

September 2002

***Bechtel National Inc.
Waste Treatment Plant Project***

***Ron Naventi
Project Manager***

***Presented to
27th Nuclear Air Cleaning & Treatment Conference
September 2002***

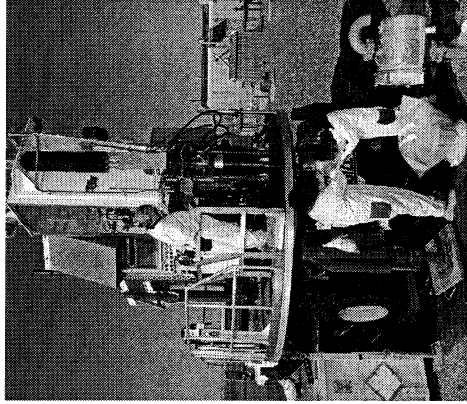


Bechtel National, Inc.

Morgan & Son



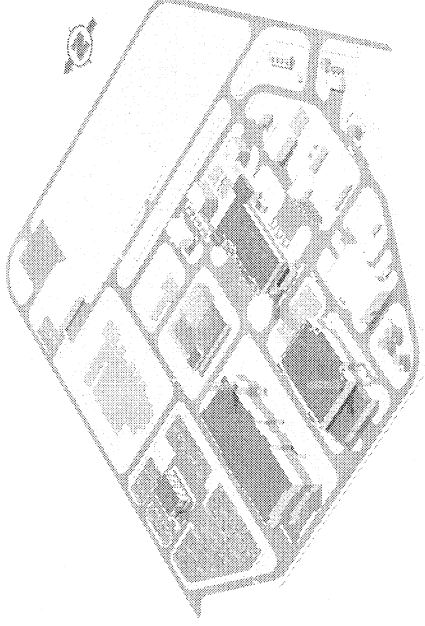
Tank Waste Management



- Operate and maintain tank farms
- Retrieve waste
- Deliver waste feed

CH2M Hill Hanford Group

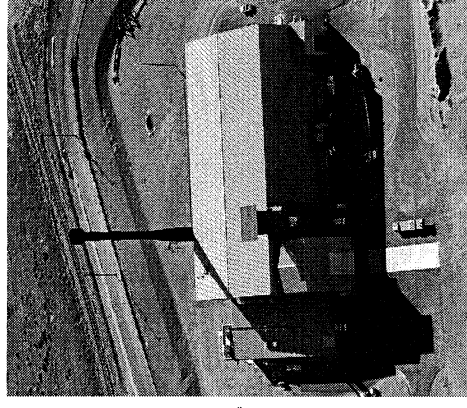
Vitrification



- Pretreat waste
- Process high-level waste to glass
- Process low-activity waste to glass

Bechtel National, Inc.

Storage/ Disposal



- Dispose of immobilized low-activity waste
- Store immobilized high-level waste

CH2M Hill Hanford Group

DOE

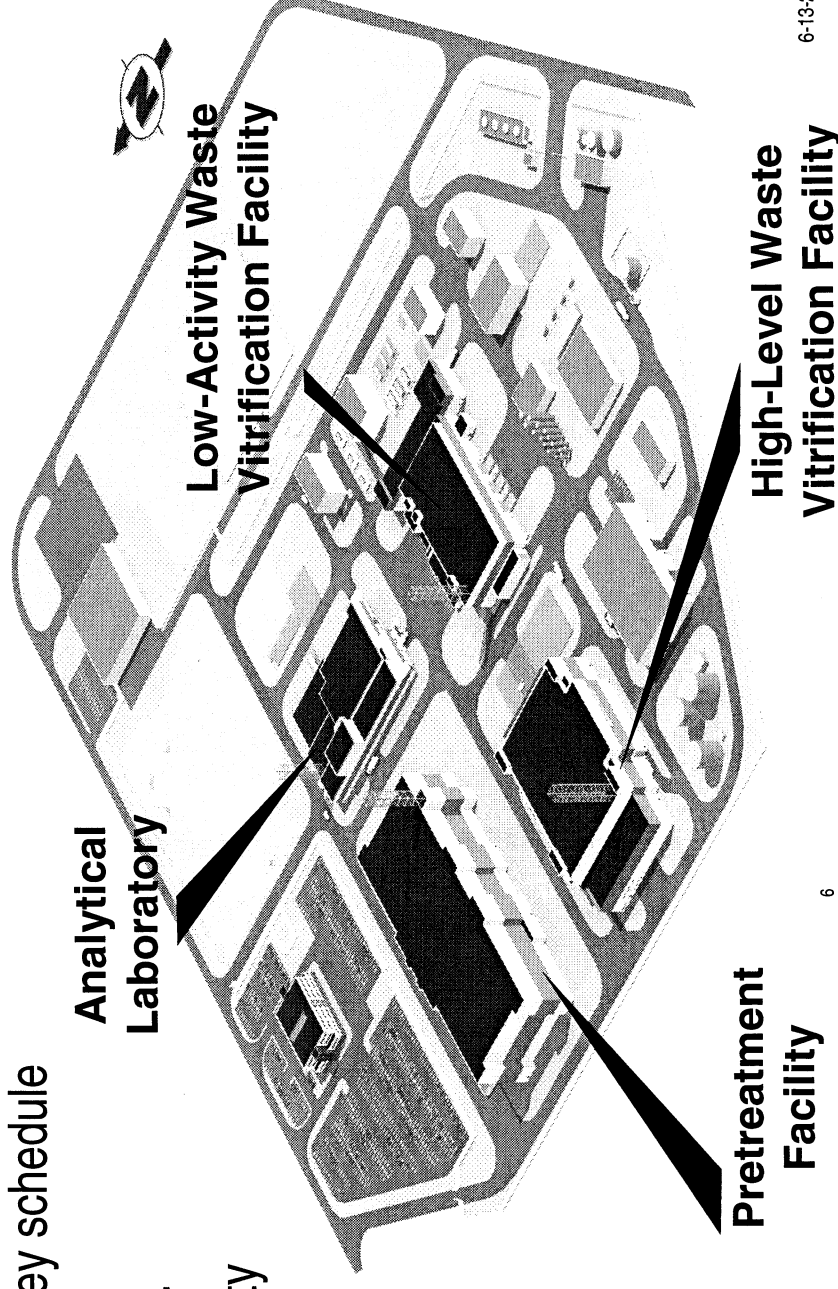
Plans, integrates, and manages

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- Garth Duncan, Bechtel National, Inc.
 - Deputy Engineering Manager for Waste Treatment Plant Project
 - 30 Years experience with Engineering, Procurement, Construction and Commissioning projects

 - Cliff Winkler, Washington Group International
 - Melter Technology Manager for Waste Treatment Plant Project
 - 17 Years experience with diverse clean-up technologies; 22 years nuclear experience

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- Waste Treatment Plant Project
 - Plant Vitrification Technology
 - HVAC Design

- WTP is one 10-year project -- 10-year work plan, no yearly work plans
- WTP is a capital funded turn-key project.
 - Scope: Research & technology, engineering, procure, construct, commission
 - DOE is the owner -- BNL is the design authority.
- WTP contract provides incentives and penalties tied to total cost, key schedule milestones and plant performance.
- R&T and operability integrated into project execution planning.



Our Mission:

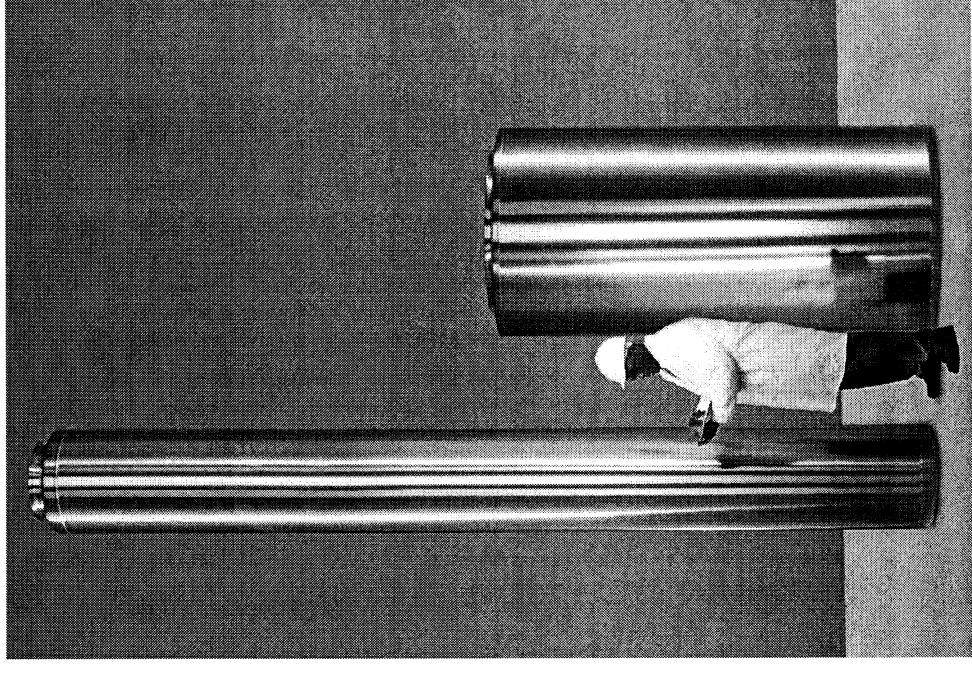
Glass in 2007

•High Level Waste Canisters

- 2' X 14.5'
- 6,600 pounds of glass
- 120 per year
- Temporarily stored in Hanford's Canister Storage Building until national repository built

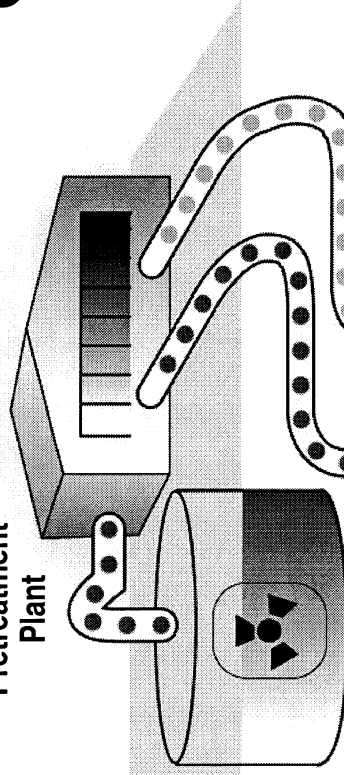
•Low Activity Waste Canisters

- 4' X 7.5'
- 13,000 pounds of glass
- 1100 per year
- Stored at Hanford's Central Plateau



PRETREATMENT

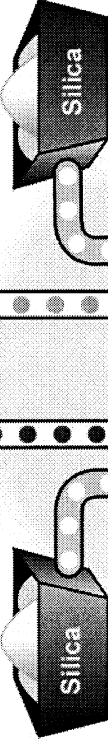
Pretreatment
Plant



Underground
waste tank

At a Hanford Site pretreatment plant, liquid waste is separated into two streams – high-level and low-activity radioactive waste.

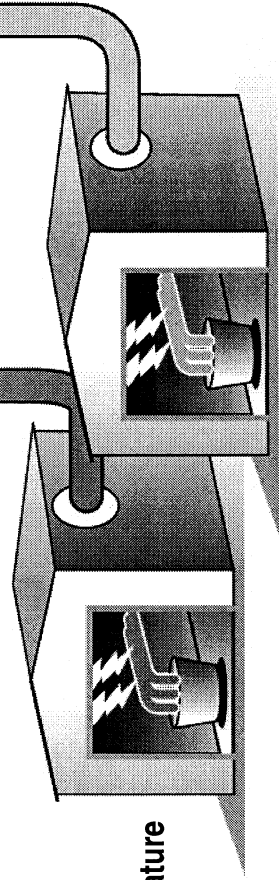
VITRIFICATION/ PROCESSING



High-level
radioactive waste

Low-activity
radioactive waste

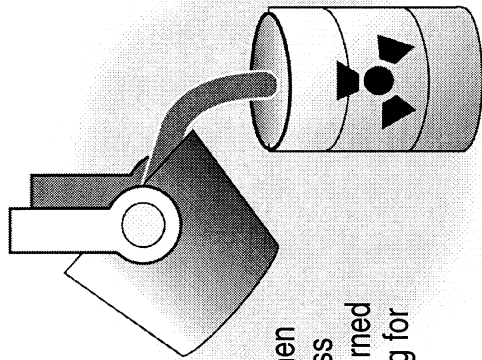
Waste is prepared for the vitrification process by mixing it with silica and other glass-forming material to form a slurry mixture.



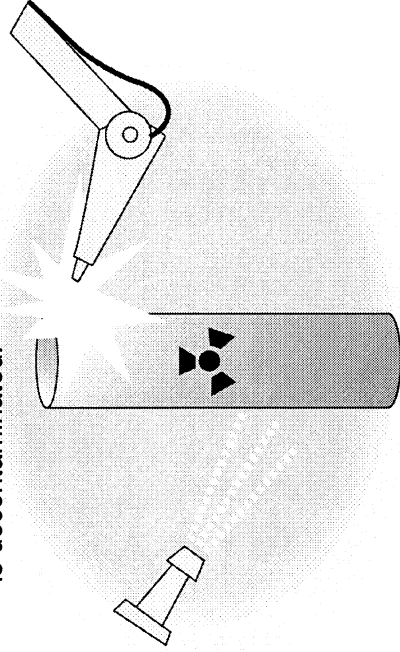
High-temperature
melters

The mixtures are fed into high-temperature melters where they are heated with electrical current for several days to form a molten glass.

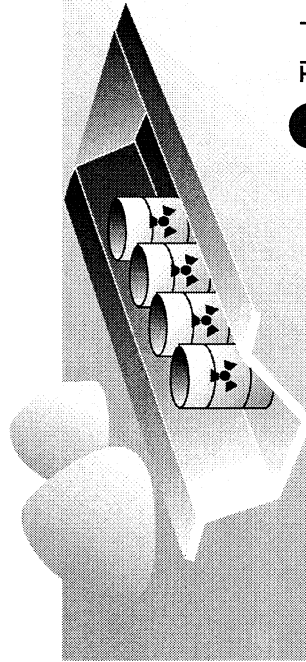
STORAGE/ DISPOSAL



● The molten material is then poured into large stainless steel containers and returned to a solid state by cooling for several days.



● The containers are then welded shut and the exterior is decontaminated.



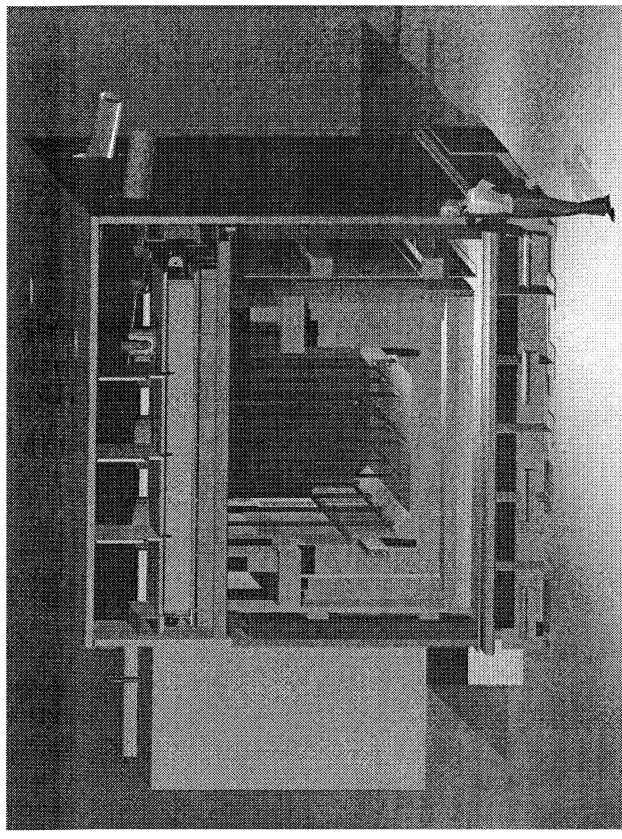
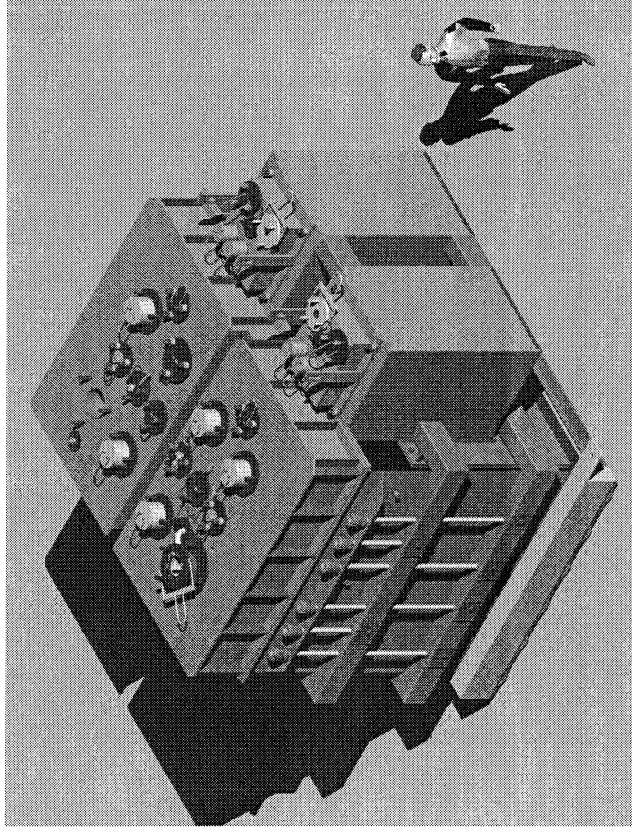
● The low-activity radioactive waste containers are stored in a cement-lined trench on site. The high-level radioactive waste containers are stored until shipped to a federal facility for permanent disposal.

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- July 10: First structural concrete placed
 - Fall 2002: Full construction authorization for LAW and HLW
 - Winter 2003: Full construction authorization for Pretreatment
 - 2003:
 - Major procurements for plant equipment
 - Complete Research and Technology testing for ultrafiltration and resin performance
 - 2004
 - Commission support facilities
 - water treatment plant
 - chiller plant
 - 2007: Radioactive Glass “Hot commissioning”

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- Broad engineering organization capable of design, construct, commission
 - 1,200 Engineers on staff
 - Design supports close-coupled execution

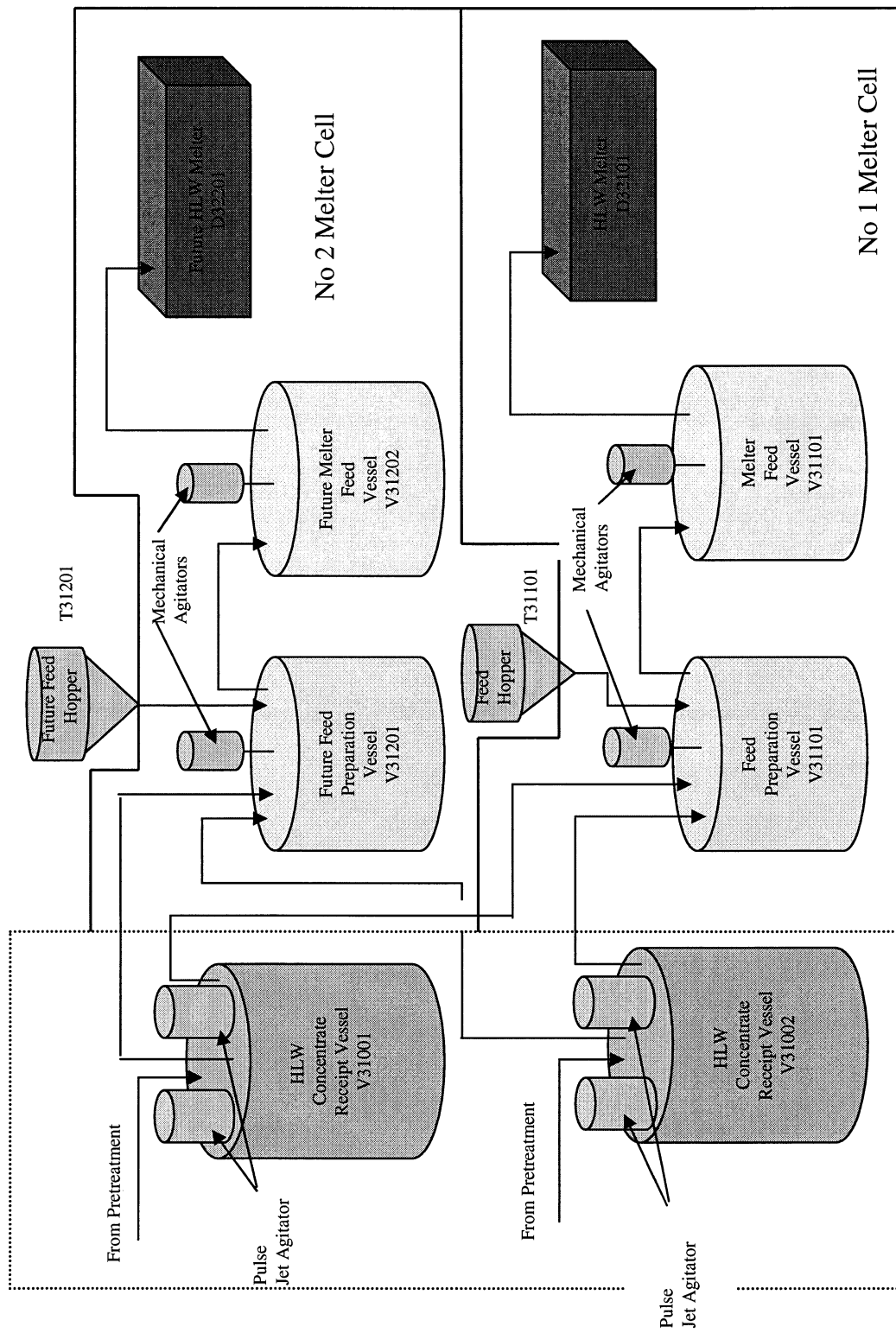
- 
- Vitrification
 - history
 - WTP technology
 - process

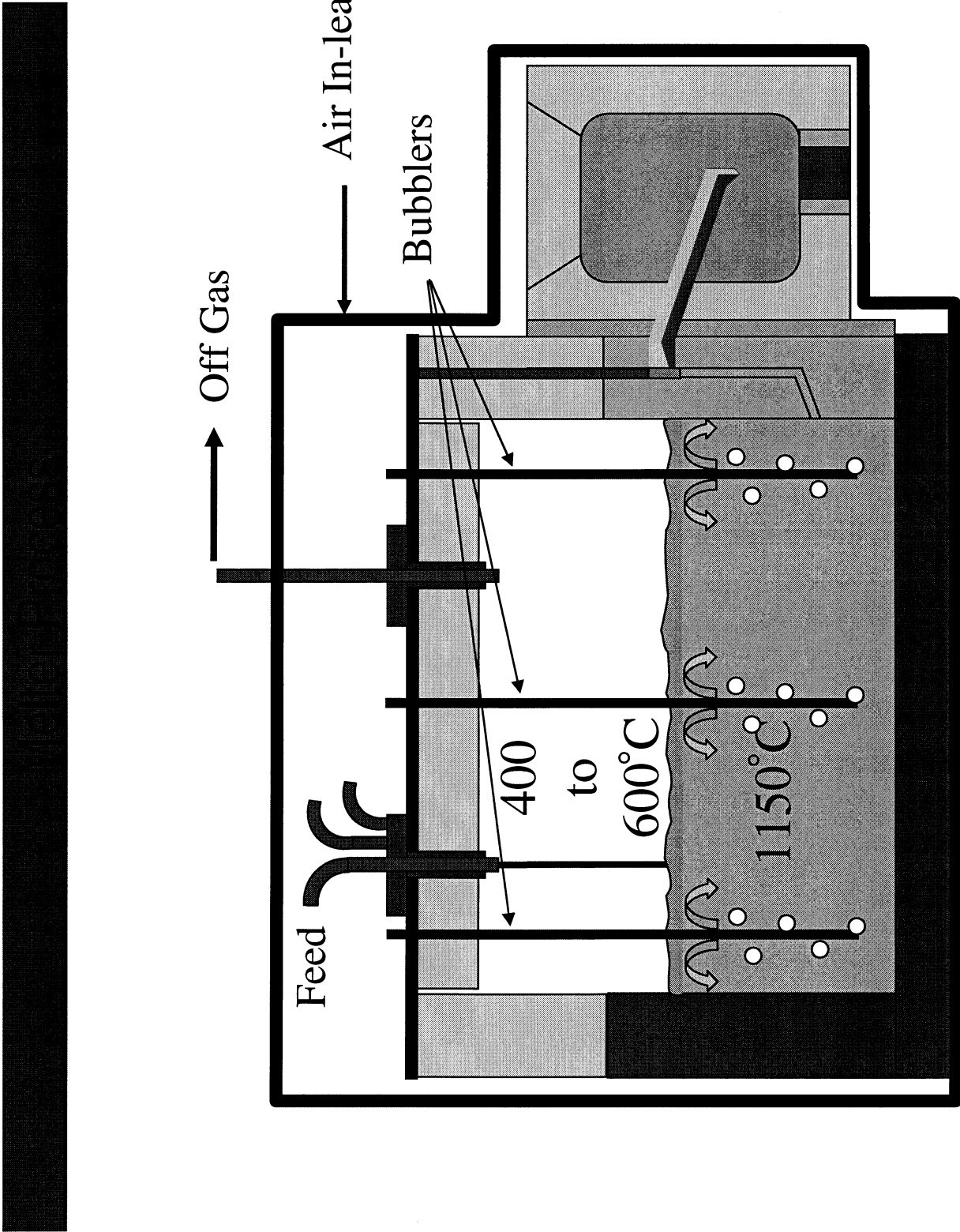
- LAW MELTER- 330 tons - 30 ft x 22 ft x 16 ft - 10 Sq M of glass surface - 15 MT/day.

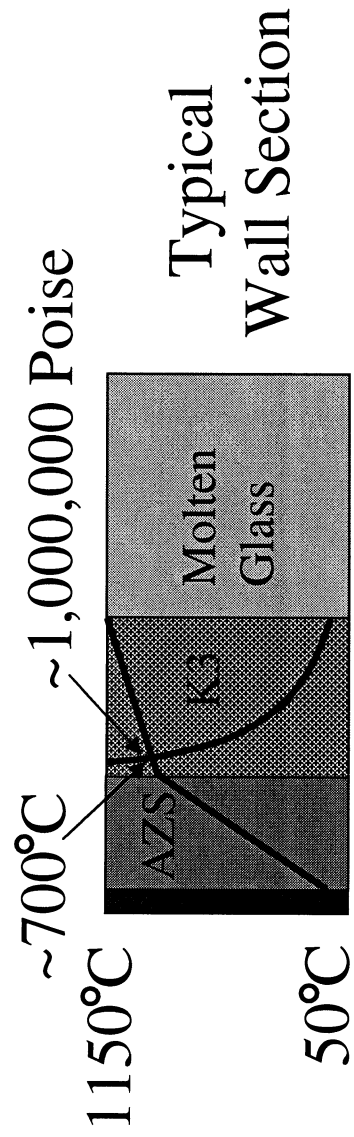
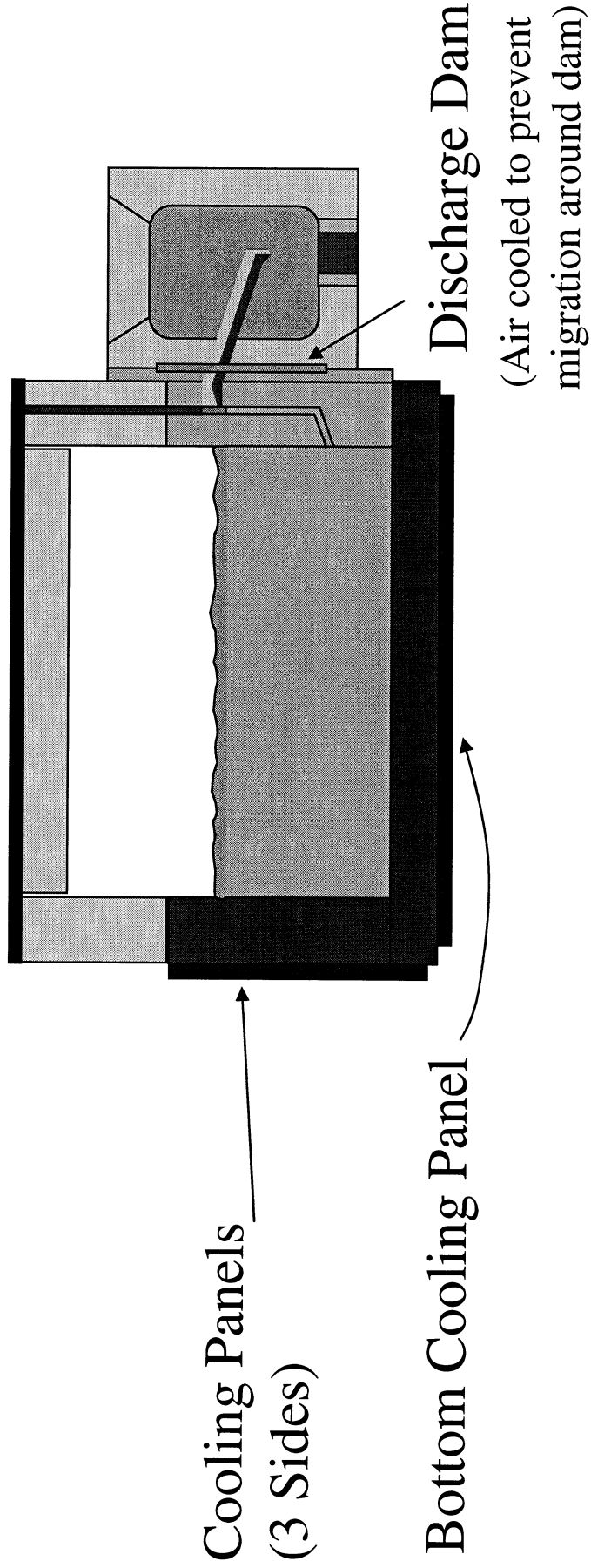
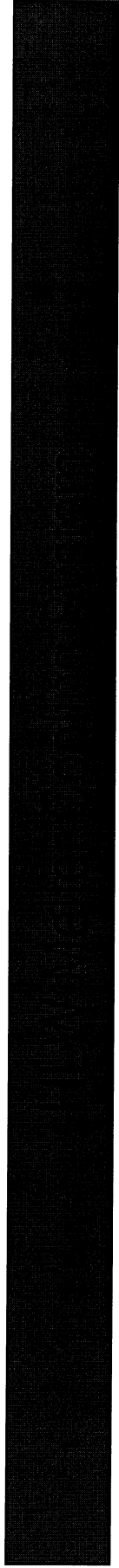


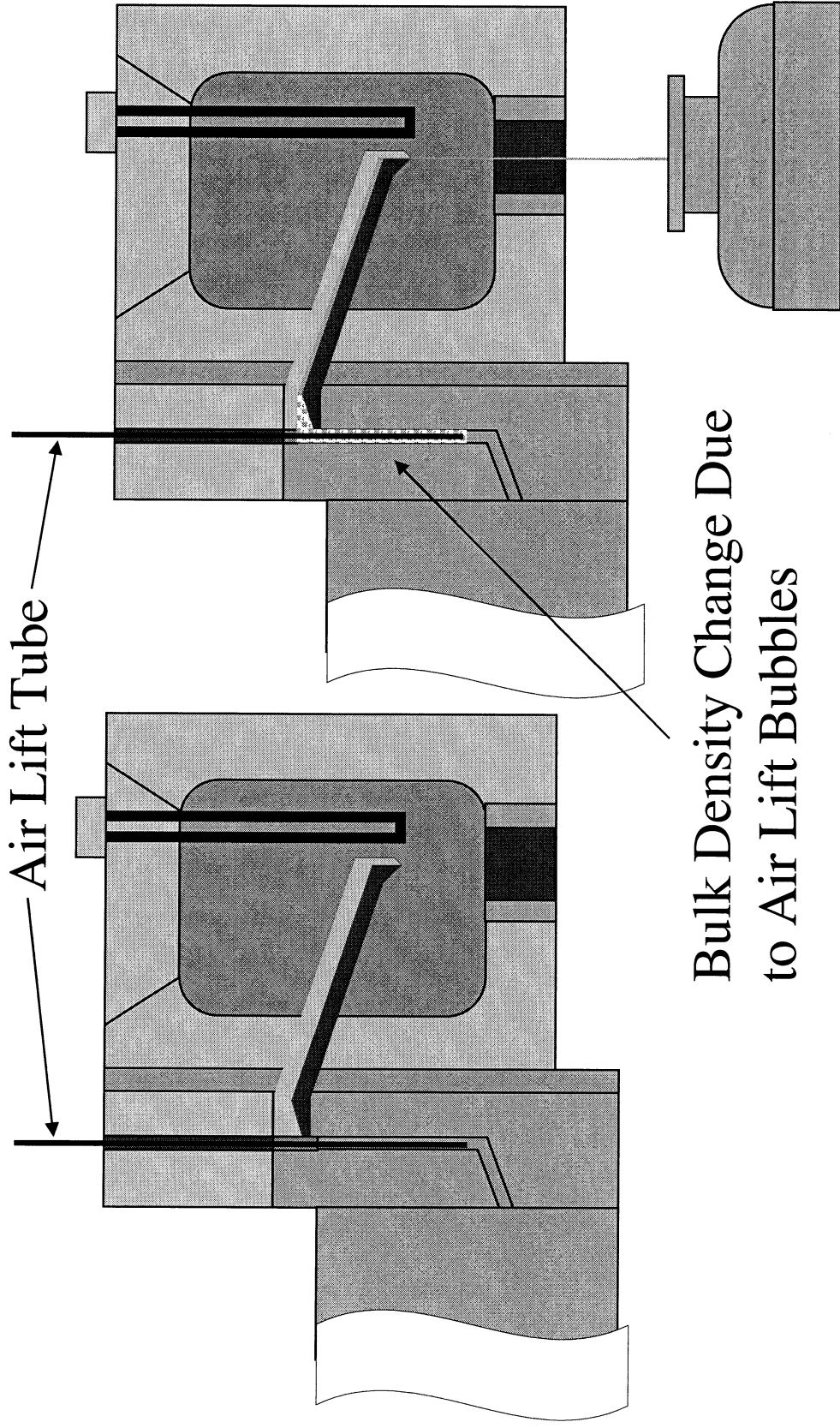
HLW MELTER- 100 tons - 14 ft x 15 ft x 12 ft -3.75 Sq M of glass surface - 1.5 to 3.0 MT/day.

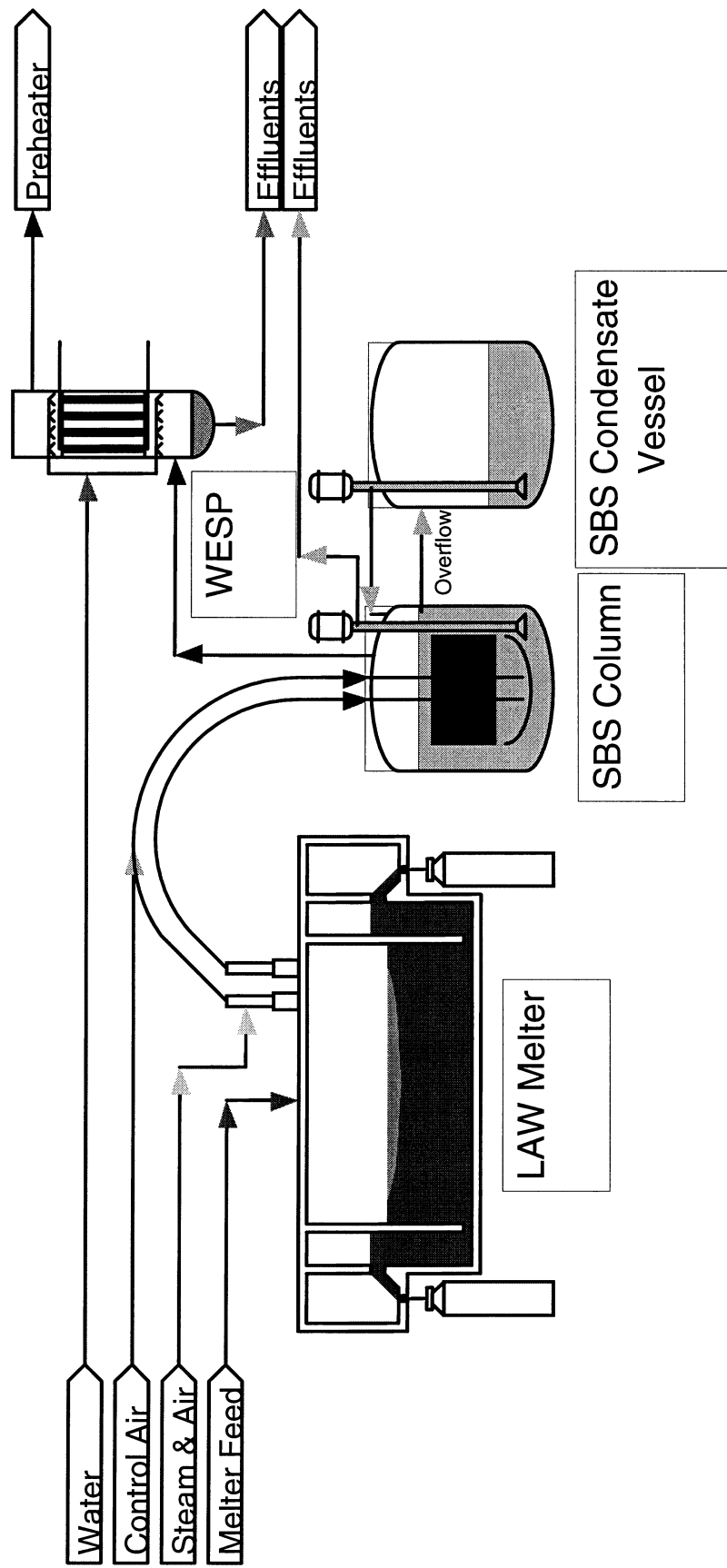
Wet Process Cell

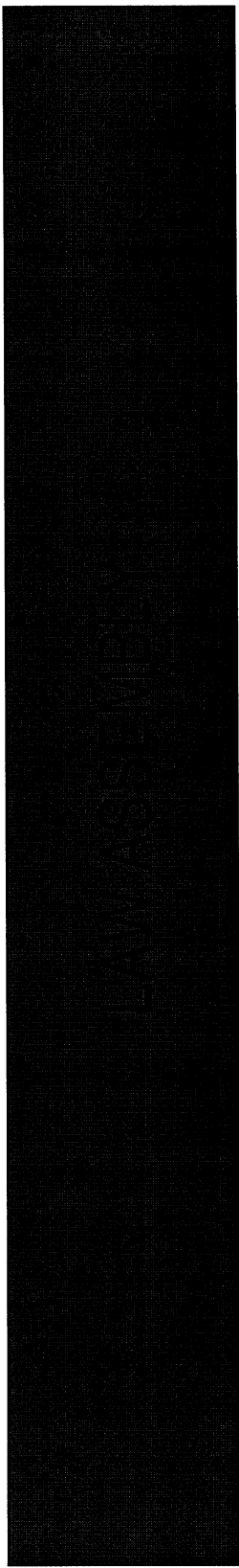








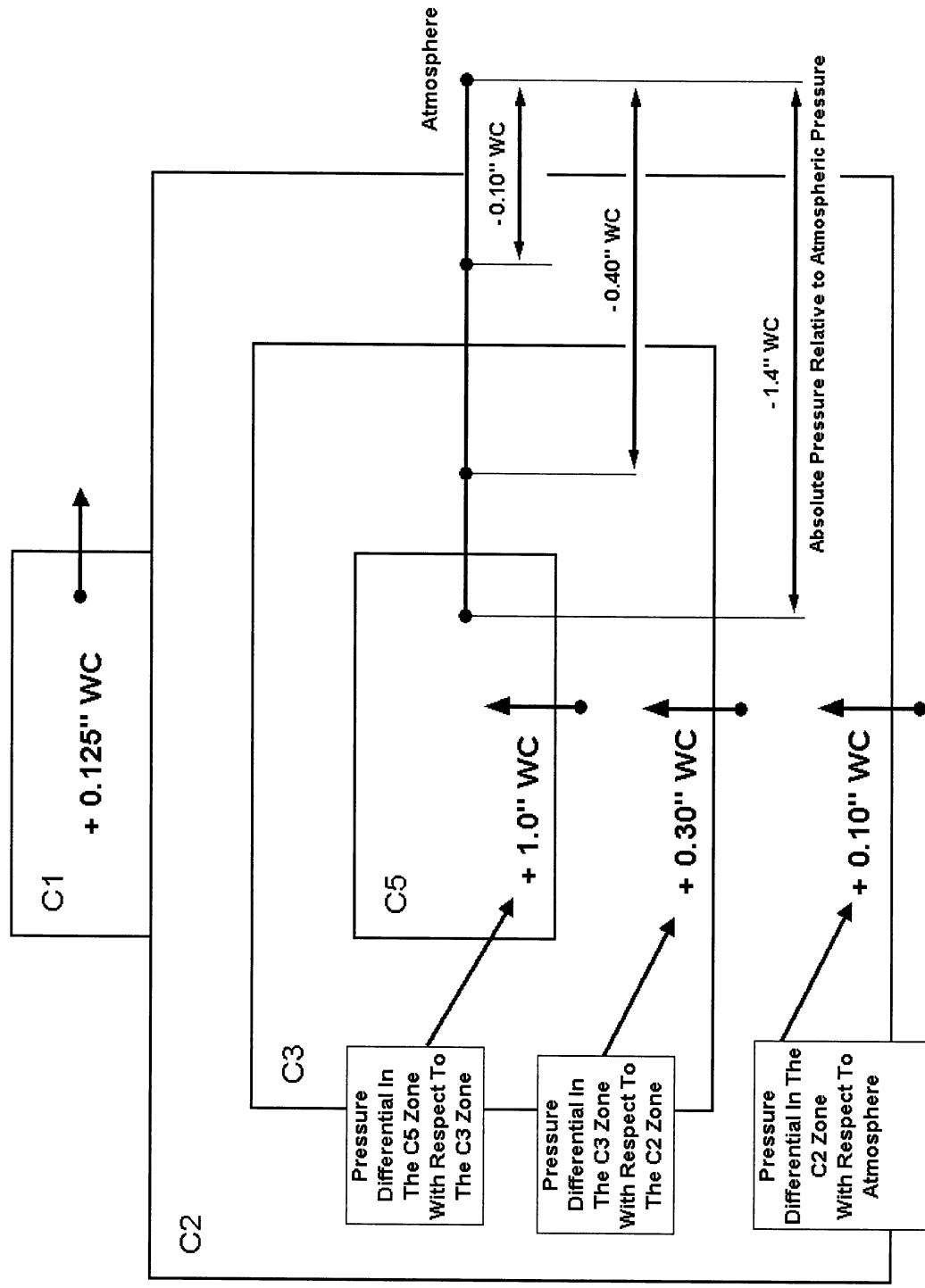




Automation of LAW Melter Assembly

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- HVAC Design Criteria
 - Confinement Zones and Pressure Differentials
 - HVAC System Capacities
 - HEPA Filters and Housings

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- **ASME AG-1 Code on Nuclear Air and Gas Treatment**
 - **ASME N509 Nuclear Power Plant Air-Cleaning Units and Components**
 - **ASME N510 Testing of Nuclear Air Treatment Systems**
 - **ASME NQA-1 Quality Assurance Program Requirements for Nuclear Facilities**



Nominal Pressure Differential By Contamination Zone



Pretreatment Facility

- C2 Air Supply = 210,000 CFM
- C2 Exhaust = 82,000 CFM
- C3 Exhaust = 54,000 CFM
- C5 Exhaust = 63,000 CFM
- Vessel Vent Exhaust = 3,000 CFM
- Reverse Flow Diverter / Pulse Jet Mixer Exhaust = 37,000 CFM



HLW Vitrification Facility

- C2 Air Supply = 162,000 CFM
- C2 Exhaust = 60,000 CFM
- C3 Exhaust = 55,000 CFM
- C5 Exhaust = 53,000 CFM
- Canister Storage C3 Exhaust = 11,400 CFM
- Canister Storage C3 Supply = 6,400 CFM



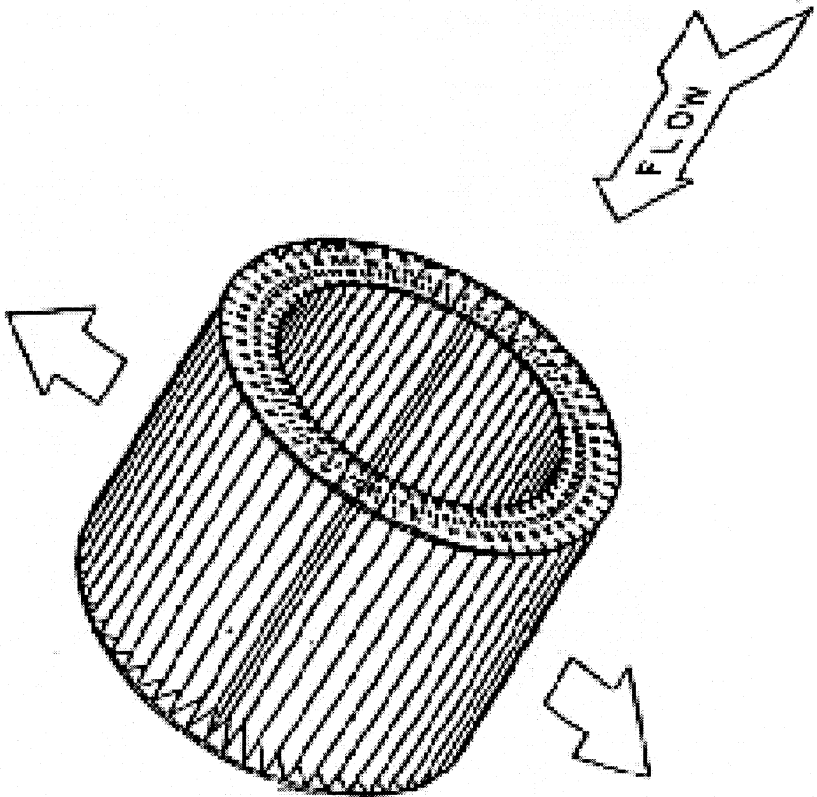
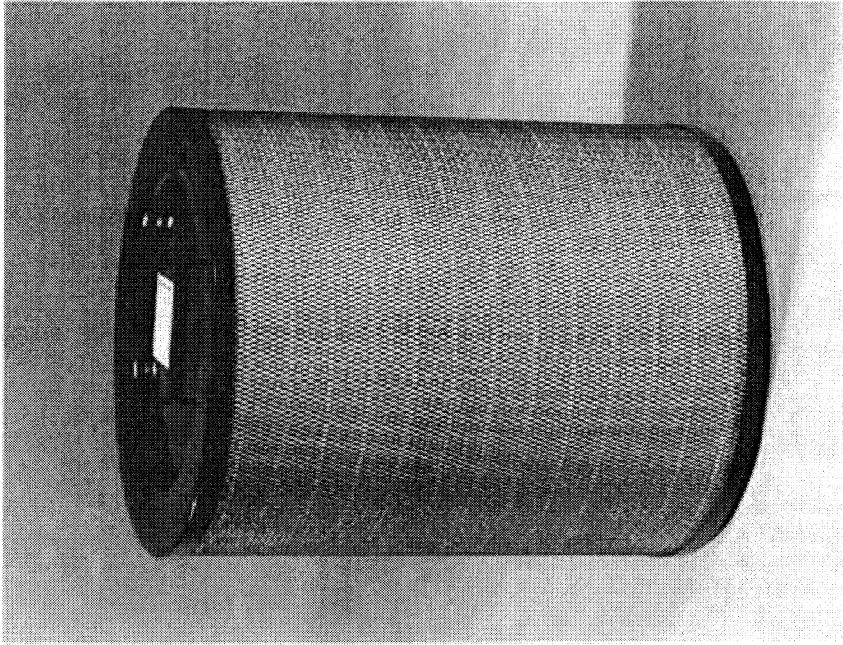
LAW Vitrification Facility

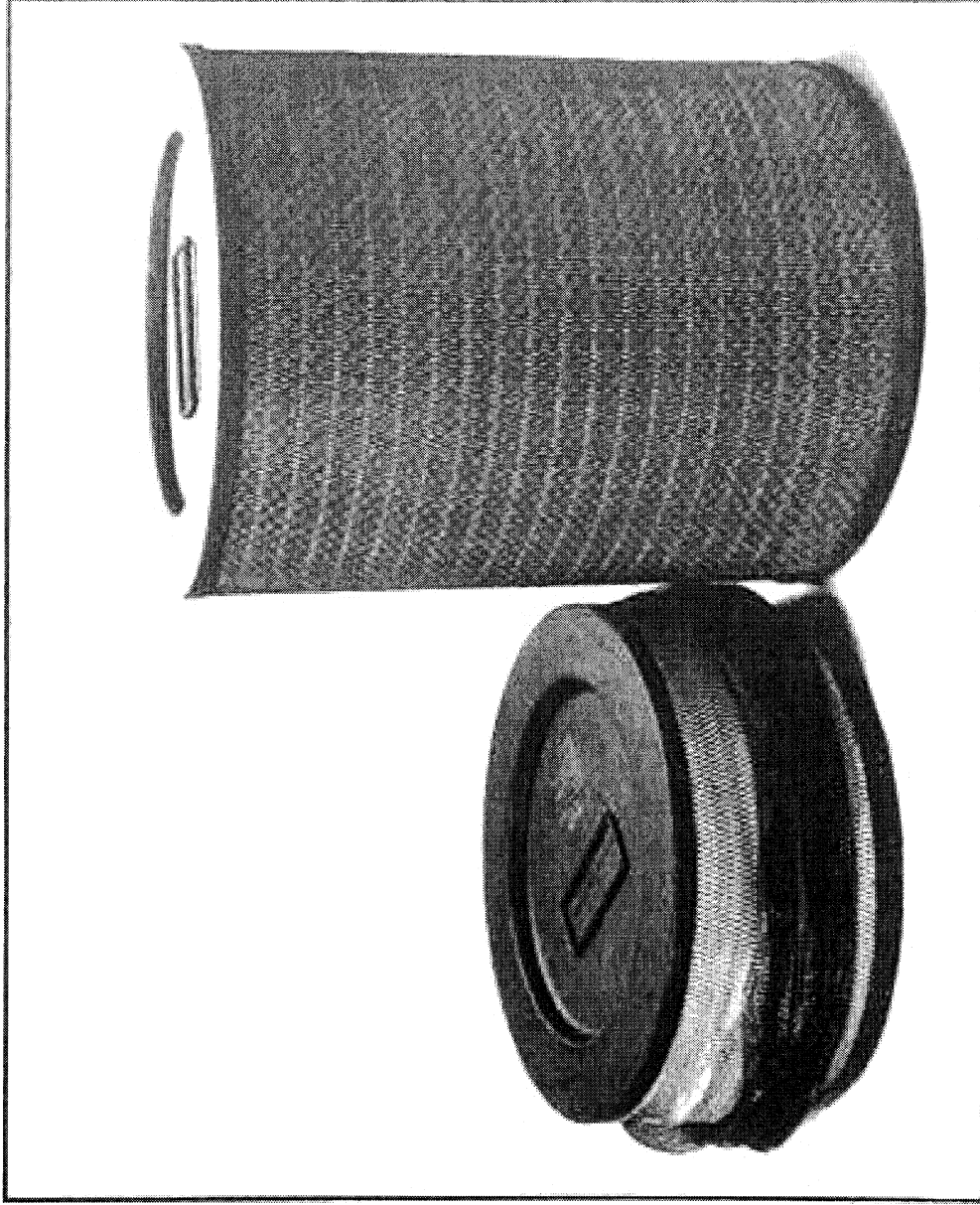
- C2 Air Supply = 115,000 CFM
- C2 Exhaust = 50,000 CFM
- C3 Exhaust = 45,000 CFM
- C5 Exhaust = 61,000 CFM
- Container Storage Exhaust = 42,000 CFM
- Container Storage Supply = 40,000 CFM



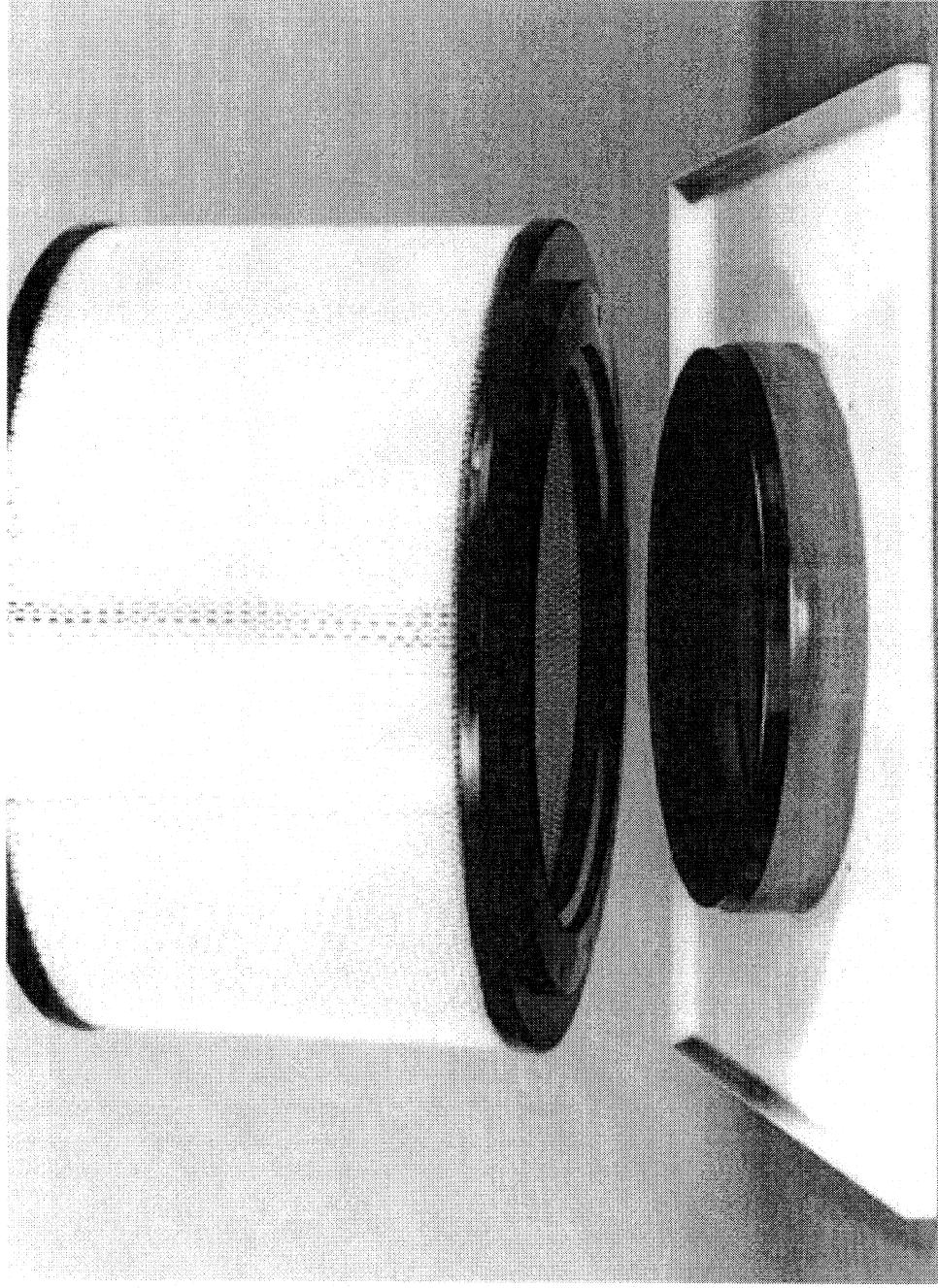
Analytical Laboratory

- C2 Air Supply = 124,000 CFM
- C2 Exhaust = 50,000 CFM
- C3 Exhaust = 82,000 CFM
- C5 Exhaust = 17,000 CFM



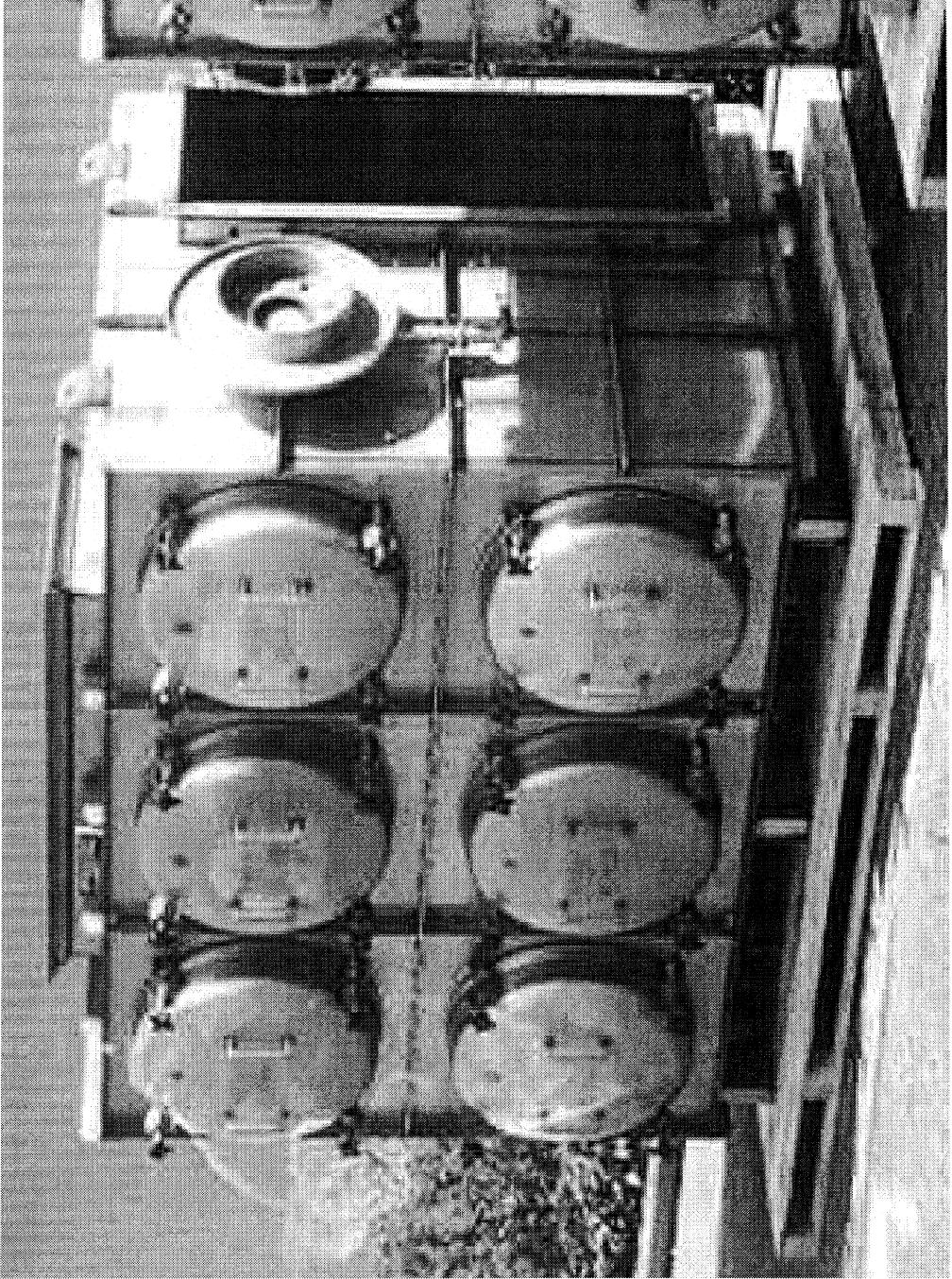


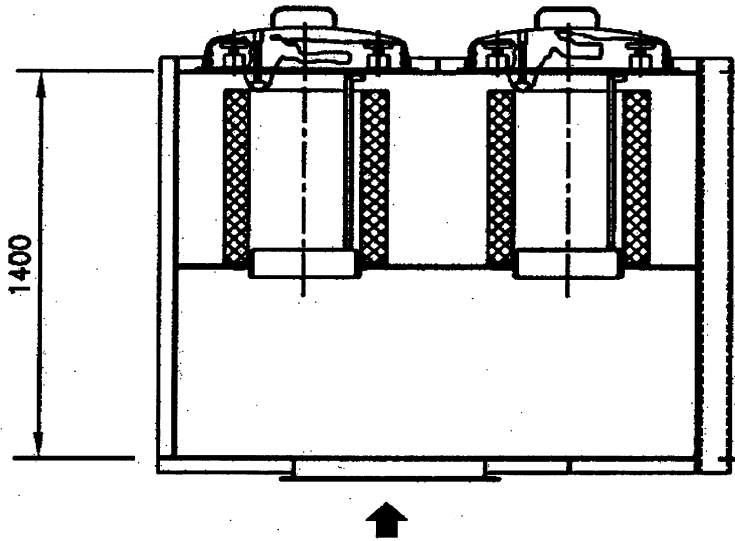
Compacted Radial Flow HEPA Filter



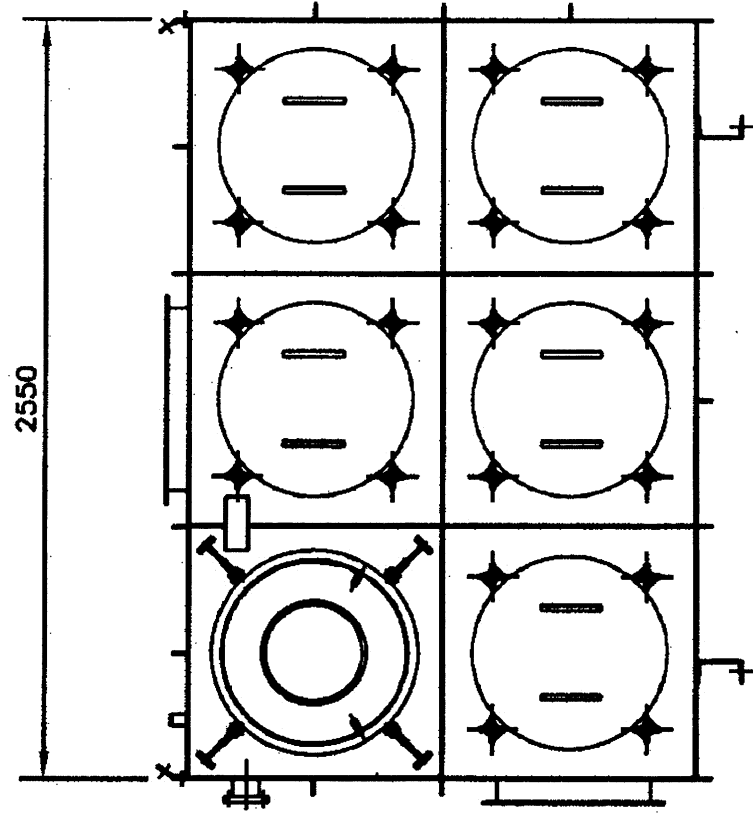
Safe Change HEPA Filter Seal

- Compact system -- lower building volume
- Sealing without clamping.
- Internal gaskets less likely to be damaged in normal handling.
- Improved filter positioning and orientation characteristics.
- Ease of reducing volume for disposal.
- Safer handling with no sharp edges.
- Confining the contaminant inside the annulus of the filter which minimizes the release of collected particles.
- This allows the filter to be plugged after use to limit the loss of collected material.



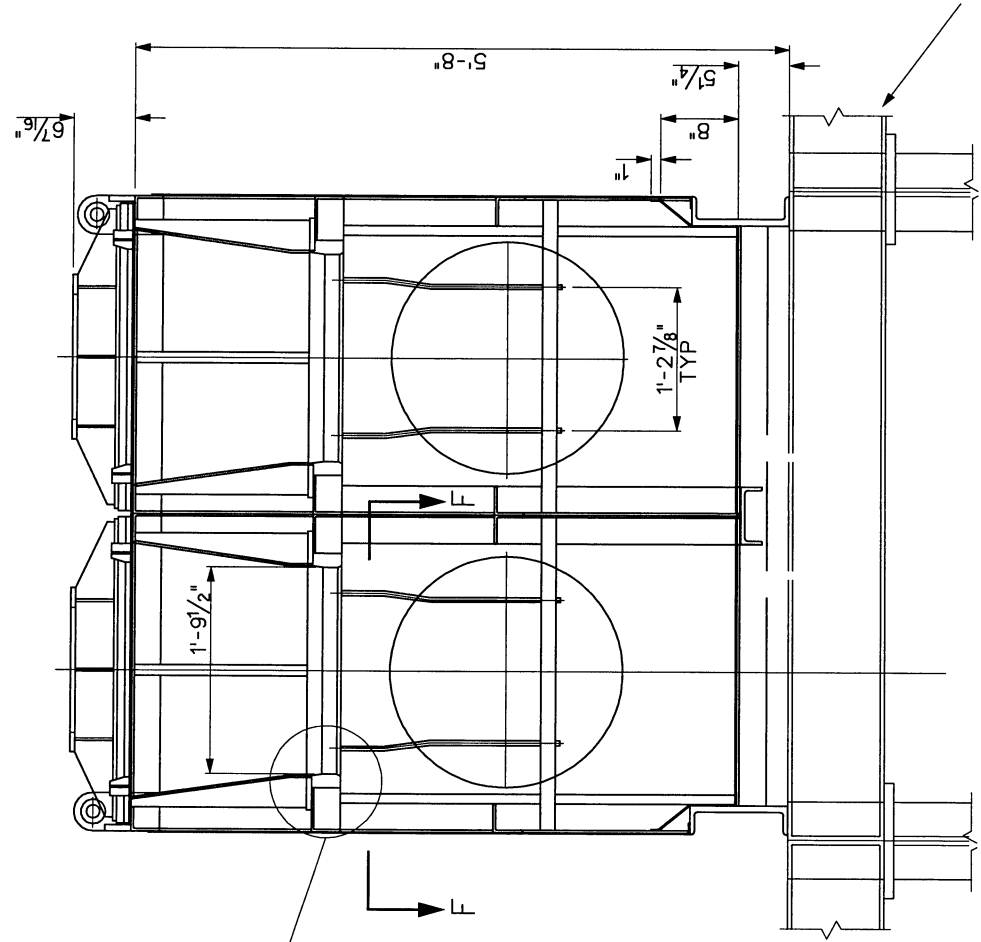
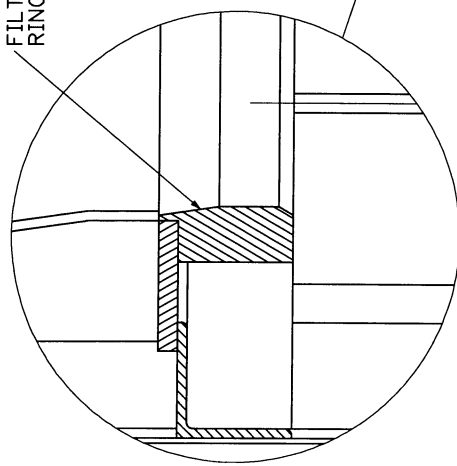


TYPICAL SECTIONAL ELEVATION



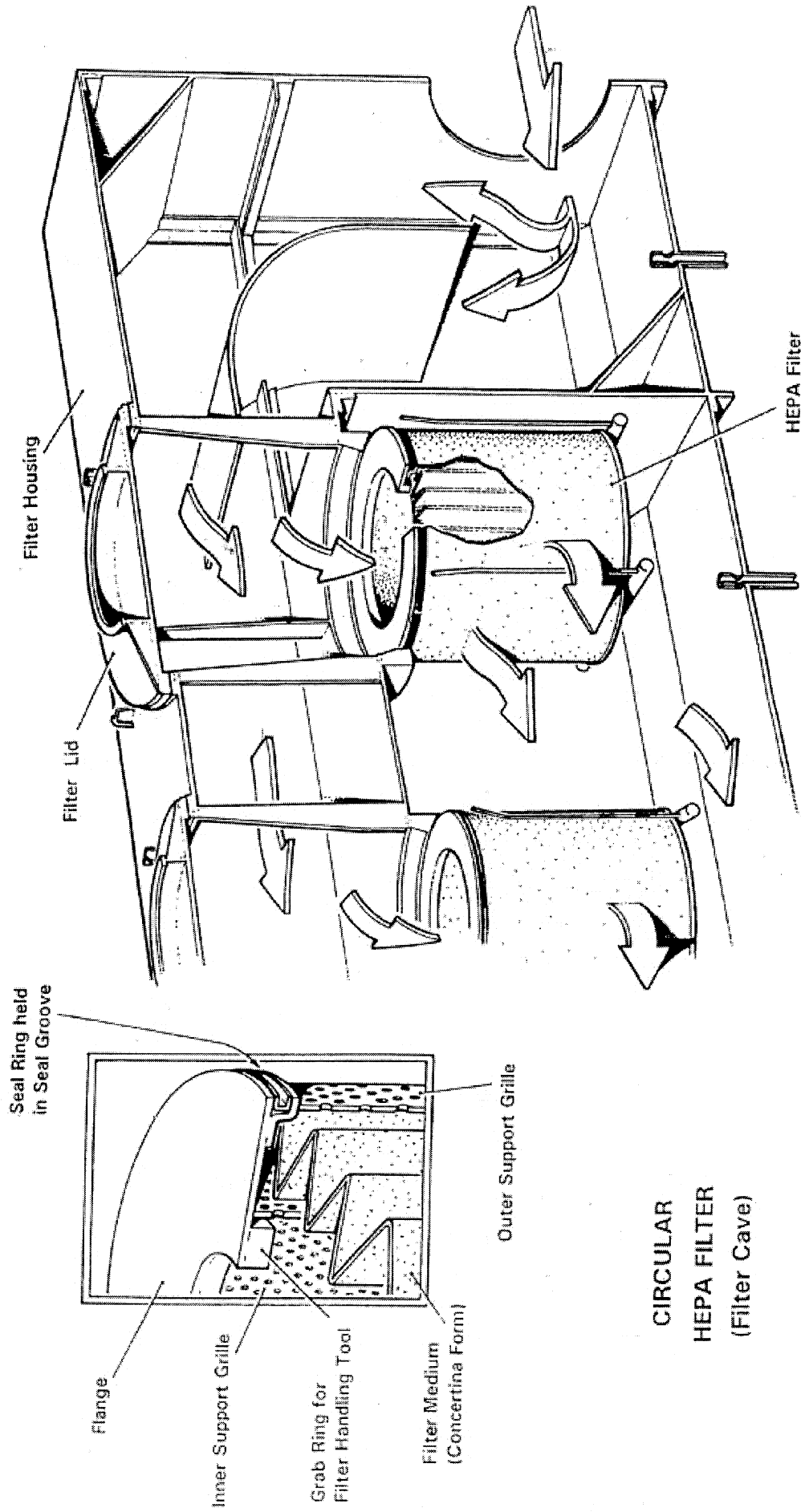
3 x 2 FILTER UNIT

FILTER SEATING
RING

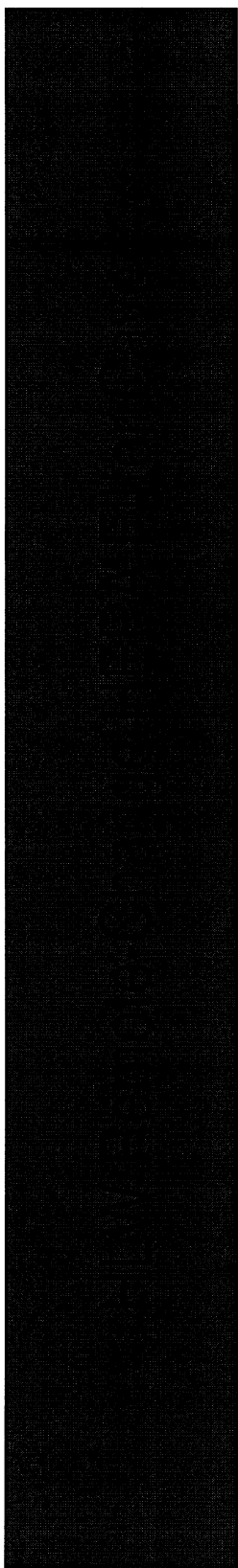


TYP (4) 1.2" DIA, ROD
PER FILTER POSITION

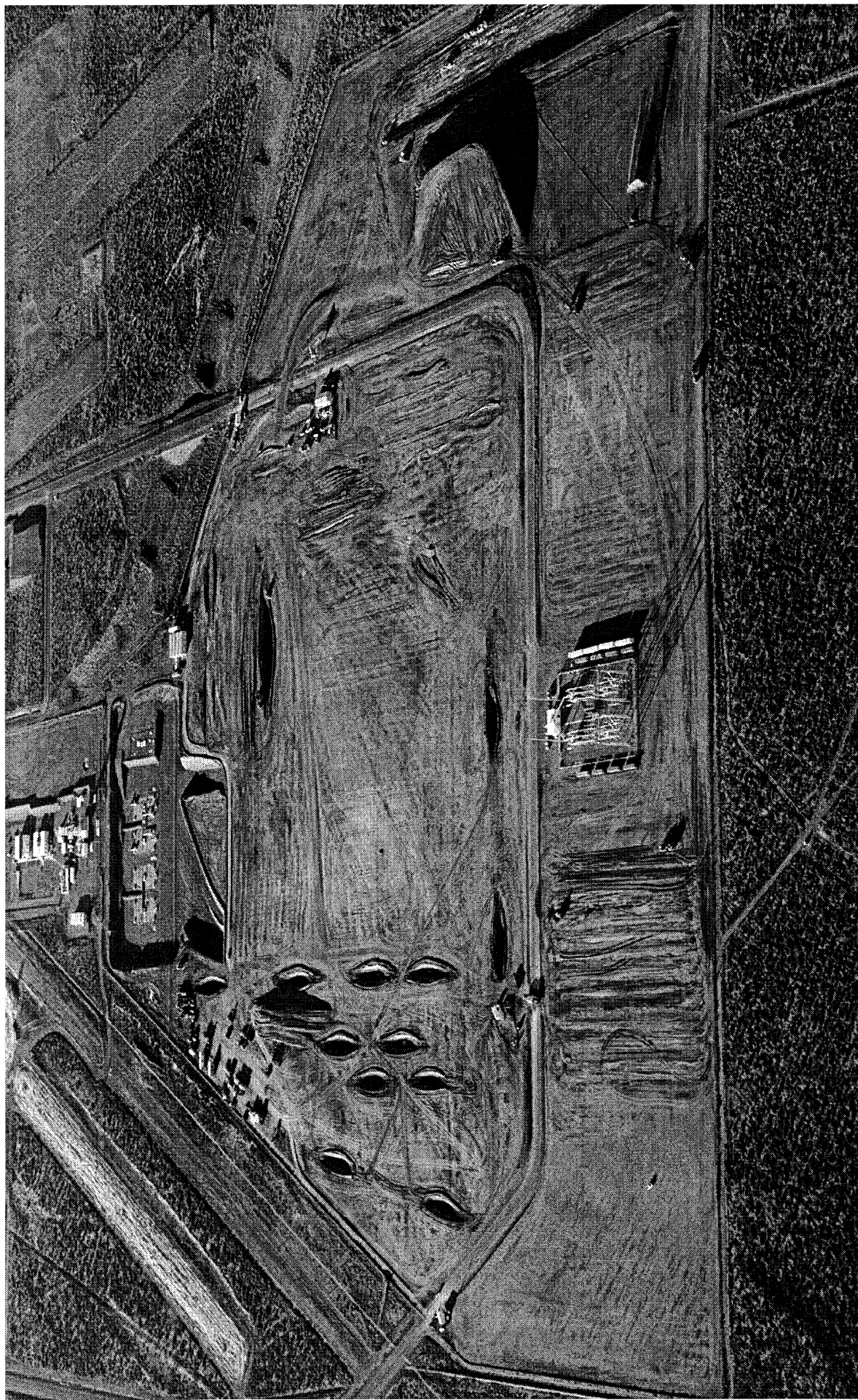
End View



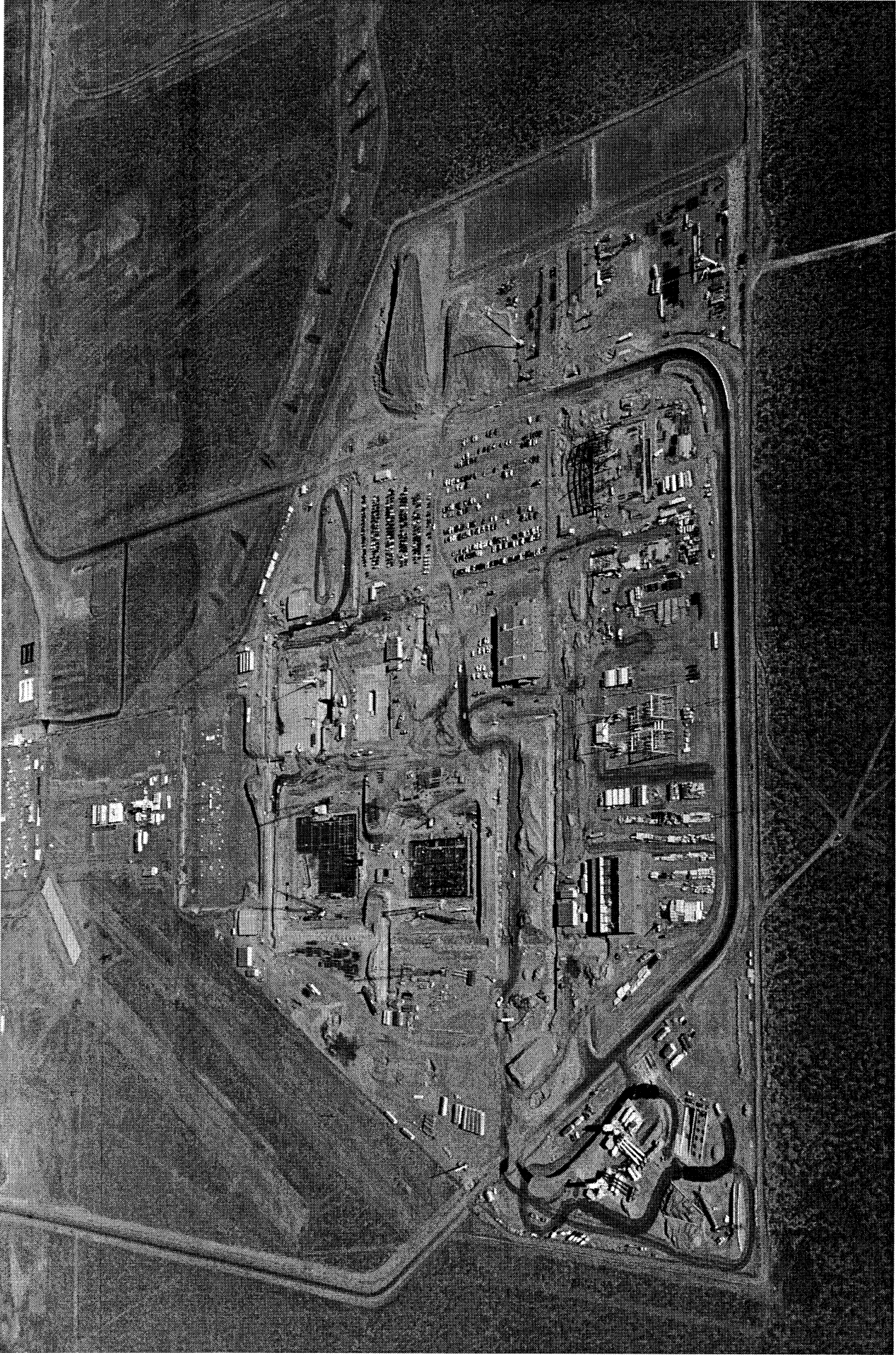
Section View



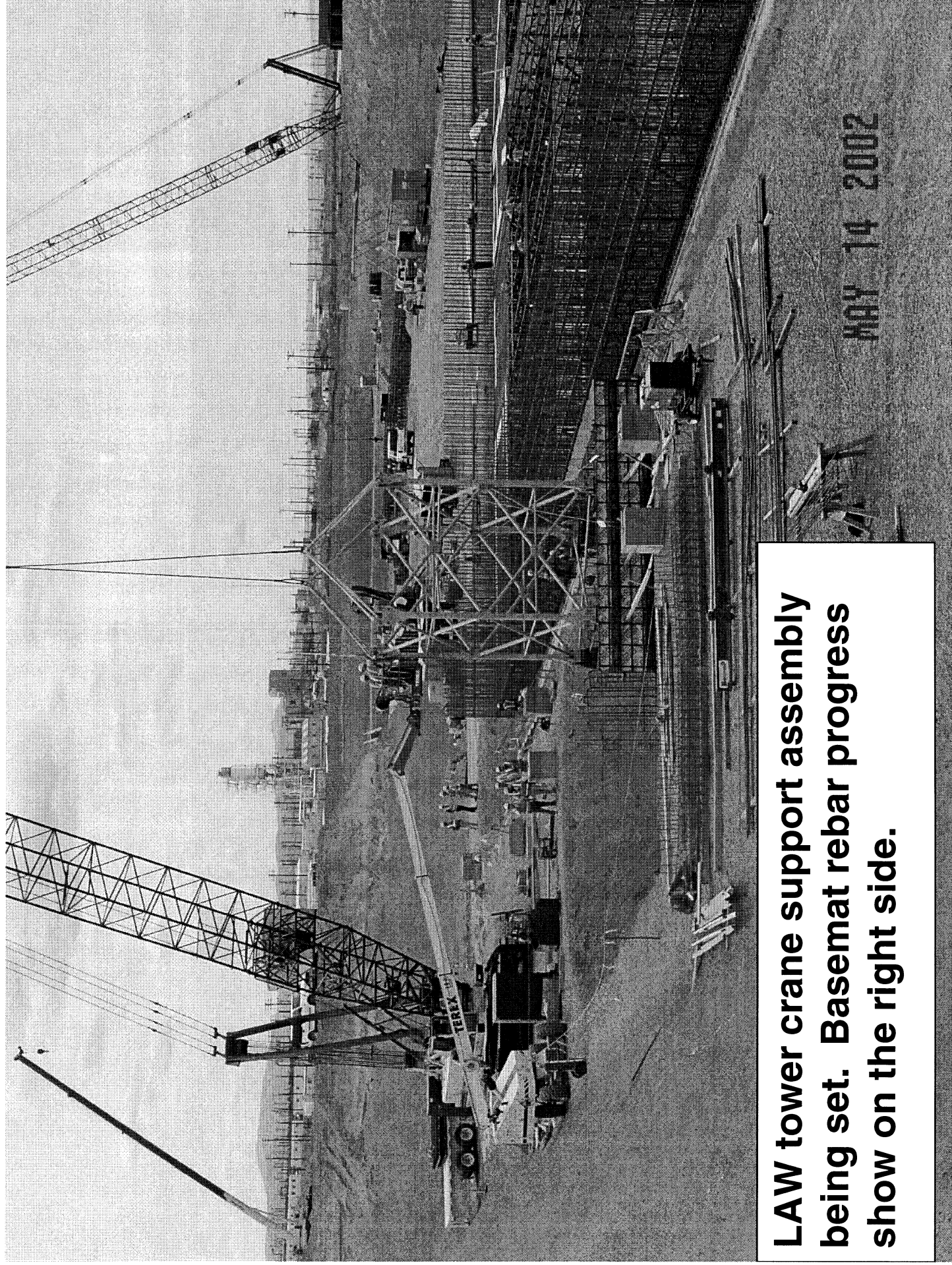
Automation of HLW HEPA Filter Change



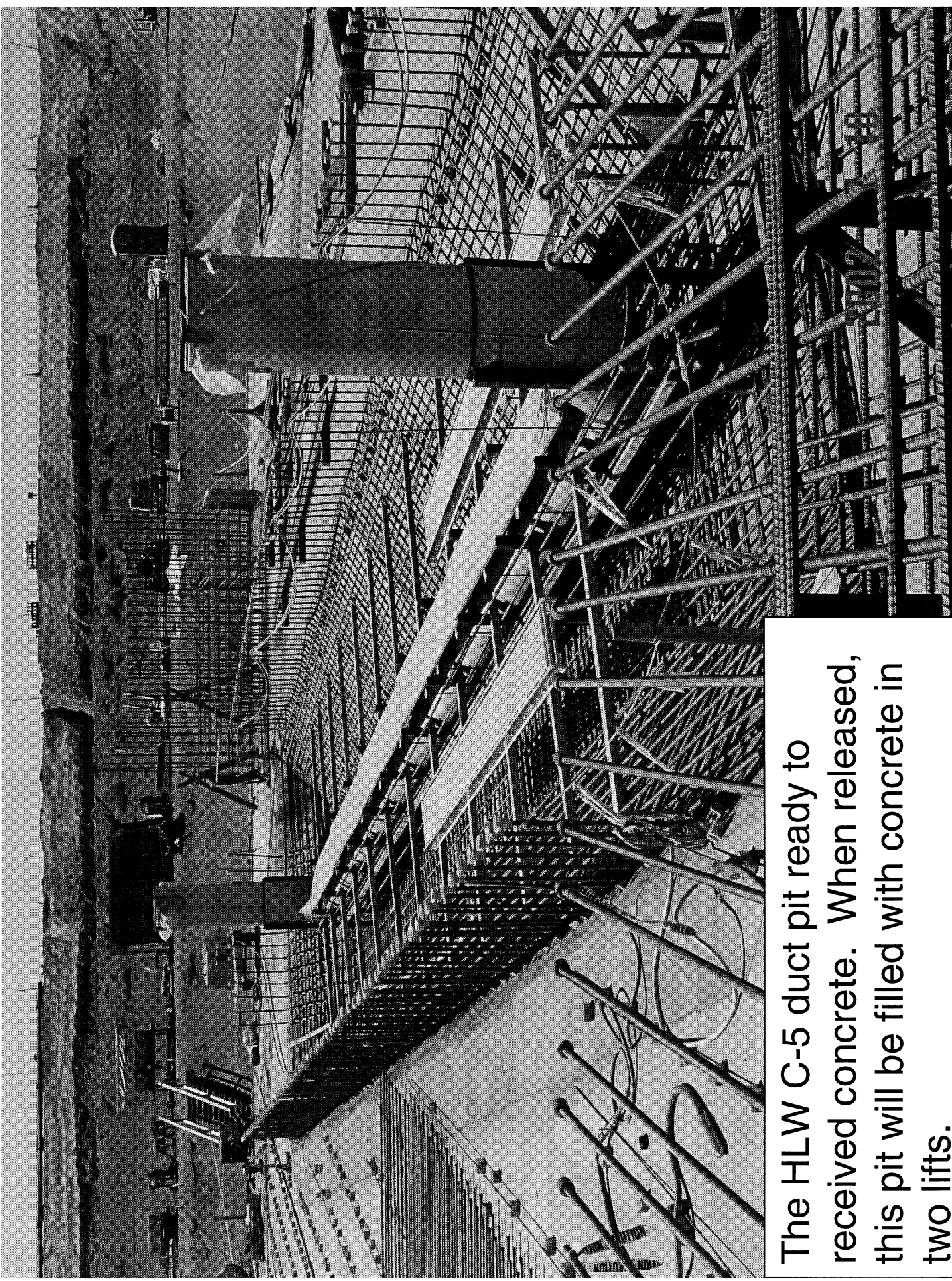
WTP Construction Site -- January 2002



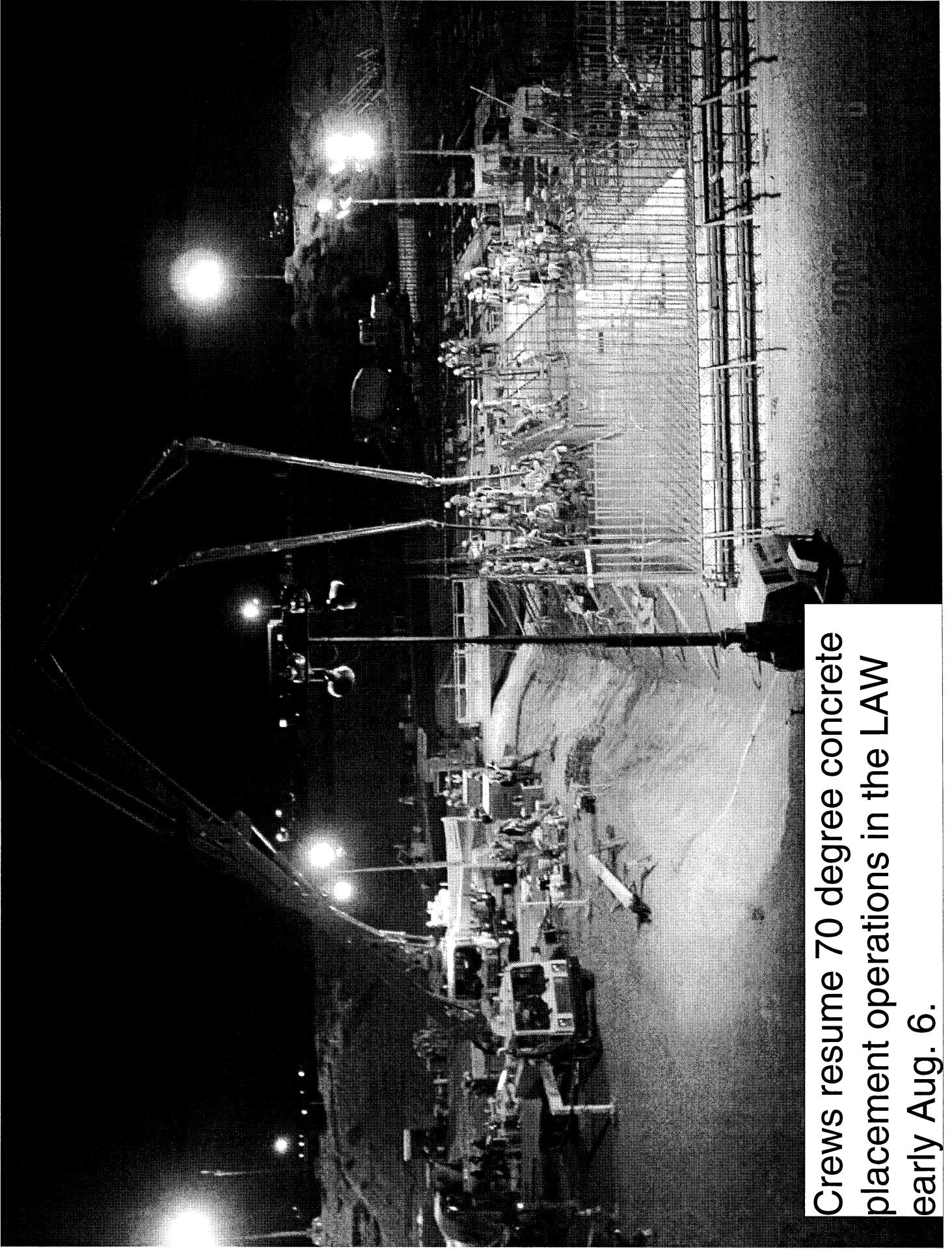
WTP Construction Site -- Today



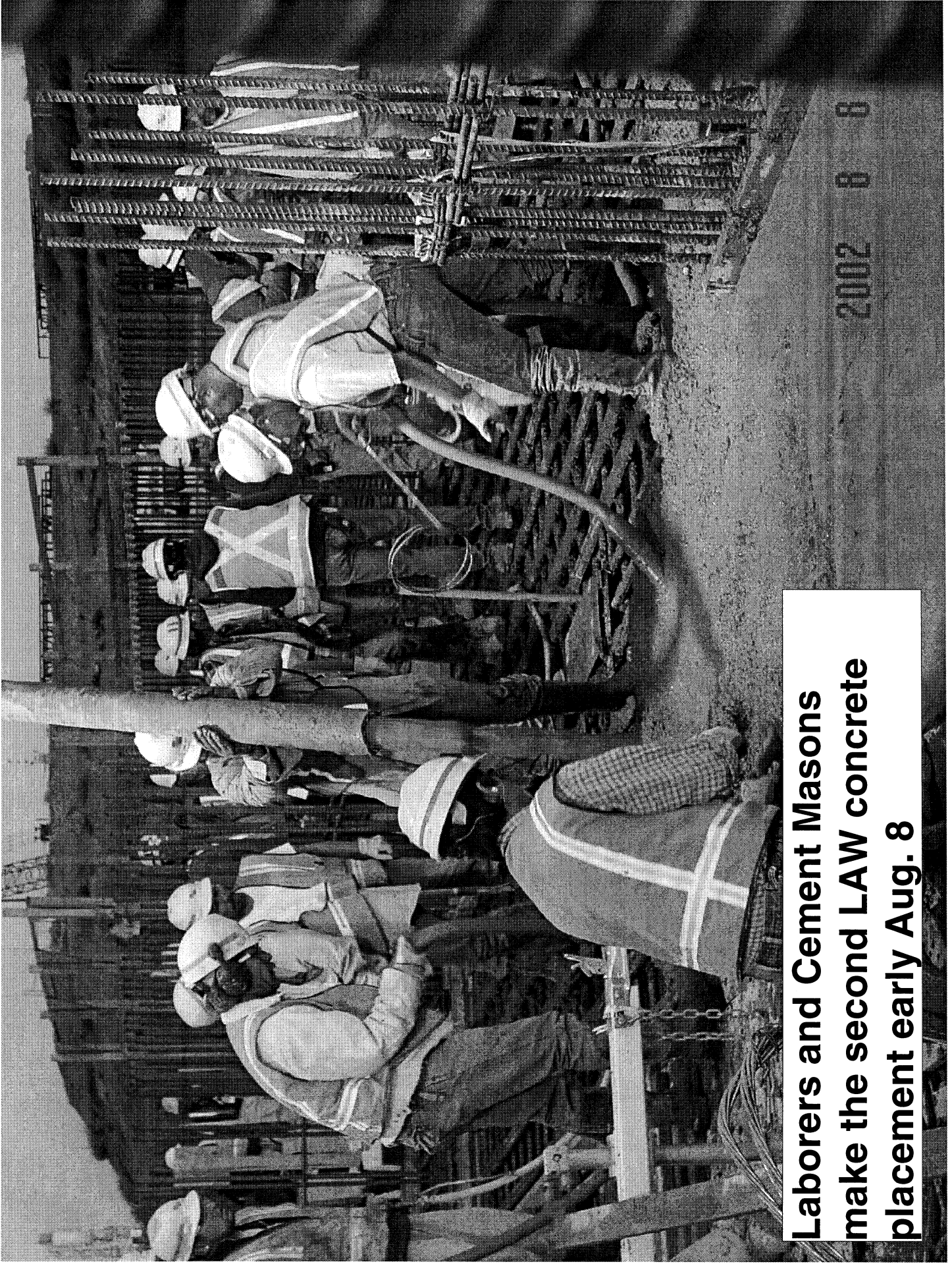
**LAW tower crane support assembly
being set. Basemat rebar progress
show on the right side.**



The HLW C-5 duct pit ready to received concrete. When released, this pit will be filled with concrete in two lifts.

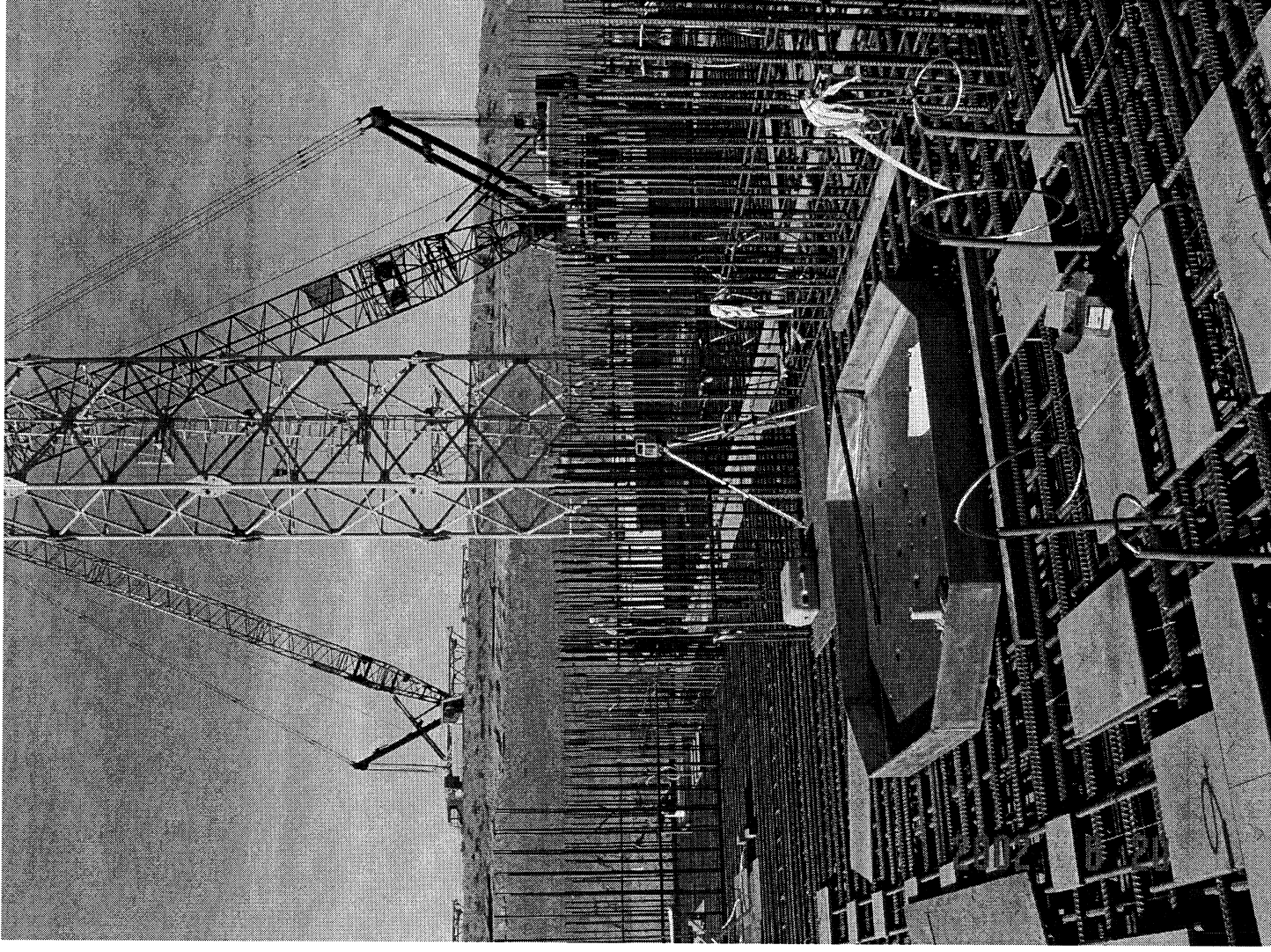


Crews resume 70 degree concrete placement operations in the LAW early Aug. 6.



**Laborers and Cement Masons
make the second LAW concrete
placement early Aug. 8**

2002 8 8



LAW basemat progress with interior wall rebar dowels and miscellaneous embedded metal. The special embed shown is the canister carousel embed.

Glass in 2007

**Safety
Quality
Compliance
Skilled Work Force
Schedule
Technology**

“Let’s get on with it”

