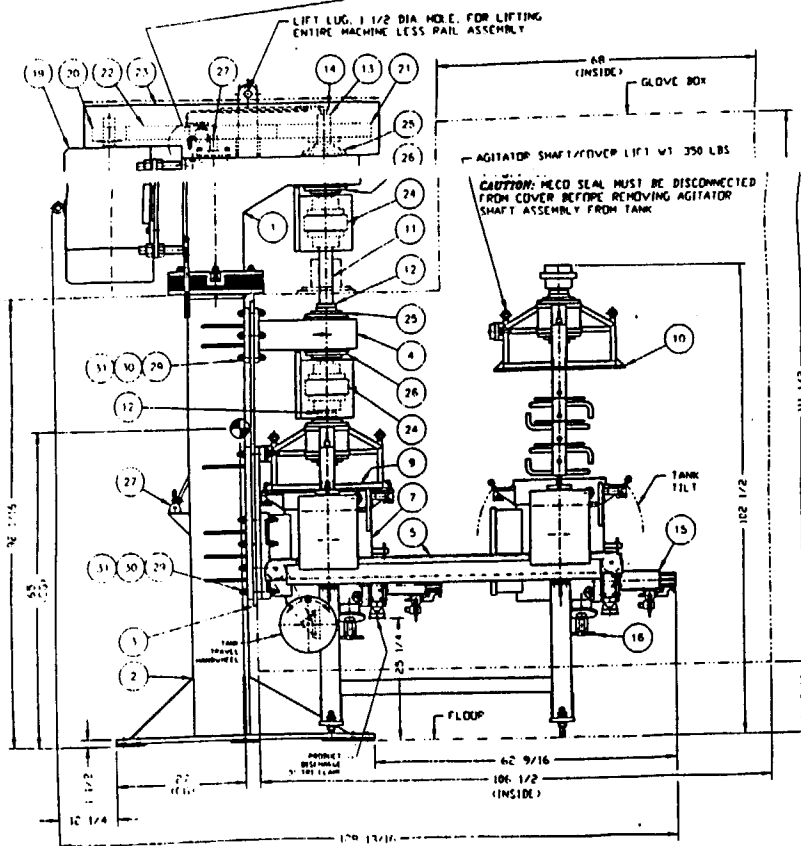
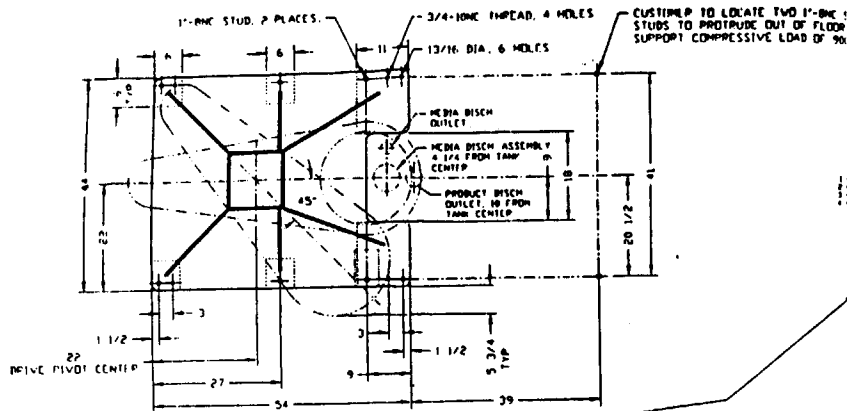
SECTION D-D



COUNTER & HOOD

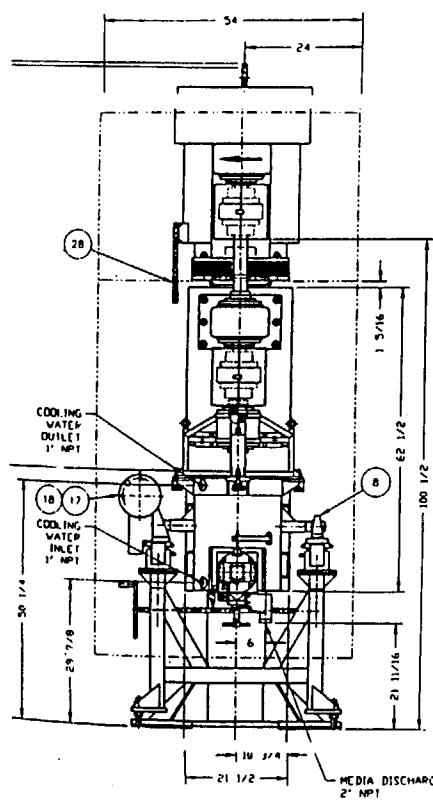
MAINT OFFICE

SECTION E-E



SEE REPAIR
LET CONNECTION 1/2\"/>

TO CONNECTIONS/PARTS
IN OTHER PAGES



SYM	DESCRIPTION	QTY	DRG. NO.
1	DRIVE PIVOT ASSEMBLY	1	HS420-1200
2	FRAME	1	HS420-1200
3	BACK PLATE (GLOVE BOX)	1	HS420-1200
4	BEARING BRACKET	1	HS420-1200
5	RAIL ASSEMBLY	1
6			
7	GRINDING TANK/JACKET ASSEMBLY	1
8	BEARING PILLOW BLK. P20-SC-200 W/ 12 1/8\"/>		

SEE NOTE 4

- NOTES:
- APPROX SPEED OF AGITATOR SHAFT IS 415 RPH @ 60HZ
 - APPROX WEIGHTS: OPERATING WT. 5700 LBS.
RAIL SYSTEM WT. 800 LBS.
TOTAL SYSTEM WT. 6500 LBS
WT MOVING ON RAILS 1400 LBS
 - DRIVE ASSEMBLY CAN BE RAISED 7/8\"/>

SPECIAL FOR CEIL / WSRC

Union Process

GENERAL ASSEMBLY

HS420 ATTRITOR

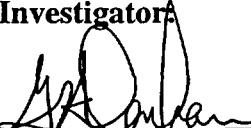
GENERAL ASSEMBLY

DATE: 6/28/00 BY: [Signature]

SCALE: 1" = 1" PART NO.: HSA20-A100

PIP Approval Sheet

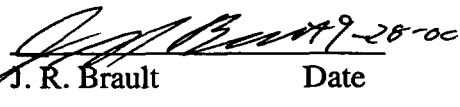
Principal Investigator:

Signature:  9-27-00
Name: G. A. Donham Date

Approved: SRTC Level 3 Manager

Signature:  9/28/00
Name: A. L. Blancett Date

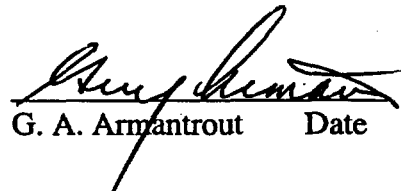
Approved: Task Leader

Signature:  9-28-00
Name: J. R. Brault Date


Approved: Team Leader

Signature:  9/28/00
Name: J. C. Marra Date

Approved: Site Leader/Activity Leader

Signature:  10/5/00
Name: G. A. Armantrout Date

Approved: Project Manager

Signature:  10/11/00
Name: T. H. Gould Date

This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.