TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

5B Lookout Place

JAN 03 1991

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of the Application of )
Tennessee Valley Authority ) Docket No. 50-390

WATTS BAR NUCLEAR PLANT (WBN) - FINAL SAFETY ANALYSIS REPORT (FSAR)
CHAPTER 12, AMENDMENTS 54 - 63 (TAC NOS. 63647 AND 77061)

This letter provides TVA's response to NRC's request for additional information (RAI) dated October 19, 1990, concerning various updates to Chapter 12 of WBN's FSAR that were submitted in Amendments 54 - 63. The RAI included nine questions for TVA to answer. Our response to each of these questions is attached as Enclosure 1. A list of the commitments resulting from these responses is attached as Enclosure 2.

NRC's RAI requested a 45-day response time from the date of receipt of their letter. A two-week extension for TVA's response was agreed to verbally by Mr. Peter Tam of NRC on November 28, 1990.

If there are any questions, please telephone M. C. Bryan at (615) 365-8819.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

E. G. Wallace, Manager
Nuclear Licensing and
Regulatory Affairs

Subscribed and sworn to before me

on this 3rd day of January 1991

Sandra D. Burk
Notary Public

My Commission Expires 11/4/92

Enclosures
cc: See page 2



A053
1/3

ENCLOSURE 1

WATTS BAR NUCLEAR PLANT (WBN)
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI)
CHAPTER 12 UPDATES TO FINAL SAFETY ANALYSIS REPORT (FSAR)
AMENDMENTS 54 THROUGH 63

1. Question:

Amendment 63 made two substantial revisions to the description of the calibration and maintenance of area radiation monitors in Section 12.3.4.1.3 on page 12.3-22. The Watts Bar commitment to test functionally each monitor on a monthly schedule was relaxed to a quarterly functional test. No basis for this change was given. Also, the discussion of a two-point calibration for each monitor (consistent with industry standard ANSI 6.8.1-1981) was deleted.

Clarify whether your calibration and maintenance of area radiation monitors is consistent with ANSI 6.8.1-1981 or provide a basis for the adequacy of the proposed alternative methods. Provide a basis for the determination that quarterly functional tests will provide sufficient assurance of monitor stability to support an 18-month calibration frequency.

Response:

WBN has not committed to comply fully with ANSI 6.8.1-1981. However, the following information is intended to provide an adequate alternative basis for the methods that are used at WBN for the calibration and maintenance of area radiation monitors.

There are four types of tests performed on the area radiation monitors: pulse-to-analog alignment, check source response check, analog channel operational test (or functional test), and channel calibration.

Pulse-to-Analog Alignment -- This is a bench test that requires removal of the radiation module from its channel NIM bin. It verifies proper conversion of input detector pulses to output analog voltage at each decade of range. Performance of this test is required during the performance of the channel calibration, but is not specifically identified as a required test in FSAR Section 12.2.4.1.3 since it is considered to be part of the channel calibration. A similar test called a log picoammeter alignment is performed on the two high-range channels.

Check Source Response Check -- This test is performed on at least a monthly basis. It involves, on all area radiation monitors except the two high-range channels, exposing the detector to a radioactive source to verify upscale response at the radiation module and other indicating devices. The source response check for the two high-range channels simulates a detector input to the radiation module electronics.

Analog Channel Operational Test (Functional Test) -- This test, as previously defined in Section 1.1 of the Proposed WBN Draft Technical Specifications (April 1990), is required to included "injection of a simulated or actual signal into the channel as close to the sensor as practicable to verify OPERABILITY of alarm, interlock, and trip functions. The ANALOG CHANNEL OPERATIONAL TEST shall include adjustments, as necessary, of the alarm, interlock, and trip setpoints such that the setpoints are within the required range and accuracy." With respect to this definition, this requirement is met quarterly by using the built-in test features of the radiation modules. A signal is first injected at the output of the pulse-to-analog conversion circuit. Then, setpoints and alarm indications are verified and adjusted as required. Although not required, additional verifications, including indicator and recorder calibration checks and the check source response check, are performed during this test because the configuration of the equipment lends itself to such testing and because more detailed performance information is desired.

Channel Calibration -- This test is performed at least once every 18 months. It involves exposing the channel detector to an NBS-traceable Cs-137 source to verify calibrated response at the output of the pulse-to-analog conversion circuitry. The analog channel operational test and the pulse-to-analog alignment (or log picoammeter alignment) are performed concurrent with the channel calibration to ensure verification of the entire channel's performance. All area radiation monitors, with the exception of the high-range channels, receive a two-point calibration. The high-range detectors do not receive a second point-source exposure because the vendor-supplied calibration source has a strength at the second point of less than the channel's minimum reading of 0.1 R/hr.

TVA believes that a quarterly schedule, as opposed to a monthly schedule, for analog channel operational testing is justified based on past experience at WBN. There have been only infrequent instances when the area radiation monitor electronics that performs alarm, interlock, and trip functions has been found out-of-tolerance or inoperable. TVA believes that performing the check source response check (a monthly test) is more effective in determining the operability of the other channel components which are more likely to fail than the alarm circuitry.

Although the channel calibration of area radiation monitors, except the high-range channels, does include a second-point check with an NBS-traceable source, no particular emphasis is given to the low-exposure data point. This is because performing the pulse-to-analog alignment (or the log picoammeter alignment) is considered to be more reliable in determining proper calibration over the full range of the channel. The single-point-source response calibration is sufficient to ensure that the transfer function gain and the zero settings are appropriate for the installed detector, given that the pulse-to-analog alignment (or log picoammeter alignment) sets the gain and zero to an expected nominal detector response independent of the actual installed detector.

2. Question:

Amendment 63 deleted the description of the health physics operating facilities at Watts Bar from Section 12.5.2.

Provide a description of the health physics operating facilities to the level of detail prescribed in Regulatory Guide 1.70, Section 12.5.2.

Response:

The Radiological Control (RADCON) facilities consist of office space for the RADCON manager, section managers, technical staff, and clerical personnel; short-term record storage; and a laboratory.

A statement similar to the above description will be added to Section 12.5.2 in a future FSAR amendment.

3. <u>Question</u>:

Amendment 63 deleted the Watts Bar commitment to have health physics technicians onsite for 6 months prior to fuel loading from Section 12.5.1. Also, discussions of qualification requirements and resumes of key individuals (including the Radiation Protection Manager) have been deleted from Chapter 13.

Provide a resume for the Watts Bar Radiation Protection Manager and his backup. Provide a description of the number of fully qualified Health Physics Technicians assigned to Watts Bar (identify how many of these are contractors). Clarify whether the minimum qualifications of all health physics personnel are consistent with Regulatory Guide 1.8 or, if not, provide a basis for judging your alternate criteria acceptable.

<u>Response</u>:

The following commitment will be restated in Section 12.5.1 as part of a future FSAR amendment: "RADCON technicians will be assigned to the plant approximately six months prior to fuel loading to allow time for familiarization with the facility, personnel, and procedures."

A resume for the RADCON manager (J. W. Cox, Jr.) is attached. WBN does not presently have a specifically assigned backup for the RADCON manager. However, the requirements of Regulatory Guide 1.8, Revision 2, and ANSI/ANS 3.1-1981, which is endorsed by the regulatory guide, will be followed per TVA commitments in the Nuclear Quality Assurance Plan (TVA-NQA-PLN89-A), with alternatives as described in Appendix B of this plan. ANSI/ANS 3.1-1981 establishes the minimum education and experience for any individual who temporarily replaces the RADCON manager.

WBN RADCON will be staffed with approximately twenty-three health physics technicians for Unit 1 operation. None of these are planned to be contractors. The qualification requirements for RADCON positions (other than the RADCON manager) will meet or exceed the minimum acceptable levels as described in Regulatory Guide 1.8, Revision 2, Regulatory Position C.2, dated April 1987.

JACK W. COX, JR.

[redacted]

## EDUCATIONAL EXPERIENCE

B.S. Degree, May 1976, in Radiation and Nuclear Technology at Oklahoma State University, Stillwater, Oklahoma

## HEALTH PHYSICS EXPERIENCE

September 1989 - Present:

Watts Bar Nuclear Plant, Tennessee Valley Authority, Spring City, Tennessee

**RADIOLOGICAL CONTROL MANAGER**
Responsible for developing and implementing an effective radiological protection program. Areas under direct supervision include reviewing plant design changes for ALARA consideration; providing coverage for radiological work activities; maintaining personnel dosimetry and bioassay programs; and preparing radioactive material for shipment.

October 1983 - September 1989:

V.C. SUMMER NUCLEAR STATION, South Carolina Electric and Gas Company, Jenkinsville, South Carolina

**ASSOCIATE MANAGER, HEALTH PHYSICS (RADIATION PROTECTION MANAGER)**
Responsible for implementing and maintaining an effective Health Physics program in full compliance with regulatory requirements. Areas under direct supervision include reviewing plant activities to ensure that personnel exposures are maintained ALARA; providing Health Physics coverage for radiological work activities; monitoring and accounting for radioactive effluents released to the environment; maintaining personnel dosimetry and bioassay programs; receiving, shipping, and storing radioactive materials; packaging radioactive material for shipment in accordance with NRC and DOT regulations; calibrating and maintaining radiation survey and counting instrumentation; and providing direct input into programs for training and qualification of Health Physics and other Station personnel.

February 1981 - October 1983:

V.C. SUMMER NUCLEAR STATION

**HEALTH PHYSICS SUPERVISOR**
Responsible for initial development and implementation of Health Physics counting laboratory. Responsibilities include calibrating and maintaining portable and laboratory instrumentation; developing quality control program for counting equipment in accordance with

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JAN 03 1991

cc (Enclosures):
Ms. S. C. Black, Deputy Director
Project Directorate II-4
U.S. Nuclear Regulatory Commission
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11555 Rockville Pike
Rockville, Maryland 20852

NRC Resident Inspector
Watts Bar Nuclear Plant
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Spring City, Tennessee 37381

Mr. P. S. Tam, Senior Project Manager
U. S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

Mr. B. A. Wilson, Project Chief
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

## HEALTH PHYSICS EXPERIENCE

Regulatory Guide 4.15; establishing release criteria for radioactive effluents; establishing Radiation Monitoring System setpoint and correlation data; maintaining radioactive sources and emergency response equipment; and supervising 9 Health Physics Specialists.

November 1977 - February 1981:

HOUSTON LIGHTING & POWER COMPANY, Houston, Texas

**RADIATION PROTECTION TECHNICIAN**
Training: Student/Instructor for 520 Introductory Health Physics/Chemistry training course; on-the-job training/experience at Kewaunee Nuclear Power Plant (3 weeks), Oconee Nuclear Station (7 weeks), Three Mile Island Nuclear Station (6 weeks during recovery phase), Rancho Seco Nuclear Station (6 weeks), and Prairie Island Nuclear Generating Plant (3 weeks). Responsibilities: Writing and coordinating Health Physics procedures; maintaining company radioactive material licenses; establishing budget tracking system; maintaining fossil plant radioactive sources; maintaining instruments; and performing source leak testing and inventory.

June 1976 - October 1977:

INGALLS SHIPBUILDING, PASCAGOULA, MISSISSIPPI

**RADIATION CONTROL ENGINEER**
Responsibilities: Reviewing major jobs for adequate radiological controls; reviewing work procedures (overhaul and refueling), drawings, and other technical documents to ensure radiological control requirements are incorporated; evaluating radiological status of ships' systems from available survey data making recommendations for handling associated piping, components, equipment, etc.; preparing standard procedures and departmental operating instructions; recognizing inadequate radiological work practices and affecting corrective action; and handling budget for Radiation Control organization.

4. Question:

Amendment 56 revised the description of the processing and handling of personnel dosimetry TLD badges in Section 12.5.2. Two statements in this revision need clarification. They are the relaxation of processing frequency for personnel TLDs from monthly to quarterly, and the processing "in accordance with ANSI 13.11."

Clarify whether personnel dosimetry at Watts Bar will be processed with a program that is accredited for all radiation categories under the National Voluntary Laboratory Accreditation Program consistent with 10 CFR 20.202(c). Provide the justification that shows that quarterly processing of TLDs is adequate to insure that radiation doses received by plant personnel are within the limits of 10 CFR 20.101 and are ALARA.

Response:

In a future FSAR amendment, the paragraph in Section 12.5.2 (on page 12.5-4) that begins "A TLD badge service is provided onsite..." will be replaced by a discussion similar to the following paragraph.

Personnel monitoring is conducted using thermoluminescent dosimeters (TLDs) and direct-reading dosimeters (DRDs). Each person entering a radiologically controlled area is provided with a TLD badge and may be provided a DRD if exposure conditions warrant. TVA is accredited as a TLD processing laboratory in all eight categories described in American National Standards Institute (ANSI) N13.11-1983, "Personnel Dosimetry - Criteria for Performance," by the National Voluntary Laboratory Accreditation Program that is conducted by the National Institute of Standards and Technology. TLDs may be processed onsite by WBN personnel as an accredited subfacility or by another processing laboratory that falls within the scope of TVA's accreditation. Quality assurance provisions for dosimetry processing meet the requirements of accreditation. Dose information for whole body, skin of the whole body, lens of the eye, and extremities is used by a real-time dose tracking system and retained in a permanent historical data base for generating required reports. Real-time exposure control is generally implemented using DRDs. The data from DRDs are tracked in the real-time exposure control system until replaced with TLD data, which are the official doses of record. DRDs are supplemented with alarming dosimeters when radiological conditions make their use advantageous. Doses are calculated when dosimetry devices are not available or their use is not practical.

With respect to the quarterly versus monthly processing of personnel TLDs, the extension of the processing frequency is justified by use of the real-time exposure control tracking of DRD exposure. Fade studies of TLDs in use show no significant fading in the interval between a month and a quarter. Real-time exposure tracking is used for as-low-as-reasonably-achievable (ALARA) tracking and trending and to ensure that 10 CFR 20.101 limits are not exceeded.

5. Question:

Amendment 63 revised the specification in Section 12.5.2 for the sensitivity of whole body counters used at Watts Bar from 1 percent of a maximum permissible body burden (MPBB) to 5 percent of a MPBB.

Provide a justification for this change. Typically, well run whole body counting programs have sensitivities much less than 1 percent of a MPBB for isotopes normally found in a power plant.

Response:

The whole body counter sensitivity stated in Amendment 63 was in error. The sensitivity should have been given as approximately five percent of maximum permissible organ burden rather than "approximately 5 percent of maximum permissible body burden." In a future FSAR amendment, the last paragraph in Section 12.5.2 will be replaced by a discussion similar to the following two paragraphs.

WBN RADCON has a whole body counter to determine internal deposition of gamma-emitting radionuclides. The frequency of counts with this whole body counter will be determined for each individual based upon the work environment of that individual. The counter will be calibrated with standard radioisotopes in configurations that approximate the human body. It will employ a multichannel analyzer and a shielded detector system. This system will be able to detect approximately five percent of maximum permissible organ burden for the common gamma-emitting radionuclides, with the exception of Ce-144 and Ru-106, in the associated organs of reference. The lungs and thyroid will be the organs of reference for all minimum detectable activity requirements.

Data obtained from the whole body counter may be supplemented by urinalysis. The necessity to perform urinalysis will be determined for each individual based upon the work environment of that individual. Urinalysis and whole body counter data will be maintained as a part of each employee's permanent exposure record. The whole body counting program action level recommendations of Institute of Nuclear Power Operations (INPO) 88-10, "Guidelines for Radiological Protection at Nuclear Power Stations," are above five percent of maximum permissible organ burden. WBN's radiation protection program follows these INPO guidelines.

6. Question:

Amendment 63 revised the description of controlling access to high radiation areas in Section 12.5.3. The controls described are a significant relaxation from the requirements of 10 CFR 20.203(c) or the provisions for high radiation area access control in the Standard Technical Specifications.

Provide the basis for determining that this alternative control is adequate. Also, Section 12.5.3 is inconsistent with notes on Table 12.3-2 "Access Control Areas." Resolve this discrepancy.

Identify each area in the plant where dose rates can exceed 100 rads per hour during normal operations and refueling outage conditions and describe the controls employed to prevent unauthorized personnel access to each.

Response:

In FSAR Amendment 63, the words "if practical" were added to the statement which requires high radiation areas greater than 1000 mrem/hr to be posted and locked except when authorized entrance is required.

The words "if practical" were added to allow the use of barriers, conspicuous posting, and a flashing light for high radiation areas greater than 1000 mrem/hr that are located within larger areas, such as containment, where no enclosure exists for purposes of locking and where no enclosure can be reasonably constructed around the individual high radiation area. RADCON may provide continuous coverage for personnel entering high radiation areas greater than 1000 mrem/hr. Continuous coverage may also be provided by personnel who are qualified in radiation protection procedures and who have the responsibility to provide positive exposure control over the activities being performed within the high radiation area. Specific Radiation Work Permits (RWPs) that include stay-time calculations and and immediate work area dose rates may also be used in lieu of continuous RADCON coverage. This basis is consistent with Standard Technical Specifications, Section 6.12.2 (NUREG-0452, Rev. 4).

A proposed revision of Table 12.3-2, "Access Control Areas," is attached to resolve inconsistencies with other information provided in the FSAR. This revised table or a similar change will be incorporated in a future FSAR amendment. Areas in the plant that exceed 100 mr/hr are identified by Zones IV and V on Figures 12.3-1 through 12.3-8 and 12.3-11. Updated versions of these figures are attached. Note that the versions of Figures 12.3-1, 12.3-3, and 12.3-4 which are currently in the FSAR inadvertently omitted radiation zone identifications. The latest figures will be incorporated into a future FSAR amendment.

TABLE 12.3-2

ACCESS CONTROL AREAS

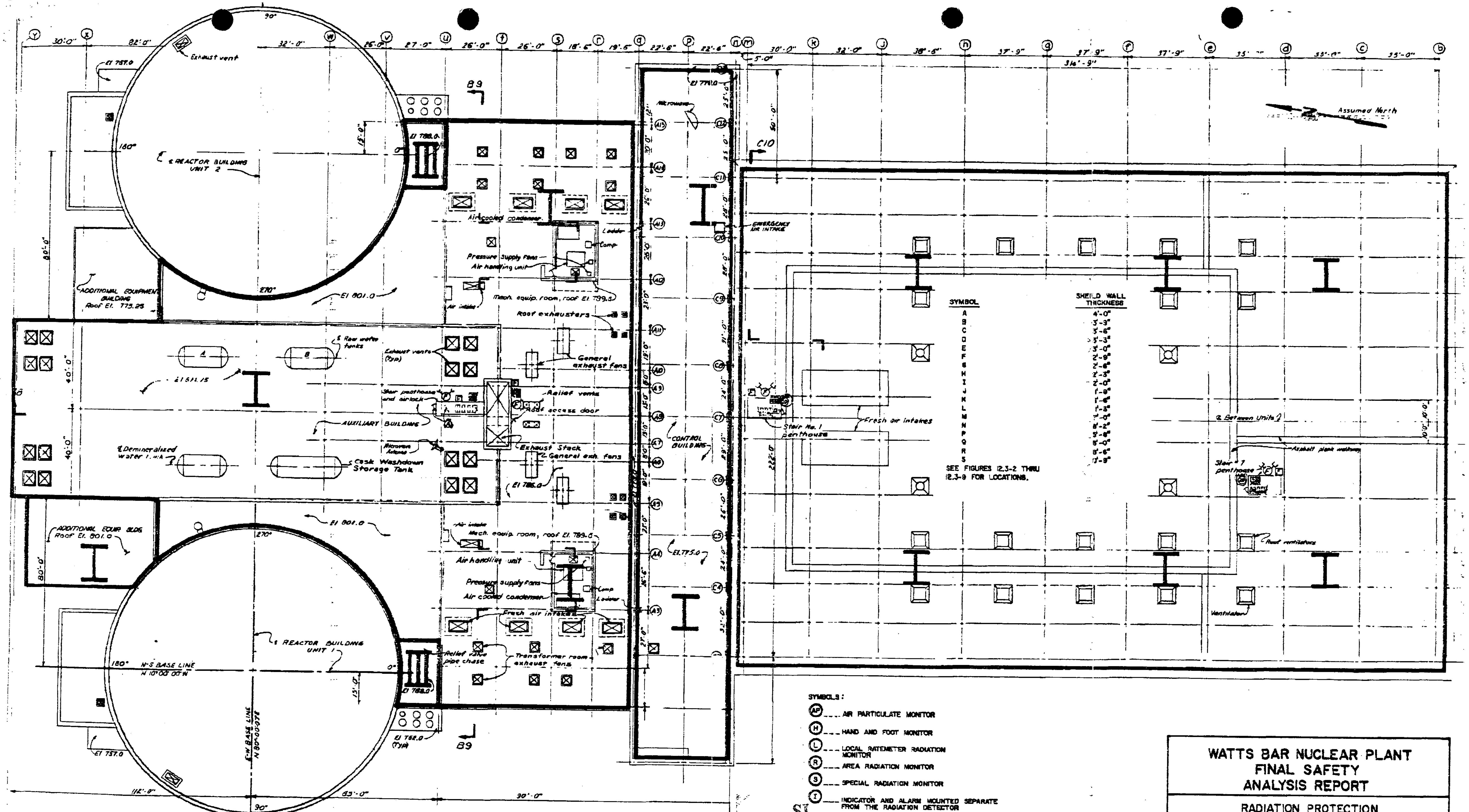
| AREA TYPE | ZONE | ACCESS TYPE | DOSE EQUIVALENT RATE, mrem/hr | SHIELDING DESIGN LEVEL, mrem/hr | AREA IDENTIFICATION and ENTRY REQUIREMENTS |
|---|---|---|---|---|---|
| Unlimited Access - Continuous Occupancy | 1 | I | 0-0.1 | 0.1 | NOTE 1 |
| Unlimited Access - Intermittent Occupancy | 1a | I | 0-1.0 | 1.0 | NOTE 1 |
| Radiological Control Area | 2a | II | 1.0-5.0 | 2.5 | NOTE 2 |
| Radiation Area | 2b | III | 5.0-100 * | 15.0 | NOTE 3 |
| High Radiation Area (controlled) | 3 | IV | 100-1000 | | NOTE 4 |
| High Radiation Area (restricted) | 4 | V | >1000 | | NOTE 5 |

* Or a dose in excess of 100 mR in any 5 consecutive days

NOTES

1. Access Type I areas within the Auxiliary Bldg., Additional Equipment Bldg., and Condensate Demineralizer Waste Evaporator Bldg. are under administative control. The area is conspicuously posted with a sign or signs bearing the words, Radiological Control Area.
2. Access is under administrative control. The area is conspicuously posted with a sign or signs bearing the words, Radiological Control Area.
3. Access is under administrative control. The area is conspicuously posted with a sign or signs bearing the radiation caution symbol and the words, CAUTION RADIATION AREA.
4. The area is conspicuously posted with a sign or signs bearing the radiation caution symbol and the words, CAUTION HIGH RADIATION AREA. At each entrance is a solid or wire mesh door which is maintained locked except when access to the area is required. Entry is under administrative control. The door can always be opened from the inside. Large areas, such as PWR containment, where no enclosure exist for purposes of locking, and where no enclosure can be constructed around the individual/area shall be barricaded, conspicuously posted and have a warning device such as a flashing light.
5. Same as note 4 above except that continuous RADCON monitoring may be required.

(Proposed)




SYMBOLS:

- (AP) --- AIR PARTICULATE MONITOR
- (H) --- HAND AND FOOT MONITOR
- (L) --- LOCAL RATEMETER RADIATION MONITOR
- (R) --- AREA RADIATION MONITOR
- (S) --- SPECIAL RADIATION MONITOR
- (I) --- INDICATOR AND ALARM MOUNTED SEPARATE FROM THE RADIATION DETECTOR

FOR CONTROLLED ACCESS SYMBOLS SEE FIGURE 12.3-2

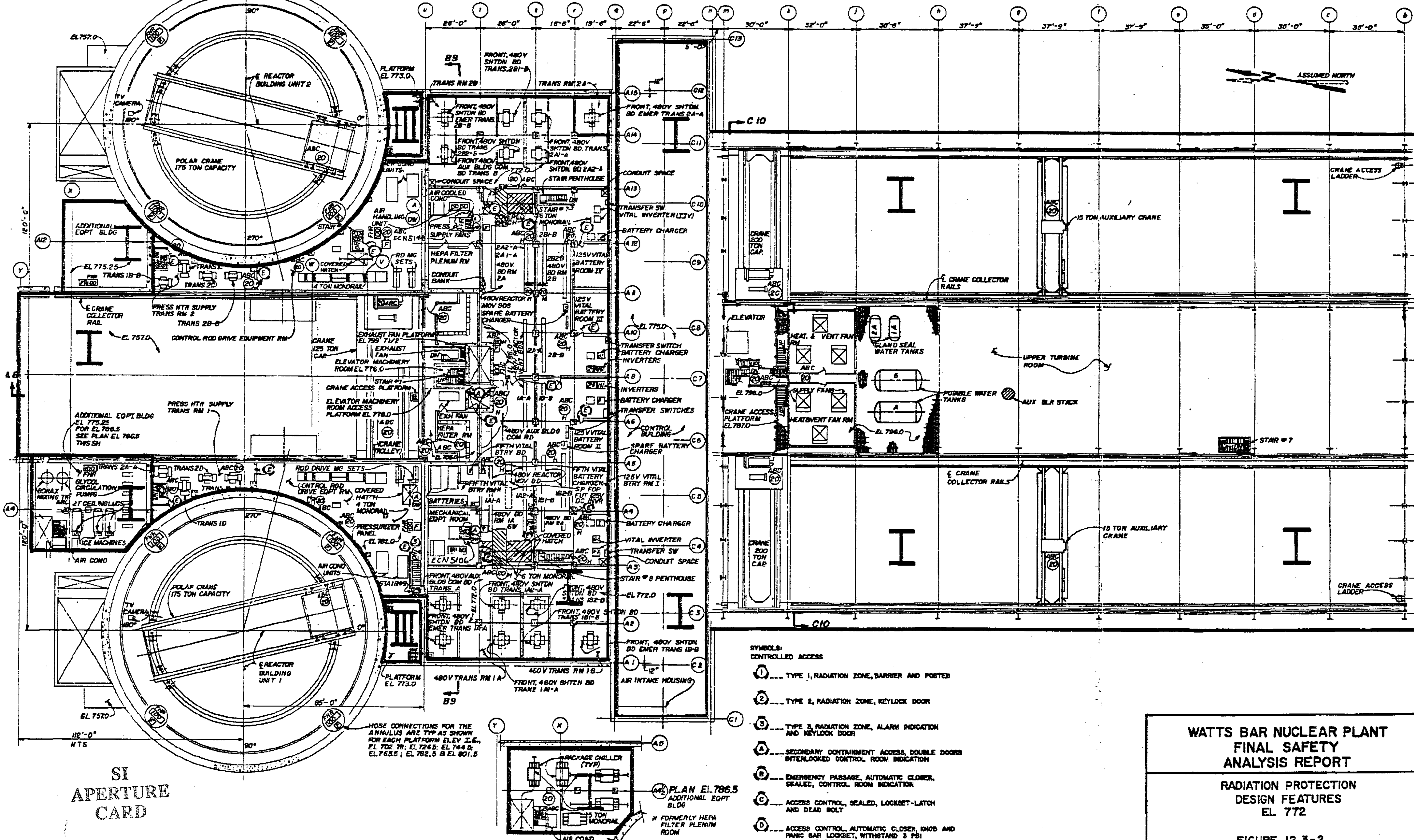
| ACCESS TYPE | EXPOSURE RATE M rem/HR | AREA TYPE |
|---|---|---|
| I | 0-1.0 | UNLIMITED ACCESS |
| II | 1.0-5.0 | REGULATED ACCESS |
| III | 5.0-100 | RADIATION AREA |
| IV | 100-1000 | HIGH RADIATION AREA (CONTROLLED) |
| V | >1000 | HIGH RADIATION AREA (RESTRICTED) |



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

RADIATION PROTECTION
DESIGN FEATURES
ROOF

FIGURE 12.3-1




SYMBOLS:
CONTROLLED ACCESS

- (1)___ TYPE 1, RADIATION ZONE, BARRIER AND POSTED
- (2)___ TYPE 2, RADIATION ZONE, KEYLOCK DOOR
- (3)___ TYPE 3, RADIATION ZONE, ALARM INDICATION AND KEYLOCK DOOR
- (A)___ SECONDARY CONTAINMENT ACCESS, DOUBLE DOORS INTERLOCKED CONTROL ROOM INDICATION
- (B)___ EMERGENCY PASSAGE, AUTOMATIC CLOSER, SEALED, CONTROL ROOM INDICATION
- (C)___ ACCESS CONTROL, SEALED, LOCKSET-LATCH AND DEAD BOLT
- (D)___ ACCESS CONTROL, AUTOMATIC CLOSER, KNOB AND PANIC BAR LOCKSET, WITHSTAND 3 PSI PRESSURE DIFFERENTIAL
- (E)___ UL CLASS A FIRE DOOR
- (F)___ UL CLASS B FIRE DOOR
- (CA)___ ACCESS CONTROL, SEALED, LOCKSET-LATCH AND DEAD BOLT, LOCAL ALARM

**WATTS BAR NUCLEAR PLANT**
**FINAL SAFETY ANALYSIS REPORT**

RADIATION PROTECTION DESIGN FEATURES EL 772

FIGURE 12.3-2



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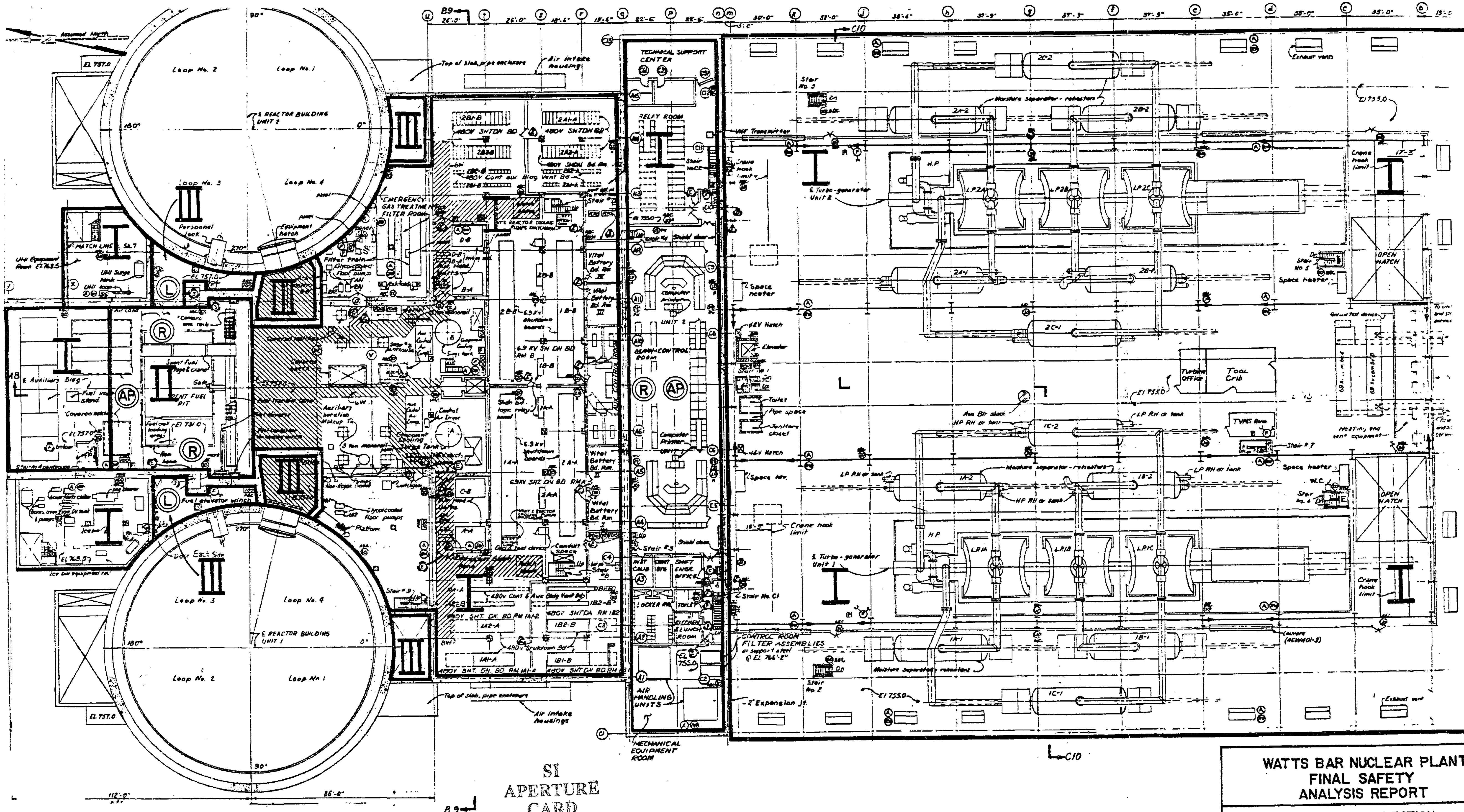


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FINAL SAFETY
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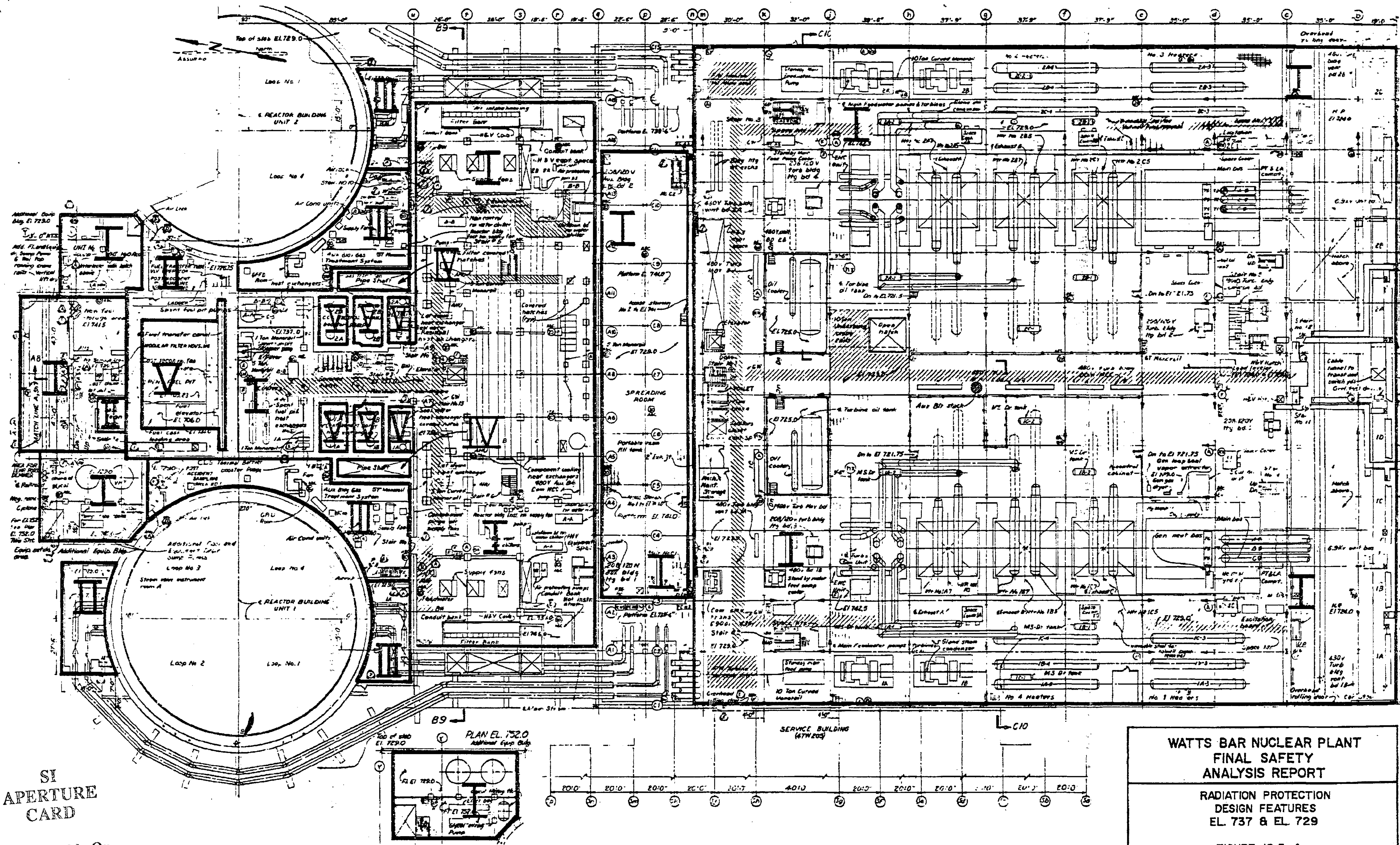
RADIATION PROTECTION
DESIGN FEATURES
EL. 757 & EL. 755

FIGURE 12.3-3



WATTS BAR NUCLEAR PLANT
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ANALYSIS REPORT

RADIATION PROTECTION
DESIGN FEATURES
EL. 737 & EL. 729

FIGURE 12.3-4

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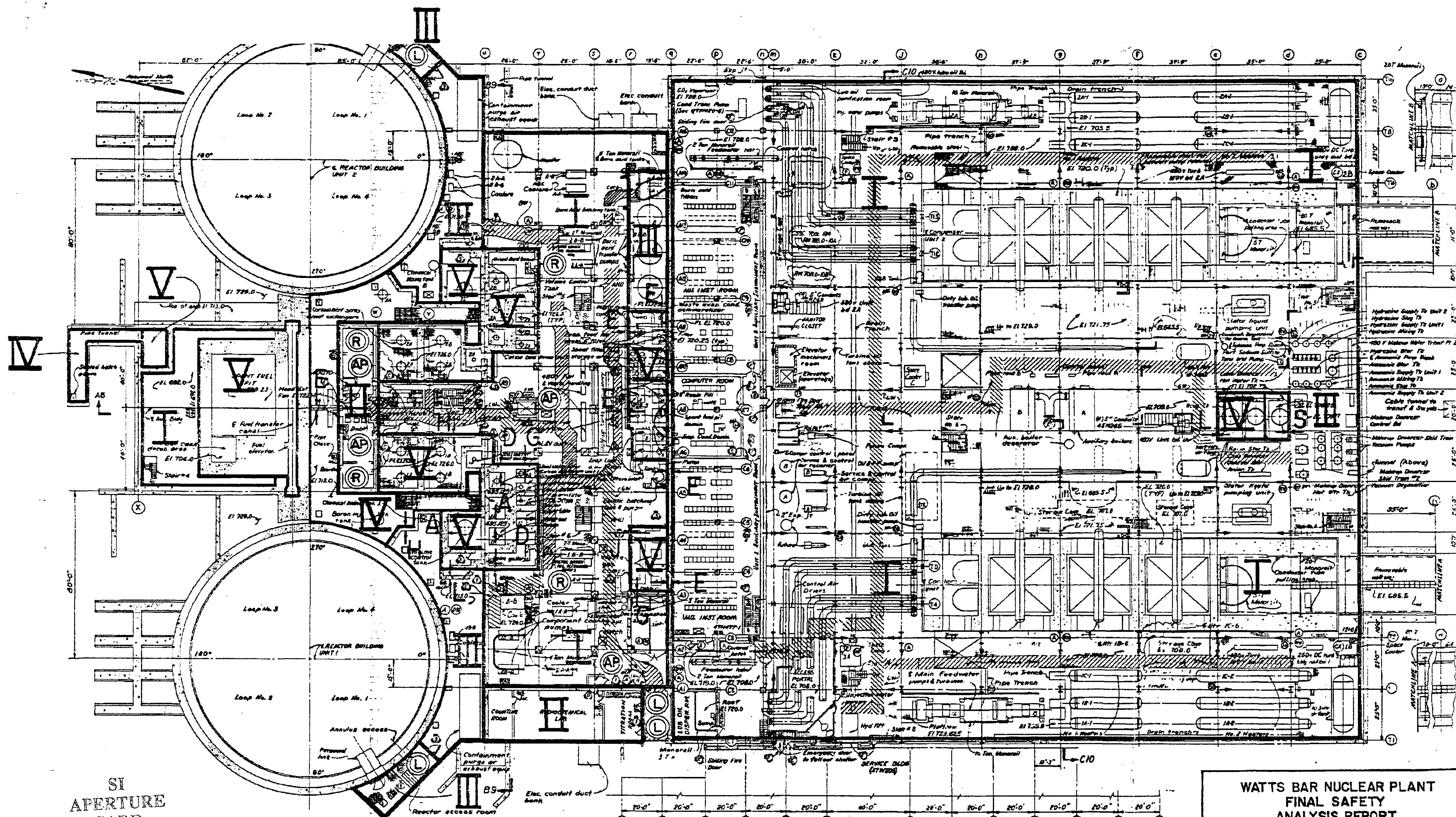


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**WATTS BAR NUCLEAR PLANT**
**FINAL SAFETY**
**ANALYSIS REPORT**

RADIATION PROTECTION
DESIGN FEATURES
EL. 713 & EL. 708

FIGURE 12.3-5

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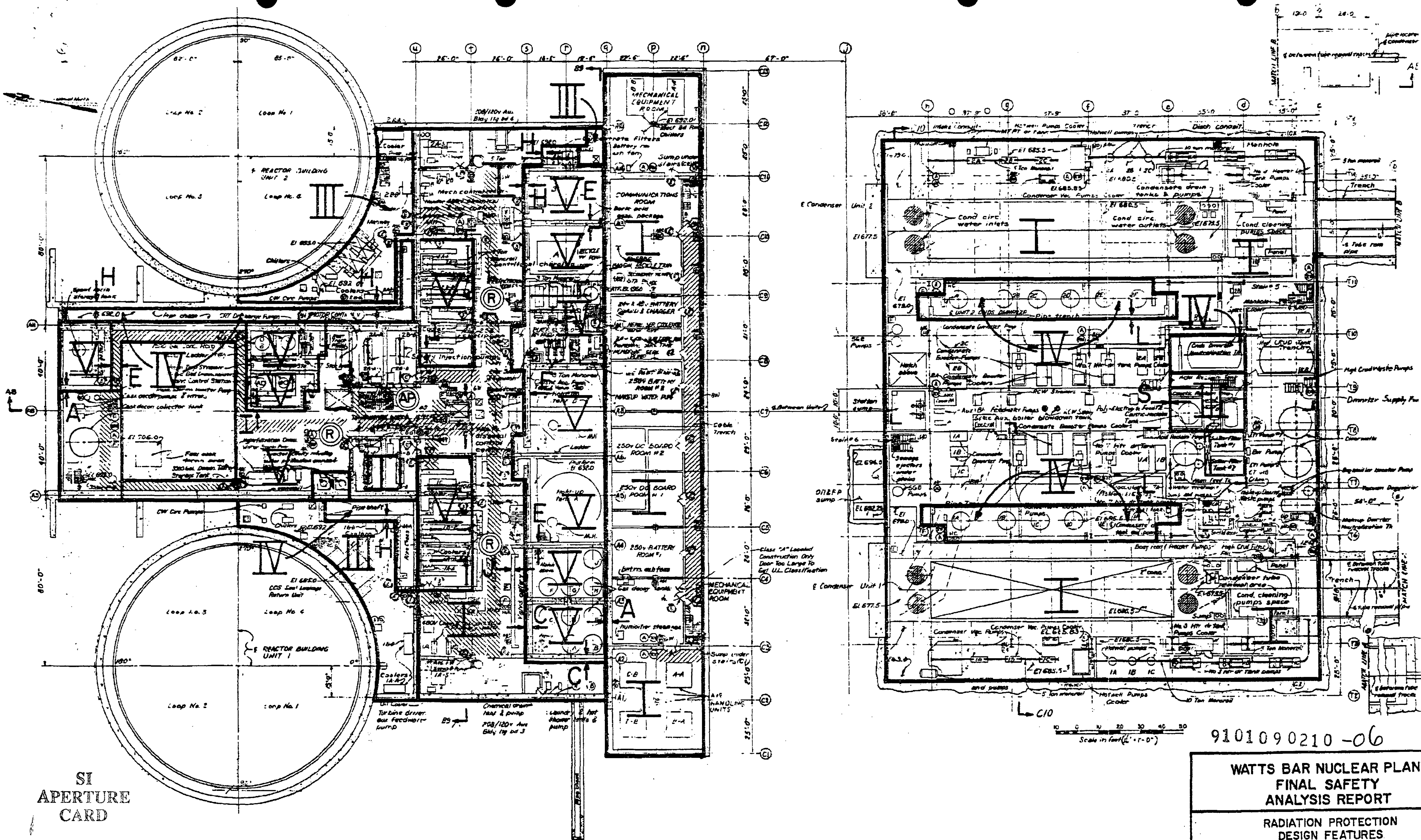


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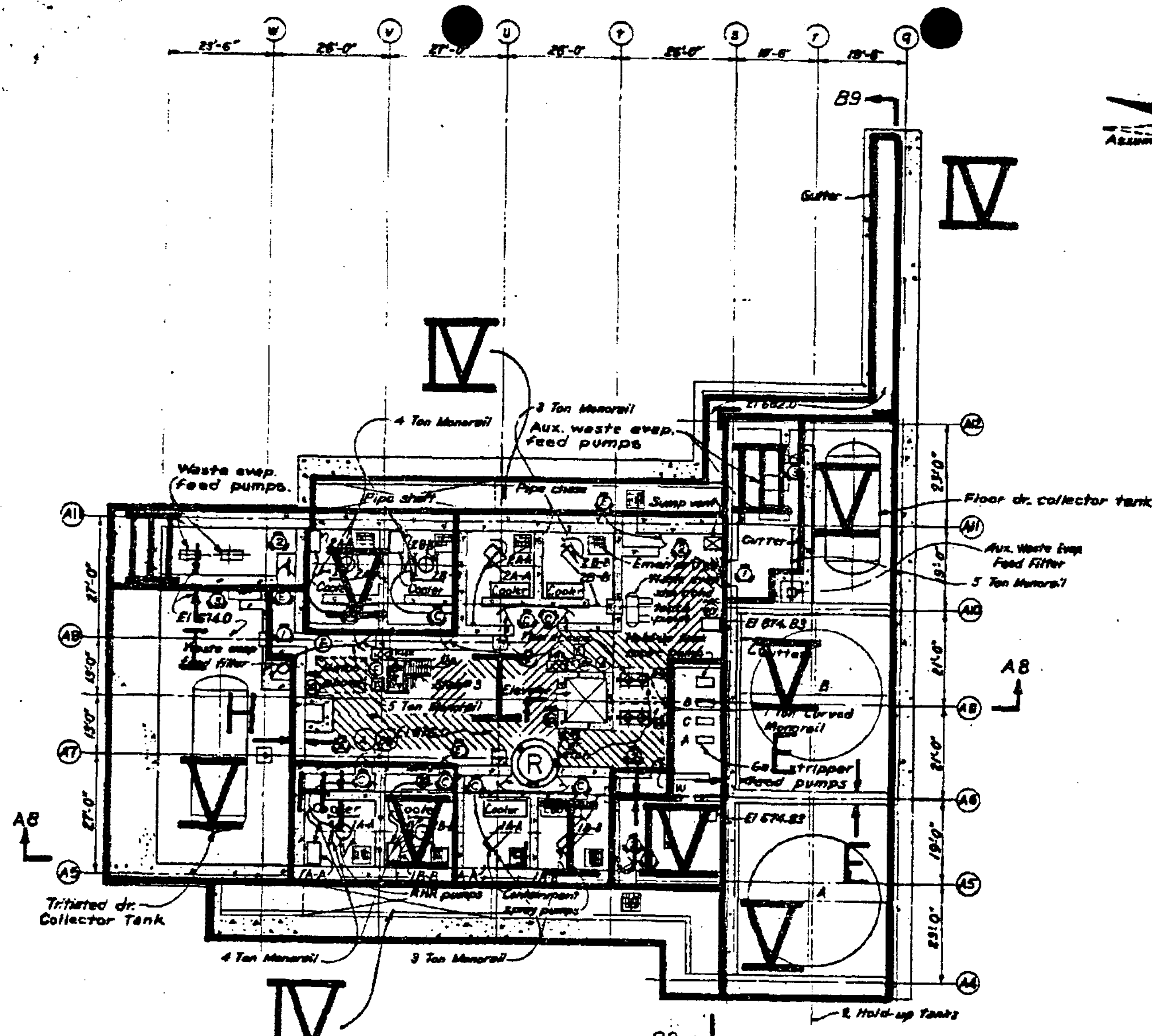
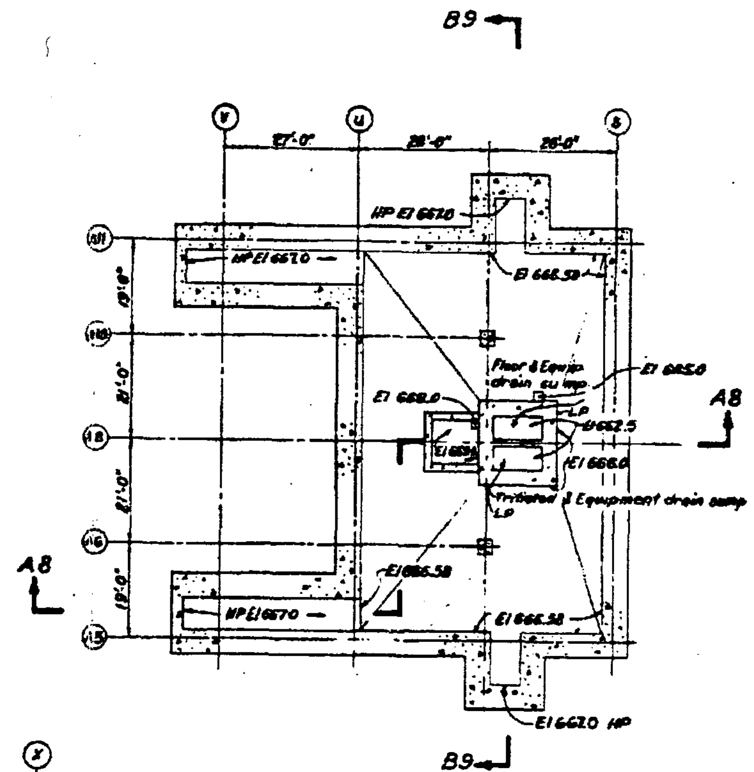
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

RADIATION PROTECTION
DESIGN FEATURES
EL. 692 & EL.679

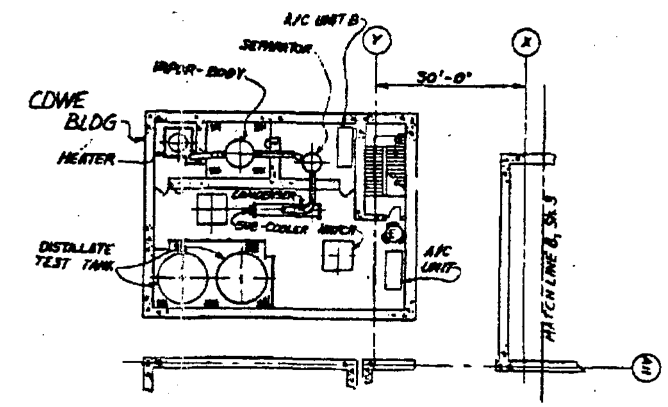
FIGURE 12.3-6



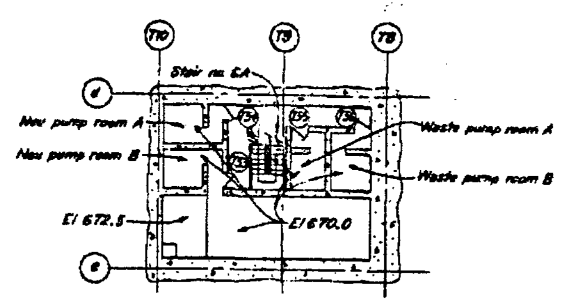

PLAN-EL 676.0



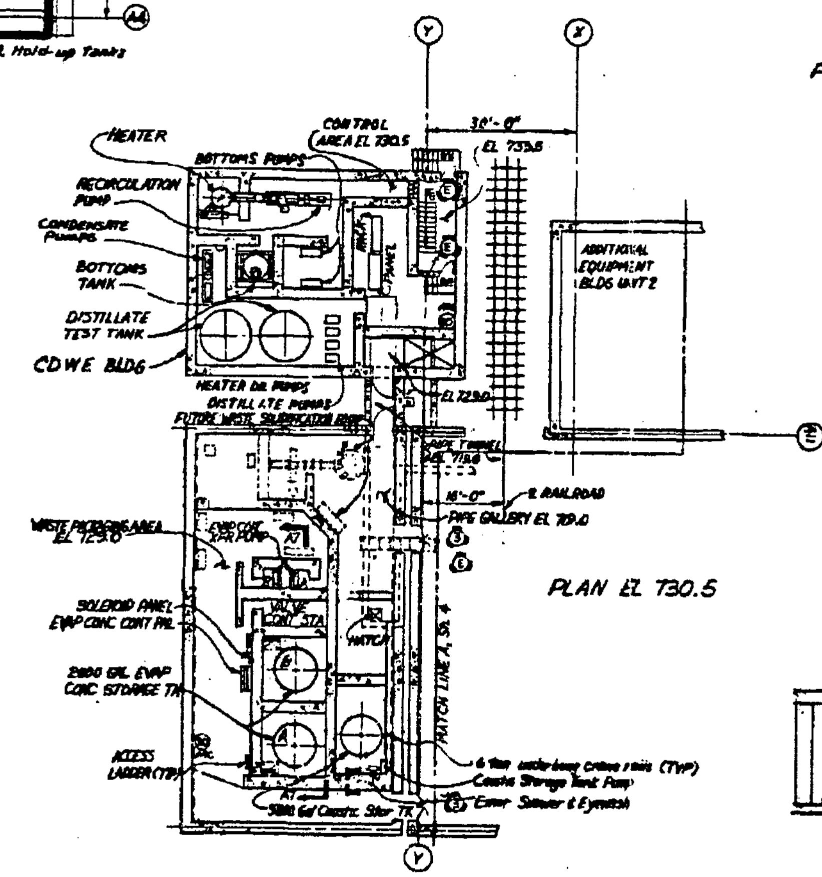

PLAN-EL 666.0±



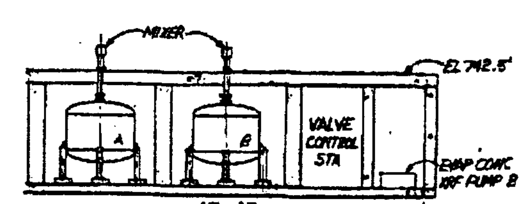

PLAN EL 750.5




PLAN EL 670.0
Not to scale




PLAN EL 730.5




A7-A7
NTS

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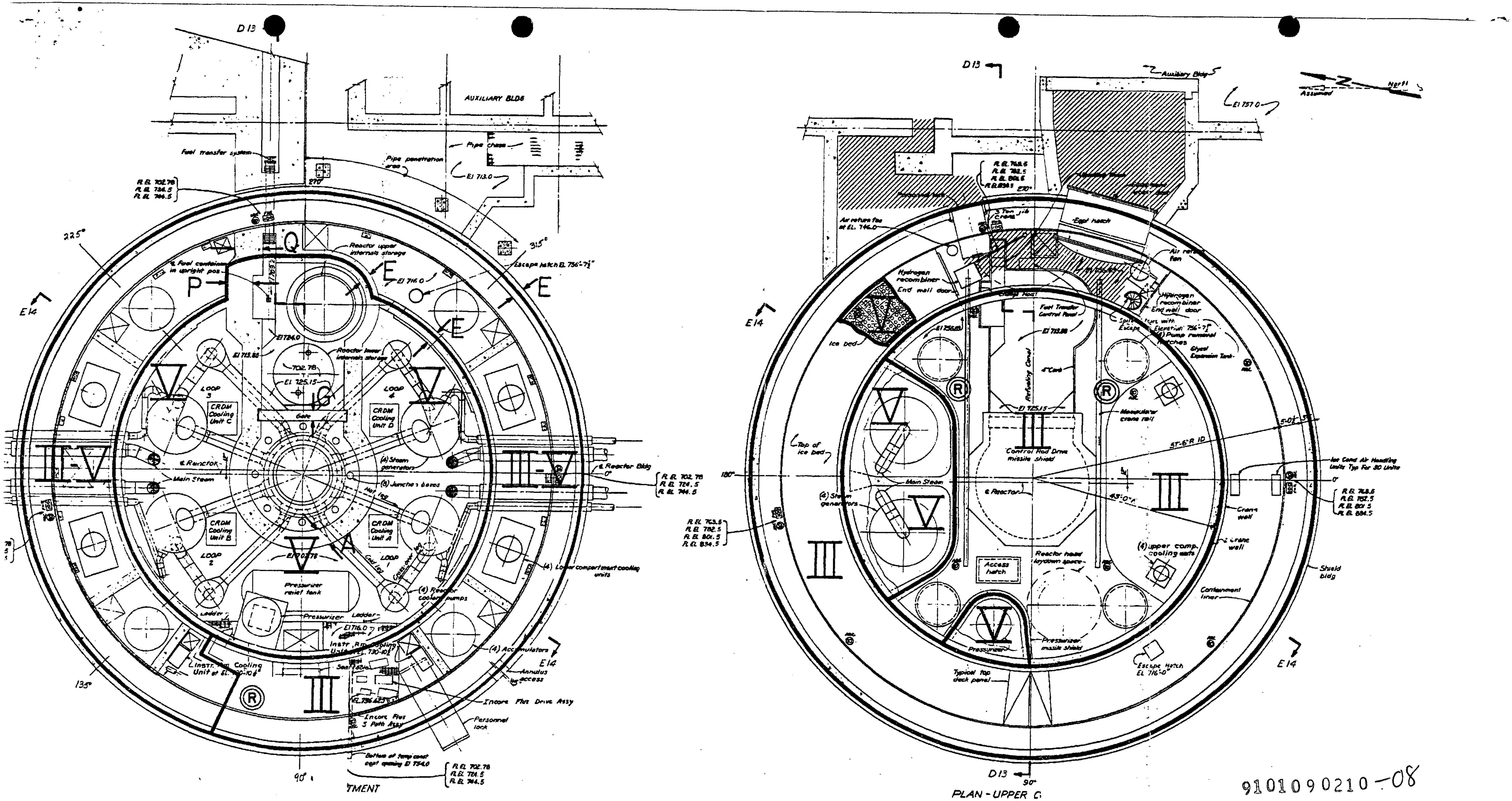
**WATTS BAR NUCLEAR PLANT**
**FINAL SAFETY**
**ANALYSIS REPORT**

RADIATION PROTECTION
DESIGN FEATURES
EL 676

FIGURE 12.3-7

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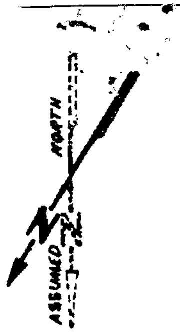
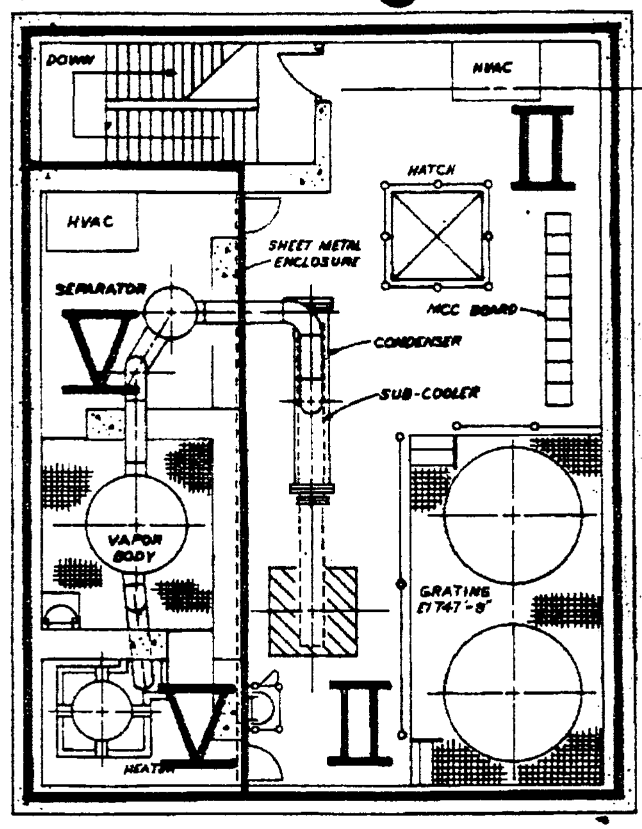
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

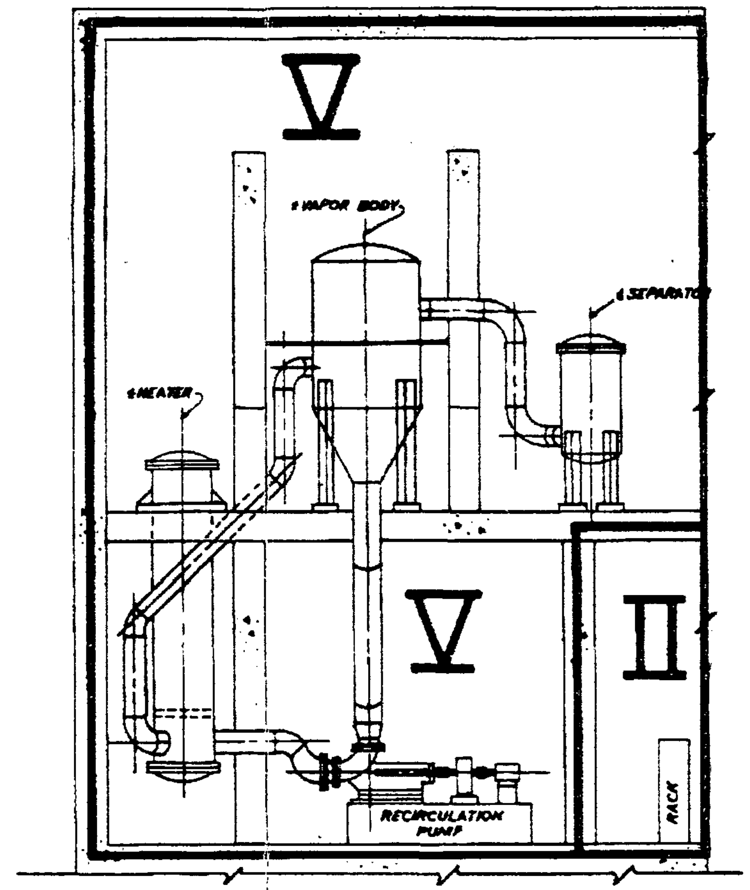
RADIATION PROTECTION
DESIGN FEATURES
REACTOR BUILDING

FIGURE 12.3-8



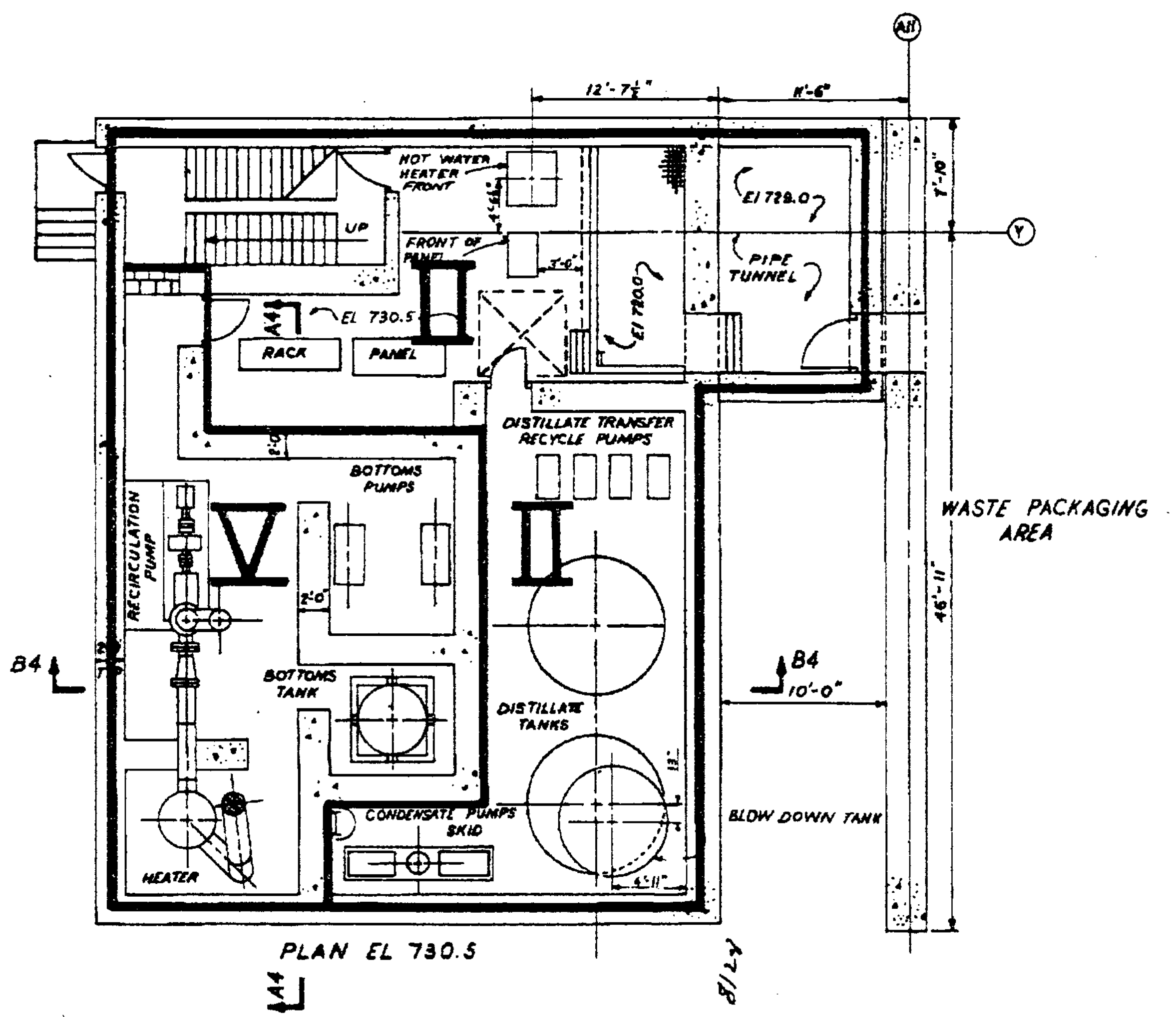




PLAN EL 750.5

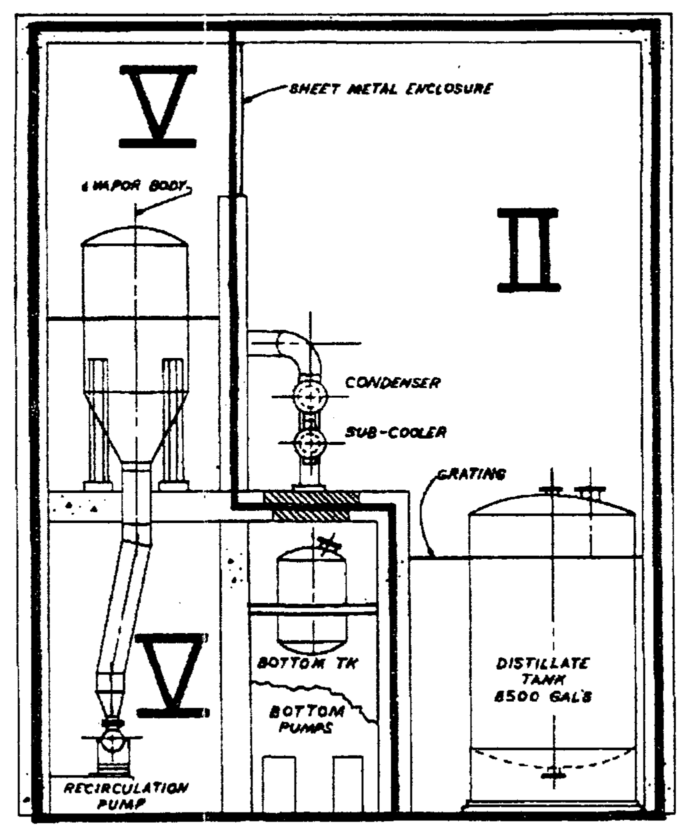



SECTION A4-A4

| ACCESS TYPE | EXPOSURE RATE MREM / HR | AREA TYPE |
|---|---|---|
| I | 0 - 1.0 | UNLIMITED ACCESS |
| II | 1.0 - 5.0 | REGULATED ACCESS |
| III | 5.0 - 100 | RADIATION AREA |
| IV | 100 - 1000 | HIGH RADIATION AREA (CONTROLLED) |
| V | 1000 | HIGH RADIATION AREA (RESTRICTED) |




PLAN EL 730.5




SECTION B4-B4

SI APERTURE CARD

Also Available On Aperture Card

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

RADIATION PROTECTION DESIGN FEATURES EL 730.5 & 750.5

FIGURE 12.3-11

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7. Question:

Amendment 56 revises the description of contamination control in Section 12.5.3. The last sentence in the first paragraph on page 12.5-6 states that "all items which have been in controlled areas except personal items which leave the plant site will be monitored" (for contaminants).

Provide justification for exempting personal items from contamination monitoring.

Response:

The statement cited is incorrect. It will be revised in a future FSAR amendment to read similarly to the following: "All items which have been in a radiologically controlled area and which have the potential for becoming contaminated will be monitored prior to being released from the area."

8. Question:

Amendments 55 and 56 revised the ventilation flow rates specified in Table 12.3-3 for various areas within the plant. These flow rates are provided as one parameter in the calculated expected airborne radioactive source term stated in Section 12.2.2 of Regulatory Guide 1.70. However, the reviewer noted that there is no discussion of airborne radioactive source terms in the Watts Bar FSAR (Section 12.2.2 is completely missing). Estimated average airborne concentrations for plant buildings are provided in Tables 12.2-19 through 12.2-22. These estimates are not of sufficient detail for the reviewer to determine if the acceptance criteria in the Standard Review Plan have been met by the applicant.

Using the revised data in Table 12.3-3, provide the airborne radionuclide concentrations expected during normal operation, anticipated operational occurrences, and accident conditions for equipment cubicles, corridors, and operating areas normally occupied by operating personnel. For each area determined to be considered an airborne radioactivity area, as defined by 10 CFR 20 Section 20.203(d)(1)(ii), show why additional process or engineering controls, as required by Section 20.103(b)(1), are not warranted to reduce radioactive airborne concentrations.

Response:

The airborne radioactivity source terms for Watts Bar are discussed in FSAR Section 12.2.2, page 12.2-12 (as of Amendment 64). As stated in this section, the assumptions used in calculating expected airborne activities for the turbine building, auxiliary building, and containment building are given in Section 11.3.7. The results are given in Tables 12.2-19 through 12.2-22. They use the flow rates described in Section 11.3.7.5. These results include the potential airborne radioactivity levels in normally occupied areas of the plant. Normally occupied areas in the auxiliary and turbine buildings will not normally be considered airborne radioactivity areas as defined in 10CFR20.203(d)(1)(ii). Areas inside containment which may be airborne radioactivity areas are not normally occupied. The equipment and procedures used to identify and control access to airborne radioactivity areas, when they exist, are described in FSAR Sections 12.3.4 and 12.5.3.

9. Question:

Figures 12.3-5 and 12.3-6 appear to indicate two accessible areas in the auxiliary building adjacent to the spent fuel transfer tube. Figure 12.3-5 shows accessible areas on the 729.0-ft elevation just outside the reactor buildings (near the 270° point). Figure 12.3-6 shows two passageways leading to the cask decon equipment that pass just below the transfer canal (692.0-ft elevation).

Provide an estimate of the peak dose rate in these areas during transfer of "fresh" spent fuel bundles.

Response:

Fuel transfer shielding is described in FSAR Section 12.3.2.2, beginning on page 12.3-12 (as of Amendment 64). As stated in this section, 5 ft - 6 in of concrete shielding around the spent fuel transfer canal will reduce the dose rate during fuel transfer to less than 5 mrem/hr in adjacent areas. In the auxiliary building areas on elevations 692.0 ft and 729.0 ft which are adjacent to the fuel transfer canal, there is at least 5 ft - 6 in of concrete shielding around the canal. Accordingly, the dose rate will be less than 5 mrem/hr during spent fuel transfer. The only high radiation area generated by the transfer of spent fuel is in the emergency passageway underneath the transfer canal inside containment where the dose rate could be as high as 210 mrem/hr (see FSAR page 12.3-14). This area is not readily accessible.

Enclosure 2

List of Commitments

1. Revise FSAR Sections 12.5.1, 12.5.2, and 12.5.3, Table 12.3-2, and Figures 12.3-1 through 12.3-8 and 12.3-11 as described in the responses to questions no. 2, 3, 4, 5, 6, and 7 of Enclosure 1 of this submittal.

2. Assign RADCON technicians to the plant approximately six months prior to fuel loading to allow time for familiarization with the facility, personnel, and procedures.