

TITLE I REPORT
FOR THE
CHEMICAL CLEANING AND PLATING FACILITIES

REPORT TO STANFORD LINEAR ACCELERATOR CENTER - ABA No. 75
STANFORD UNIVERSITY SUBCONTRACT S-136
UNDER AEC CONTRACT AT(04-3)-400

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INTRODUCTION

This report presents the Title I work for the Chemical Cleaning and Plating Facilities and associated services, including the cleaning and plating area, cleaning and chemical storage building, catch basin, and distilled water unit installations. The report consists of a general description of the work and preliminary drawings and schematics.

The plating-cleaning area will be located in the NE corner of the Fabrication Building. The cleaning and chemical storage building and the catch basin will be outside of, and north of, the building. The distilled water unit, with the storage tank and pumps will be in the vicinity of the Heavy Assembly Substation Building. The distilled water unit and piping will supply 10,000 gallons per day of distilled water to the plating-cleaning area, and 2,000 gallons per day to the Klystron Gallery.

BASIS FOR DESIGN

General

The facilities described herein are based upon SLAC criteria. The design incorporated features to meet the functional requirements, to allow flexibility for possible changes in arrangements, and to obtain efficient and economical operations. The equipment costs and scheduling of SLAC on-hand equipment and SLAC purchased equipment are not included in this report.

Plating-Cleaning Area: About 3,000 sq. ft. of the Fabrication Building has been set aside for the plating and cleaning area. This room will contain cleaning and plating tanks, power supplies, overhead air-operated

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traveling cranes, distributed cold, hot and distilled water, compressed air, agitation air, and nitrogen gas. The area will be designed to suit functional requirements. There will be substantial space below the floor level for ventilation ducting, piping, tank support, etc. The concrete pit below the floor will be covered with an epoxy-concrete coating. To minimize drafts in the room, the filtered, heated ventilation air will be supplied to a plenum below the roof and released to the room through a perforated ceiling. Fumes from the tanks will be exhausted by lip-type exhaust hoods. Utilities will be distributed as required. This report covers the moving and reinstallation of the cleaning and plating tanks, electric heaters and special equipment now in use by SLAC. Additional tanks, hot water heating coils, temperature controls, liquid level controls, solution controls, and other standard equipment and materials will be furnished and installed under this report.

Cleaning and Chemical Storage: The Cleaning and Chemical Storage Area is an enclosure containing ten cleaning tanks, the copper cleaning pit with five tanks, chemical and acid storage facilities, agitation air compressor, vapor hone, and dry blast equipment. Utilities and services are distributed in a pipe trench. An on-hand monorail, with 6 foot additional track, will be installed to serve the copper cleaning pit. An on-hand bridge crane, with 12 feet of additional rails, will be installed to serve the cleaning tanks. No ventilating, space heating, or exhaust equipment will be provided.

Catch Basin: The Catch Basin will be adjacent to the cleaning and chemical storage building. The basin will be a concrete structure, below grade with an interior epoxy-concrete coating and with grating cover. Its function will be to receive the chemical waste from the chemical cleaning

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and plating areas. Waste will be monitored and retained, if contaminated, for dilution and neutralizing before releasing it to the sanitary sewer. The basin capacity will be approximately 4,000 gallons.

Distilled Water Unit: The Distilled Water Unit will consist of water treating equipment, evaporator, storage tank, transfer pumps and control equipment, all located on a concrete pad within a concrete revetment in the embankment east of the Fabrication Building and north of the sub-station serving the Heavy Assembly Building.

The water treatment will consist of sand filtration and softening to reduce sludge and scale in the evaporator.

The evaporator will be the vapor compression type, automatic in operation, designed and instrumented to function unattended and to supply on demand a total of 12,000 GPD at 50 PSIG and at a maximum flow rate of 45 GPM. Storage for a full day's usage will be provided. The feed to the distilled water unit will be from the domestic water supply. No recycled distilled water will be returned from the using facilities.

A storage tank will be the vertical cylinder type with storage capacity for a full day's usage, constructed of glass fiber reinforced plastic.

Utilities

The utilities connections will be made to existing mains in the Fabrication Building or in the immediate vicinity of this building. The electrical power will be supplied from the existing control centers or panels in the Fabrication Building.

Health and Safety: The facilities will be conventional industrial types and the attendant health and safety hazards can be considered ordinary and typical to working environment. All applicable codes such as the

Uniform Building Code, State of California General Industry Safety Orders and AEC Design Criteria will be followed in regard to health, safety and fire protection.

Equipment Source: This report covers furnishing and installing all equipment, materials, and services except as listed below.

SLAC-Purchased Items - The following equipment will be purchased by SLAC for delivery to the site. Installation is included in this report.

Quan.

- 1 Evaporator, distilled water
- 1 Storage tank, distilled water

On-Hand Items - This report covers moving the following on-hand equipment from its present location on the Stanford Campus to the site and installing them in the new facility as shown on the drawings.

Quan.

- 31 Tanks, plating and cleaning
- 1 Ultra-sonic cleaner
- 1 Drying cabinet
- 1 Dry blast cabinet
- 1 Vapor hone
- 9 Tank heaters, electric
- 10 Rectifiers
- 2 Cranes

Stored Items - The following equipment will be purchased by SLAC and stored. This report covers the transfer of the following items from storage and installing them as shown on the drawings.

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<u>Quan.</u>	
1	Drying cabinet
1	Vapor degreaser
1	Blower, low pressure air
34	Tanks, plating and cleaning
10	Rectifiers

OUTLINE SPECIFICATIONS

Plating & Cleaning Areas

Supply Air Unit: Cabinet type with belt driven centrifugal fan, high efficiency filters, hot water heating coils, supply 100% outside air.

Supply Air Distribution: Galvanized iron ducts to a plenum over a perforated ceiling.

Exhaust Hoods: Double-slot lip ventilators, down-draft type, fiberglass-reinforced plastic construction with adjustable slot gates.

Exhaust Ducts: Fiberglass-reinforced plastic, with drain and cleaning provisions.

Exhaust Fans: Roof mounted, belt driven, centrifugal, forward curved blades, stainless shaft, corrosion proof coated, vertical discharge.

Cranes: Manually propelled; air operated hoist with exhaust oil trap, stainless steel chain, one ton capacity; 1/4 inch diameter air hose.

Monorails: Manually propelled; air operated hoist with exhaust oil trap, stainless steel chain, 1000 lb. capacity; 1/4 inch diameter air hose.

Piping Systems

Agitation Air; Copper tubing main lines and Schedule 80 polyvinyl-chloride (PVC) branches to tanks, bronze valves with neoprene seats.

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Domestic Water: Type L copper pipe, soldered, with bronze globe valves. The system shall have two stainless-steel filters with 50-micron elements, Cuno Manufacturing Company or equal.

Tanks Drains & Overflows: PVC pipe and valves with neoprene seats.

Heating Water Supply & Return: Schedule 40 steel, insulated, Insulation coated with fiberglass-reinforced plastic in process area.

Buried Drainage Lines: High silicon cast iron, and PVC pipe and fittings.

Distilled Water: Interior piping, Schedule 80 threaded PVC pipe, and PVC valves with neoprene seats. Outdoor buried lines, welded stainless steel pipe, Type 304.

110 PSIG Air: Stainless steel pipe, Type 304, welded, with diaphragm type shut-off valves; or Schedule 40 steel pipe coated with fiberglass-reinforced plastic in process area.

Duct Boards

Fir 2 x 4 on edge, with 1/2" space, made in sections for handling ease.

Support Structures

Structural steel shapes protected by corrosion resisting paint. Concrete columns will be epoxy coated.

Floor and Pit Surfaces

Concrete with epoxy-concrete coating.

Electrical

The electrical wiring system will, in general, be installed in rigid galvanized conduit using cast fittings and liquid-tight flexible connections. No other special consideration will be given this area. Power for the 120/208-volt equipment is available from Panels PP-J, K and L that are supplied from a 150-KVA transformer adjacent to the room.

Power for the 480-volt equipment, including the Distilled Water Unit, will be supplied from Control Center CC3-1. Spaces are available in the Control Center to serve the ventilating fans, compressor, and pumps. An additional 480-volt panel will be installed as required adjacent to the plating area for the smaller 480-volt loads and the 480-volt single phase rectifier loads.

Cleaning and Chemical Storage Building

General (Per Uniform Building Code, 1961 Ed.)

- | | |
|-------------------------|----------------------|
| 1. Occupancy | F-2 |
| 2. Type of Construction | IV |
| 3. Number of Stories | 1 |
| 4. Location on Property | Separated on 4 sides |
| 5. Area Limitations | Per UBC |

Building Foundations: Periphery grade beam, spread footings @ cols.

Structural Frame: Rigid steel frames both directions.

Roof: On metal deck, 4-ply built-up tar and gravel on 1-inch rigid insulation. Roof sloped 1/4" per foot to drains.

Exterior Walls: Pressed metal panels. East, west and the partial south walls will be constructed of full height vertical louvers.

Floor: Reinforced concrete slab.

Mechanical

The building will not have any heating, ventilating or air conditioning equipment installed. The plumbing will consist of service piping to cleaning tanks.

Electrical

The electrical services will consist of incandescent light fixtures (18 @ 500 W eas) , 120 V outlets (6), and one 12 circuit panel. The illumination level will be approximately 15 foot-candles.

Distilled Water Unit

The Distilled Water Unit will include a water treating facility, evaporator, storage tank, transfer pumps, and control equipment, all interlocked by instrumentation to operate automatically and unattended.

Capacity: Will be 12,000 GPD at 50 PSIG and at a maximum rate of 45 GPM.

Quality: The distilled water to be produced from softened Hetch-Hetchy water is defined as containing not more than 1 ppm total dissolved solid (expressed as sodium chloride by the conductivity method after boiling).

Materials: Equipment, piping, instruments and valves in contact with distilled water will be of material compatible with distilled water, such as stainless steel, plastic, glass teflon and high silicon bronze. Packing for valves or pumps and gaskets for flanged joints will be teflon.

Services: The distilled water unit will be provided with the following facility services:

- (a) 30 PSIG Instrument Air
- (b) 240° Hot Water Supply and Return
- (c) Electric Power for Motor Drives, Instrumentation and Lighting
- (d) Waste Drains to Sewer
- (e) Domestic Water

The Water Treating Facility will consist of a sand filter, softener, brine tank, and salt storage bin. The unit will have a capacity of not less than 14,000 gallons per 20 hour operating day. The filter will be instrumented and valved to operate automatically.

Evaporator - Vapor compression type distillation unit having a capacity of not less than 10 GPM (600 GPH or 14,400 GPD) complete with compressor, pumps, heat exchangers, instruments, controls, interconnecting piping, heat insulation, structural base and electrical wiring.

The Storage Tank will be 12'-0" dia x 15'-0" high, with a nominal total capacity of 12,600 gallon (846 gal per ft or 70.50 gal per inch). The tank will be fabricated of mandrel wound glass filaments bonded and coated with epoxy plastic (Blac, Siwalls & Bryson, Inc., "POXYGLAS" or equal). The storage tank will be fitted with manholes, nozzles, ladder, rail and level indicating controls. The level instrument will be supplied to and installed by the tank fabricator.

The storage tank automatic level gage will be a float actuated, ground reading, vapor proof type with three electric switches to

- (a) shut down evaporator
- (b) start evaporator
- (c) actuate low level alarm.

All tank gage material in contact with content of tank liquid or vapor will be stainless steel. Tank gage will be Shand and Jurs Co., Figure 2006 or equal.

Transfer Pumps will be centrifugal or turbine type, with stainless steel case, impeller and shaft. Capacity will be 45 GPM at a head of 115 feet.