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**Pacific Northwest Laboratory
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This Document consists of

Pages

234-5 Project
Specification Letter 234-2, 235-9
Analytical Control Laboratory

The analytical requirements as set forth by the 234-5 Chemical Development Group (Document HW-7362) have been reviewed by the Laboratories Division. The work requested will be largely routine control of solutions and solid material containing a very high percentage of plutonium. There will be numerous analyses requiring the use of specialized equipment, such as spectrographs, high vacuum apparatus, recording spectrophotometers, etc., as well as standard equipment and procedures in use on the plant today. The purpose of this letter is to outline the manpower and floor space requirements, which are considered necessary to adequately service the 234-5 project.

Employing the best analytical time units available, it is estimated that a total of 33 persons will be necessary to handle the analytical load of 2400 analyses per month (including supervision and clerical). This is also based on a straight day operating basis. It is estimated that 17 women and 16 men would be a logical break-down.

It has been indicated by members of the 234-5 Development Group that, insofar as possible, one building only should be used to house the operating, analytical and other service groups. Security and radiation hazard control regulations will be very stringent. It is advisable, therefore, to limit the number of people having access to complete information and limit the number of people working in any one particular area to as few as possible. With this in mind, a proposed laboratory layout (see attached sketch) is being submitted. It is desirable to leave this layout intact if possible, and fit it into the operating building currently under design. Zoning (with regard to radiation control) and security regulations will be set up in accordance with plant policies. It is recommended, however, that the hallways and laboratory areas will be classed as Zone 2, while the inside of hoods will be classed as Zone 4.

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By Authority of per J.B. O'nealy
12-5-72

By J.H. Wells - 11-19-94

Verified By J. M. Mally
11-21-94

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Floor space requirements, based on a total of 2400 analyses per month, will be approximately 7800 sq. ft. This includes one office, a large spectrographic laboratory with office included, high vacuum and spectrometer laboratories, counting rooms, hallways, store room, glass blowing bench, balance room, decontamination room, process reagent lab, special analyses lab, hand decontamination bay, and several small "hot" labs. It should be noted that men and women's hot and cold locker rooms, a lunch room, power and instrument department rooms are not included. It is expected that facilities for the personnel listed above will be incorporated in the main plant. One front office is requested in addition to the proposed laboratory.

The entire laboratory should be windowless, outside walls of cinder brick and painted plaster (assuming that this is the material with which the building proper will be constructed). Rubber tiled floors laid over concrete with a bond of rubber cement-linen mastic-rubber cement are requested. Inside walls between the small laboratories should be movable to provide flexibility of arrangement, and no cracks or crevasses should be in evidence. It is suggested that these walls be constructed of a baked enamel steel from the floor to a height of four feet, and safety glass from there to the ceiling. Six foot hallways are recommended.

A temperature and humidity control of 75° F. and 35% RH should be maintained in the counting room, three type (2) laboratories, hy-vacuum, spectrophotometer, spectrograph and balance rooms. Desert cooling is satisfactory for the other laboratories and offices.

Air flow should be directed from hallways to laboratories to hoods, as in the manner of the Isolation Bldg. Air flow through open laboratory hoods should be a minimum of 150 linear feet/min. The exact design of these hoods is still under consideration, but it is estimated that the largest opening will be 37" x 44". (This estimate is accurate to within 10%). Exhaust from all hoods in hot laboratories should be filtered.

Some general specifications in layout of the various rooms may be itemized as follows:

- (1) Spectrographic, hy-vacuum and X-Ray Spectrophotometer laboratories to be as far as possible from the counting room.
- (2) The decontamination room to be located as conveniently to other labs as possible.
- (3) The Process Reagent Lab should not be surrounded by type (2) labs if possible. It is desirable to keep this room in the laboratory unit, rather than place it near the operating solution preparation room.
- (4) Entrance of all samples to be via the sample receiving window only. This window should be accessible to the operating department.
- (5) The shift supervisor's office should be conveniently located to all working areas.
- (6) Distilled water consumption is estimated to be a maximum of 4 gal/hr. Aluminum piping is suggested, being cheaper and easier to install than block tin. A central water supply for the operating group and the laboratory is satisfactory.

- (7) Lighting should be adequate for close, repetitive work, e.g. at least 50 foot candles on the laboratory bench tops.
- (8) All drains will go to a common building sump.
- (9) The counting room should be soundproofed. No other soundproofing will be necessary.

The following tabulation will indicate the facilities to be provided in each of the various rooms. Standard monitoring equipment will be supplied throughout the building. All piping should be concealed in removable casings behind work benches and hoods, and working surfaces are to be highly polished (#4 polish, as in Isolation Bldg.) stainless steel.

Office: 2 man

Area: 400 sq. ft.
Standard furniture and file cabinets. Equip with two telephones.

Type (2) Laboratory: 2 man

Area: 200 sq. ft. (10' x 20')
Hoods: Four stainless steel hoods of design to be submitted later - all against one wall.
Table: Stainless steel top of design to be submitted later.
Services: Water, air, propane gas, electricity.
Cabinet: Standard steel, approximately 5' x 2' x 6' with sliding glass doors.

Counting Room

Area: 400 sq. ft. (20' x 20').
Services: Regulated 110 volt lines, individual copper tube lines to each Simpson Counter to carry 0-5 lbs. pressure 99.9% methane gas.

Three Simpson Proportional Counters and one standard air chamber counter placed on stainless steel topped tables, are considered adequate.

Sample Storage and Receiving Room: one man

Area: 225 sq. ft.
Sample storage room: 5 x 15' with open stainless steel shelves spaced one foot apart up to six feet from floor. This room should be well ventilated. The door must lock.
The sample receiving shelf should be a stainless steel tray. It must be possible to lock this window securely.

The clerk will use a desk and file cabinet. One phone is needed.

A Dutch Door (to the hallway), which may be completely closed and securely locked (buzzer lock from inside) is requested.

These two rooms will be used for temporary storage of samples pending analyses and return to process.

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Special Analyzes Laboratory: 4 men

Area: 400 sq. ft. (20' x 20')
Hoods: Three banks of four each against the walls.
Cabinets: Two standard steel, approximately 5' x 2' x 6' with sliding glass doors.
Table: Steel with stainless steel top of design to be submitted later.
Services: Distilled water and tap, air, propane gas, electricity.

Hand Decontamination Bay

Hood: One stainless steel sink piped with water (tap operated with foot treadle).
Electrical outlets to be supplied for monitoring instruments.

Decontamination Room: 2 men

Area: 200 sq. ft. (10' x 20')
Hoods: Four cleaning and one drying hood of design to be submitted later.
Table: One 10'-12' cabinet type, stainless steel topped - of design to be submitted later.
Services: Tap water, distilled water, air, electricity.

Store Room:

Area: 300 sq. ft. (15' x 20')
Shelves and open cabinets should be supplied. This room will also include a glass blowing bench and should, therefore, be supplied with propane gas and oxygen.

Balance Room:

Area: 100 sq. ft. (10' x 10')
Two stainless steel topped benches supported on concrete pillars are requested.

Spectrographic Laboratory

Area: 1900 sq. ft. (approx. 40' x 50')
Layout and equipment to be submitted later. One phone to be supplied.
Services: Air, distilled and tap water, propane gas and electricity.

Hy-Vacuum and Spectrophotometer Laboratory: 4 men

Area: 400 sq. ft. each (20' x 20')
Equipment and layout to be submitted at a later date.
Services: Air, distilled and tap water, propane gas and electricity.

R. E. Curtis

Laboratories Division
Technical Department

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By L. M. Knight
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