UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-269/90-16, 50-270/90-16 AND 50-287/90-16

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242

Docket Nos.: 50-269, 50-270 and 50-287 License Nos.: DPR-38, DPR-47 and DPR-55

Facility Name: Oconee Units 1, 2 and 3

Inspection Conducted: May 17 - 22, 1990

Team Leader: _____ 6-15-90
P. H. Skinner Date Signed
Senior Resident Inspector, Oconee

Team Members: N. Economos, Materials Inspector, DRS
F. Wright, Radiation Specialists, DRSS
N. Merriweather, Electrical Plant Systems Inspector, DRS

Approved by: _____ 6-15-90
M. B. Shymlock, Chief Date Signed
Reactor Projects Section 3A
Division of Reactor Projects

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Executive Summary

On May 17, 1990 while performing component verification on the reactor vessel following fuel loading, the Unit 1 and 2 SFP overflowed resulting in various areas of the Auxiliary Building being contaminated. In addition, an area outside the Auxiliary Building adjacent to the Fuel Receiving Bay and the Unit 2 West Penetration room exterior access door became contaminated. The licensee operations personnel took quick actions to stop the spill. Health Physics personnel assisted by various other site personnel took prompt action to identify areas contaminated. The spread of contamination was controlled and the followup cleanup process was well organized and effective.

This event was caused by performing a procedural step out of sequence in the transfer canal draining procedure. Inspector review indicated that taking the step out of sequence changed the intent of the procedure and resulted in a violation for failure to operate in accordance with approved procedures.

1. General Description Of Spent Fuel Cooling System (See Figure 1)

The SF consist of a common storage pool and three cooling trains (pumps and heat exchanger) which serve both Units 1 and 2. These trains are connected in parallel loops. The number of loops in use depends upon the heat load in the SFP. The SF system also contains two filters and a demineralizer. The system under normal operation takes suction from a high point in the pool and discharges to both a high point and a low point in the pool to keep solids in suspension. The system is designed to limit pool temperature to 205 degrees F or less assuming loss of one train under maximum heat load in the pool. The pool is designed to handle 1312 spent fuel assemblies. During fueling/defueling operations, the SF system pump 'B' is normally aligned to take a suction on the fuel transfer canal and discharge to the spent fuel pool. The suction of pump B is isolated from the suction of pumps A and C at that time.

2. Description of Events

A. General

At approximately 9:20 a.m. on May 17, 1990, the licensee informed the resident inspectors that the SFP had overflowed resulting in the contamination of various areas in the plant including the Unit 1 and 2 combined control room. The inspectors immediately went to Unit 1 and 2 control room to assess the problem and to determine the cause and the extent of the spill. The cause of the spill was determined to result from performing steps out of sequence in OP/1/A/1102/15, Filling and Draining Fuel Transfer Canal dated 4/25/90, Enclosure 3.3, Draining of the Transfer Canal. The out of sequence resulted in shutting the isolation valves between the SFP and the transfer canal with SF pump B still taking a suction from the transfer canal and discharging into the SFP. The shutting of the valves occurred at about 8:25 a.m. and with the pump flow rate of approximately 1000 gpm, the SFP filled to an overflow condition. At approximately 9:15 a.m., two NLO's in the kitchen area (a room located in the control room) noted water running down the wall. They went to the sixth floor (one level above the control room) and saw that the water was coming from the spent fuel pool area. They immediately notified the CRO. The CRO directed the NLO to proceed to the SFP area and open SF-1, transfer tube 1A isolation valve, and at that time the CRO stopped the SF pumps. Securing pump B stopped the injection of water into the SFP. Another NLO was directed to the outside of the building to determine if water was present outside the fuel receipt area door. He and other available personnel placed plastic sheeting and gravel over the storm drain and rapidly obtained absorbent devices which would prevent any leakage from the SFP building area getting into the storm drains and subsequently off-site. RP personnel were notified and immediate action was taken to rope off affected areas and commence contamination control efforts. Spill areas were covered with absorbent rags, plastic sheeting was used to cover panels, sampling of the chemical treatment ponds was started,

airborne sampling in various areas performed, smears taken and traffic control initiated. This action was effective in limiting the spread of the contamination. The areas that were affected were the following: (see figures 2 through 9)

- Auxiliary Building - sixth floor (Figure 2) - Spent Fuel Pool, Spent Fuel Pool Change Room, Unit 1 and 2 Purge Rooms, stairs to the Hot Machine Shop, a portion of the Unit 2 Ventilation Equipment Room.

- Auxiliary Building - fifth floor (Figure 3) - the portion of the TSC and the Control Room from about 20 feet east of the west wall to the west wall. This did not interfere with normal operation of Unit 2 or Unit 1.

- Auxiliary Building - fourth floor - (Figure 4) Unit 1 and 2 West Penetration Rooms and about one half of the East Penetration Rooms.

- Auxiliary Building - third floor (Ground Level -Figure 5) - the area below the East Penetration Room on Units 1 and 2 and the hallway in Unit 1.

- Auxiliary Building - second floor (Figure 6) - Spent Fuel Pool Heat Exchanger and Cooler areas and hallways adjacent to areas directly beneath the East Penetration Rooms.

- Auxiliary Building - first floor (Figure 7) - Low Pressure and Building Spray Pump rooms Units 1 and 2 and Decay Heat Removal Cooler rooms on Units 1 and 2.

- Outside Auxiliary Building (Fuel Receiving Bay)(Figure 5) - ground level between Unit 1 and 2 BWST about 870 square feet was contaminated.

As a result of water entering the Unit 2 penetration rooms, the humidity exceeded 85 percent which resulted in both PRV systems being declared inoperable. Although the TS does not specifically address humidity requirements in the operational requirements for the PRV system, the operators recognized that the systems would not perform adequately if needed in the high humidity condition. At this time, this was a conservative action taken by the operators. This placed the unit in a 12 hour LCO as required by TS 3.15. Subsequent review by the Design Engineering staff confirmed that this action was correct and that the PRV system should be declared inoperable in a high humidity environment. Action was taken to reduce the humidity level by cleaning up the water in the penetration room and placement of portable fans and coolers. The humidity was reduced to less than 60 percent and the LCO was exited at 4:44 p.m.

A FRP and a Materials inspector from Region II were conducting independent inspection activities on site at the time of this occurrence. The resident inspector requested their assistance. They reviewed the activities of the licensee following the spill (see paragraphs 4 and 5.a). An electrical inspector was dispatched to the site from Region II to review electrical areas that may have been affected (see paragraph 5.b).

B. Chronology of Events

May 13 -		-	Commenced Refueling
May 16 -	12:10 p.m.	-	Reactor Building Purge System removed from service for system maintenance
Late on 5/16 or early 5/17			Reactor Building heated up slowly causing slight buildup of pressure in containment resulting in SFP level increase which caused the level instrument to peg high and the lock in of the high level alarm.
May 17 -	6:57 a.m.	-	Completed Refueling
	7:00 a.m.	-	Commenced component verification of reactor vessel
	8:24 a.m.	-	Valves SF 1 & 2 closed and red tagged in preparation for pump down of transfer canal. Evolution performed out of sequence. Authorized by shift operations management.
-	9:00 a.m.	-	CRO notified that water was accumulating in LPI room hatch area (1st level) - NLO's were dispatched to investigate
-	9:10 a.m.	-	Two NLO's in kitchen noticed water in area of west wall and went to 6th floor to investigate
-	9:10 a.m.	-	NLO's on 6th floor reported to CR that SFP was overflowing
	9:10 a.m.	-	SFP pumps A & B secured

NOTE

This stopped the pumping of water from the transfer canal into the SFP.

9:10 a.m. - SFP pump A restarted

9:10 a.m. - CRO instructed a NLO to open SF-1 (NLO required to don anti-contaminated clothing and also clear tag)

9:11 a.m. - Unit 2 Supervisor instructed NLO to check outside of fuel receiving bay for water. On the way through the Auxiliary Building the NLO saw several people including a HP individual, and told them what was happening and to obtain additional HP assistance. NLO continued into yard area and with other personnel in area covered storm drain in vicinity and commenced covering water with absorbent materials.

9:16 a.m. - Received computer alarm on Unit 2 indicating a high humidity in the Penetration room - NLO dispatched to investigate.

9:17 a.m. - Shift Supervisor notified in addition to other plant management

9:20 a.m. - Plant Management Notified NRC resident inspector notified

9:22 a.m. - Resident inspector notified FRP inspector

9:22 a.m. - NLO reported water standing in floor of Unit 2 East Penetration room - Performance personnel dispatched to obtain wet bulb humidity measurement

9:30 a.m. - Red tag cleared on SF-1, NLO dressed out in anti contamination clothing and opened SF-1 approximately 3 turns - level decreased to slightly below the top level in SFP as level equalized with transfer canal

9:35 a.m. - By this time, radiation areas had been identified and roped off, spills covered, plastic over panels in control room, smear sampling and airborne

sampling in process, #3 CTP sampling initiated, and HP supervisors in various areas directing various site personnel in control/cleanup activities

10:00 a.m. - Resident Inspector notified Region II

10:39 a.m. - Results on sample from #3 CTP indicated no boron detected into or out of pond. No isotopes identified in samples.

12:26 p.m. - Performance reported Unit 2 Penetration room humidity 92% - Operations declared both Penetration Room Ventilation (PRV) systems out of service and entered TS LCO 3.15 based on inoperability at 9:16 a.m. This is a 12 hour LCO.

12:30 p.m. - Operations notified maintenance to place spot coolers in penetration rooms and obtained additional personnel to assist in decontamination of these areas.

3:55 p.m. - Performance notified Operations that humidity in the Penetration rooms was less than 60%

4:44 p.m. - PRV's declared operable and TS 3.15 LCO was exited.

3. Radiological Review

A. Initial Notification and Radiation Protection Staff Response to the Event

At approximately 9:00 a.m. on May 17, 1990, the licensee's RP control points began receiving calls from Operations, RP technicians and other licensee employees that water was overflowing the Unit 1 and 2 Spent Fuel Pool and coming out of overheads in various locations throughout the Unit 1 and 2 AB and control room. As calls came in the RP personnel were dispatched to investigate the problem. The RP technicians determined that the water was contaminated and notified RP management. The RP personnel, with the aid of other plant employees from various groups began securing flooded areas by setting up contamination control boundaries to prevent personnel contamination. The RP staff continued identification and isolation of affected areas until the spill ended a little after 9:30 a.m.

When notified of the spill the FRP inspector proceeded to the health physics control points in the AB to receive initial radiological information concerning the event. Following the initial briefing, by the radiation protection control point personnel, the inspector began walking down the spill boundaries starting in the licensee's control room continuing through the yard and AB locations. During that walkdown the inspector observed radiation protection and other facility personnel working expeditiously to limit the spill and prevent personnel contamination. The inspector monitored the licensee's activities and plans for decontamination throughout the evening and determined that the licensee was in control of the radioactive contamination areas resulting from the spill. The licensee had developed a recovery plan and was proceeding with decontamination efforts. The inspector continued to monitor the licensee's decontamination progress through May 19, 1990.

B. Scope of Radioactive Contamination Spill

1. Inside Auxiliary Building

The licensee estimated that approximately 10,000 gallons of water spilled from the SFP wall at the 844 foot elevation. About one half of this water was collected in the Cask Decontamination Pit. The remainder of the water spilled onto six elevations throughout Unit 1 and 2 AB. Some water spilled into the licensee's Unit 1 and 2 Control Room (away from main control panel) and the Cable Spread Rooms below the Control room. The licensee also had water spill outside the AB at two points on the west side of the facility. All water in the AB was thought to have been initially drained and processed through the liquid radwaste systems. The water spilled in the Unit 1 and 2 Control Room and Cable Spread Room (which was less than 5 gallons) remained pooled in spots until wet vacuumed and processed by the liquid radwaste systems. The collection and disposal of the contaminated liquid collected in the yard is discussed in the following section. The contamination areas from the SFP spill and their associated contamination levels in disintegrations per minute per 100 square centimeters (dpm/100 cm2) are shown in Attachment C.

On May 25, the licensee reported to the resident inspectors that activity had been identified in the sanitary waste pond. This pond does not receive discharges from any system that would normally contain radioactive material. The activity was identified as the results of the normal weekly sample which had been taken on May 22, 1990. This analysis is normally performed by the Dukes Applied Science Center since the equipment at that facility is more sensitive than the equipment used on site. The previous sample that had been taken on May 15 indicated no activity. The May 22 sample identified the following:

Co 58	1.06 E-7 (microcuries/milliliter)
Cs 134	2.50 E-7
Cs 137	3.73 E-7
I 131	1.39 E-8
Ag 110 (metastable)	1.11 E-8
Ce 139	8.39 E-8

The licensee immediately commenced sample of the sanitary waste pond on a daily basis. In addition, a sample was taken on CTP 3 which receives the discharge from the waste pond. No activity was identified in CTP 3. A liquid waste release was generated and will be included in the semi-annual effluent report to the NRC. The concentration of activity released via liquid pathway was calculated to be 0.12 of the concentration listed in 10 CFR Part 20, Appendix B, Table 2. The sample taken on Friday morning indicated no activity in the influent lines to the waste pond and levels of approximately 1.0 E-7 microcuries per milliliter of Co58, Cs 134 and Cs 137 in the effluent. This daily sampling process will continue until samples indicate activity levels have decreased to less than minimum detectable levels.

The licensee at first speculated that the activity was the result of someone during the cleanup of the SFP pouring some of the contaminated waste in a non-controlled sink. Further actions consisting of dye checking various drains in the areas affected, to determine where system drains were routed, identified that a shower drain in the clean area of the spent fuel pool change room is routed to the sanitary waste pond. It is probable that water entered the waste pond through this path. An evaluation is being made to determine what action, if any, will be taken.

2. Outside of Auxiliary Building

The licensee estimated that less than 50 gallons of water leaked out of the AB onto the ground at two points on the west side of the building. A NLO sent to check the fuel receiving bay arrived in time to prevent the flow of radioactive liquid into a yard drain. When the NLO arrived the asphalt area from the roll up door to the fuel receiving bay was dry. The NLO could see that if water were to leave the fuel receiving bay it would make its way across the pavement into a yard drain that drains into a CTP. The operator obtained a plastic bag from a worker in the area and sealed the yard drain with the plastic and used rags brought to the area by another worker to soak up the water before it could get to the drain. The effort was hampered slightly by a rain shower, that commenced after the drain was sealed. A small amount of water also exited south of the fuel receiving bay at an exterior door, leading to a Spent

Fuel Pool stairway. The water at that exit made its way onto gravel next to the door. The licensee covered that area with plastic when the rain began. Smear surveys taken of the asphalt area had contamination levels up to 500 dpm/100 cm2. The licensee was able to clean up both outside areas by 2:00 p.m., the day of the spill. The licensee mopped up the asphalt and scraped up all contaminated dirt and gravel for solid waste disposal. The licensee performed followup contamination surveys of the two areas after decontamination and initiated periodic sampling of the yard drain discharge pipe at the CTP. The licensee also closed the pond spillway gate and took several samples of the CTP water for boron concentration and radioisotopic analysis. All samples of the yard drain and CTP did not detect any radionuclides and had less than 10 ppm boron. The licensee did get a sample of the radioactive liquid spilled outside the AB. A review of the radioisotopic activities measured in a SFP sample taken two days earlier and of the water spilled outside on May 17, 1990, showed good agreement with the earlier sample having radioactivity levels slightly higher for I-131, Co-58, CO-60, Cs-134 and Cs-137 isotopes. The licensee took air samples in the larger area outside and no airborne radioactivity was identified.

C. Recovery and Decontamination Efforts

On Thursday afternoon May 17, 1990, the licensee began formulating a plan for decontamination of areas contaminated during the spill. The licensee issued a decontamination priority list with the control room area and a main corridor outside the Unit 1 and 2 change room on the 796 foot elevation at the top of the list. The licensee's scheduled decontamination crew of 9 for the evening shift was doubled and split into three 7 person crews with a HP technician assigned to each group. A fourth decontamination crew of operations personnel was also assigned for duty that night.

At 2:00 p.m. On May 18, 1990, the licensee had decontaminated, surveyed and removed contamination boundaries for the following areas:

Elevation	Location
771'	Unit 1 & 2 LPI Hatch Area
783'	Unit 1 Corridor
796'	All Outside Areas Were Cleared May 17, 1990
796'	Unit 1 Corridor
796'	Hot Machine Shop
796'	Hot Machine Shop Dressout Area
809'	Unit 2 Stairwell
809'	Unit 1 Stairwell
822'	Unit 1 & 2 Technical Support Center

822'	Unit 1 & 2 Control Room Cabinets
838'	Unit 1 & 2 Spent Fuel Pool Dressout Area
838'	Unit 1 & 2 Corridor
838'	Unit 1 & 2 Purge Fan Room

The contaminated areas that had the major effect on operation and outage activities had been decontaminated and the licensee decided to continue throughout the weekend with the normal outage decontamination support staff. The licensee planned to increase decontamination efforts again on Monday May 21, 1990.

When the inspection ended, the licensee had decontaminated all of the areas that had been clean before the spill, with the exception of the following:

Elevation	Location
771'	LPI Cooler Rooms 108 & 121 (50% complete)
783'	SFP Heat Exchanger/Pump Room 218
783'	Caustic Mix Area Room 208
796'	Cask Decontamination Room 348
796'	Pipe chases Room 306 and 327
809'	East and west Penetration Rooms
838'	Spent Fuel Pool Area
838'	Purge inlet Rooms

D. Evaluation of Licensee Radiation Protection Activities During the Event

The licensee's response to the event was timely and effective. No personnel contamination resulted during the event. (Note: One individual became contaminated the afternoon of the spill when a posted contaminated area of the spill was entered incorrectly.) Licensee personnel from all plant work groups worked well with each other during the event to protect personnel and equipment. The licensee developed and implemented a workable recovery plan. When the contaminated liquid spilled into the yard, the licensee's staff took sufficient steps to prevent the release of radioactivity from the site to the environment and took sufficient measurements to ensure no uncontrolled radioactive releases occurred.

4. Materials Review

A. Mechanical Inspection

On May 17 and 18, 1990 following notification of the contaminated water spillage and entry in the AB spaces, the inspector performed a walkthrough inspection to observe and ascertain whether contaminated water came into contact with metal fasteners, mechanical components and/or piping. The walkthrough inspection disclosed that pipe location and configuration precluded these components from coming

into contact with contaminated water, except for Unit 2 East Penetration Room and Unit 1 Penetration Room. The latter was inaccessible because contamination was in the range of 150,000 dpm/100cm2. In Unit 2 East Penetration Room, contaminated water entered through two areas. In one area, entry was made down the Reactor Building wall and onto the floor. In the other, entry was through pipe penetrations in the ceiling. Water coming down from these penetrations cascaded over piping located close to the ceiling and down onto the floor. The inspector observed round, droplet like residue of a white substance, thought to be crystals from borated water. The condition was extensive in that it was observed on all the lagging on piping near the area of the spill. Piping affected by this spill was identified with the following systems, component cooling, low and high pressure injection, containment purge, feedwater, liquid waste drain and spent fuel line valve SF-96. The inspector expressed concern over the possibility that boric acid crystals may have permeated through the insulation to the pipe material, i.e, stainless steel weld joints, or carbon steel fasteners which may be susceptible to corrosion. Following discussions with cognizant engineering personnel and management, the inspector understood that following recovery of the contaminated areas, steps will be taken to assess, qualitatively and quantitatively, the presence of boric acid on these components. Corrective action(s) will be determined following these assessments. The inspectors will followup on this concern on a future inspection.

B. Electrical Inspection

1. Background

The electrical walkdown performed by the inspector concentrated on floors 2 thru 5 since most of the electrical equipment of concern was located on these floors. This included the Units 1 and 2 shared Control Room, Cable Spreading Rooms, East and West Penetration Rooms, Pipe Chase Rooms (306 and 327), and Component Cooling Water pump motors located in area 216. The inspection consisted of examining the inside of electrical and instrumentation cabinets for signs of moisture intrusion on wiring, terminal blocks, circuit boards, etc. Table 1 and 2 provide a list of both safety and non-safety electrical equipment examined during the walkdown.

2. Inspection Details

Approximately 70 safety related and non-safety related electrical panels in the Unit 1 and 2 Control Room were examined and found to be acceptable with no visible signs that any moisture had entered the cabinets. The Control Room is located on the fifth floor of the AB which is one floor below the SFP.

The Unit 2 Cable Room located below the Control Room, was observed to have some contaminated water near the Transducer and Switchyard Control Termination Cabinets. No visible signs of water or moisture were found inside these cabinets. The corresponding Cable Room on Unit 1 was also inspected with no contaminated water found. Inspection of the other elevations revealed that most of the electrical equipment such as penetrations, instrumentation, valve operators, and motors were located above the floor grade with no visible signs of moisture residue on the junction box covers. Conduit cable entrances were not open at the top.

During the walkdown in the Unit 1 East and West Penetration Rooms, the inspector noted that electrical penetration EC-10 had a film on the junction box cover that may have been caused by the spill. This penetration was considered representative of all penetrations in this area. The inspector requested a licensee technician remove the cover for a visual inspection. No signs of moisture were found in the box. However, it was noted that two wing bolts were missing from the cover. The licensee's technician documented this deficiency on Work Request 51578J. The inspector found this to be acceptable.

C. Summary and Conclusions

A walkdown inspection was performed on both safety related and non-safety related electrical equipment located in various areas and elevations of the AB known to have been contaminated. The inspection identified no significant damage to electrical equipment due to moisture intrusion. Of the electrical equipment examined internally no visible signs of moisture intrusion were identified.

5. Operational Review

Upon being informed of the spill, the CRO immediately recognized why the SFP was overflowing and took prompt effective actions to stop the overflow. Further discussion by the inspector with operations personnel indicated that shift management had decided that the Transfer Tube Isolation Valves, SF-1 and SF-2 were to be shut. This would allow expeditious entry into the next evolution following reactor core component verification which was to pump the water out of the transfer canal into the BWST. It was not recognized at that time that the SF system B pump was taking a suction from the transfer canal and discharging into the SFP. Prior to beginning of this operating shift, the SFP level indication meter had pegged high and the annunciator was actuated indicating a SFP high level. The SFP high level was caused by a slight increase in RB pressure which had occurred over the previous 24 hours. At this point no indication was available in the control room to alert the operators if an increase in level occurred. The operator involved with refueling and the CRO recommended that SF-1 and SF-2 be left open until component verification was completed in case an error in fuel loading was

identified. Shift management discussed the recommendation of CRO and refueling operator and continued with the process to shut SF-1 and SF-2.

The procedure that was used for this evolution was OP/1/A/1102/15, Filling and Draining of the Transfer Canal, Enclosure 3.3, Draining the Transfer Canal. This procedure is written to first remove the SF system pump B from operation, and realign the associated valves and then shut and tag SF-1 and SF-2. The Unit 1 Supervisor (Senior Reactor Operator) authorized steps in the procedure to be performed out of their written sequence. This is a common practice and is allowed by their OMP. OMP 1-9, Use of Procedures, Section 6.3, allows operators, one of whom is a supervisor who holds a senior operators license, to perform procedural steps out of sequence. This same section, however, also specifies that no deviation from the original intent of the procedure is allowed without an approved procedure change. The inspector review indicated that, for this case the out of sequence was a change in the intent of the procedure and resulted in a violation of OMP 1-9. TS 6.4.1 requires that the station be operated in accordance with approved procedures. Based on this requirement, the failure to operate in accordance with the requirements of OMP 1-9, Section 6.3 is identified as Violation 50-269,270,287/90-16-01: Failure to Follow Procedures Resulting in Overflow of Spent Fuel Pool.

6. Exit Interview

The inspection scope and findings were summarized on May 23, 1990, with those persons indicated in Attachment B. The inspector described the areas inspected and discussed in detail the inspection findings. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspectors during this inspection.

ATTACHMENT A

List of Acronyms and Abbreviations

AB	-	Auxiliary Building
BWST	-	Borated Water Storage Tank
CO	-	Cobalt
CRO	-	Control Room Operator
CS	-	Cesium
CTP	-	Chemical Treatment Pond
ES	-	Engineered Safeguards
FRP	-	Facilities Radiation Protection
HP	-	Health Physics
I	-	Iodine
ICS	-	Integrated Control System
LCO	-	Limiting Conditions For Operation
LPI	-	Low Pressure Injection
MPC	-	Maximum Permissible Concentrations
NLO	-	Non-licensed Operator
OMP	-	Operations Manual Procedures
PRV	-	Penetration Room Ventilation System
RP	-	Radiological Protection
RPS	-	Reactor Protection System
SF	-	Spent Fuel Cooling System
SFP	-	Spent Fuel Pool
TS	-	Technical Specification

ATTACHMENT B

Persons Contacted

*B. Barron, Station Manager
T. Coutu, Unit 1 Operation Manager
S. Coy, Supervising Scientist
*T. Curtis, Compliance Manager
L. Davis, Nuclear Control Operator
R. Emory, Nuclear Plant Engineer
W. Henderson, Instrument & Electrical Technician
D. Jones, Instrument & Electrical Foreman
*J. Long, General Supervisor Station Sciences
*B. Millsaps, Maintenance Engineering Manager
D. Repko, Associate Engineer
G. Rothenburger, Integrated Scheduling Superintendent
R. Slocum, Radiation Protection Supervisor
J. Snowden, Operations Shift Supervisor
S. Spear, General Supervisor Station Sciences
*D. Swiegart, Operations Superintendent
M. Thomas, General Supervisor Station Sciences
C. Witherspoon, Nuclear Assistant Shift Supervisor

Other licensee employees contacted included technicians, operators, mechanics, radiological controls personnel and management personnel.

NRC Resident Inspectors

*P. Skinner
B. Desai
L. Wert

*Attended exit interview.

ATTACHMENT C

Initial Contamination Areas

Floor	Elevation	Location	Contamination Levels(dpm/100cm2)
6th	838'	U-1,2 Walkway Around SFP	15,600
	838'	U-1,2 Instrument Cage	6,100
	838'	U-1,2 SFP Change Room	1,000-2,500
	838'	Stairwell (HMS to SFP)	3,000-25,000
	838'	U-2 Purge Equipment Room	13,000-32,000
	838'	U-1 Purge Equipment Room	10,000-14,000
5th	822'	U-1,2 TSC (Lockers/Floor)	1,800
	822'	U-1,2 CR Cabinet Area	1,090
4th	809'	West P/R	2,000-5,000
	809'	East P/R	2,000-15,000
	809'	U-2 Cable Room	1,290
	809'	U-1 West P/R Room 409	2,500-11,150ccpm**
	809'	U-1 East P/R Room 402	4,500dpm-13,800ccpm**
3rd	796'	U-2 (RM327) Pipe Chase	10,000-59,000
	796'	Hot Machine Shop	1,378
	796'	Hot Machine Shop Dressout Area	1,300-50,000
	796'	Fuel Receiving Bay	<1,000
	796'	Yard Outside Cask Decon Tank	
	796'	Yard Outside Fuel Receiving Bay	1,400
	796'	U-1 (Rm306) Pipe Chase	11,900ccpm
	796'	U-1 Corridor @Freight Elevator	2,000dpm-4mRad*
	796'	U-1 Cask Decon Tank Rm(Rm348)	12,000-18,000
2nd	783'	U-2 Corridor Outside Rm 217 Seal Supply Filter Rm.(Rm217)	1,100-1,800
	783'	U-2 Corridor Outside Rm208 Seal Supply Filter Rm(Rm208)	2,400
1st	771'	U-2 LPI Cooler Room	7,800
	771'	U-1 LPI Hatch Area (Rm119)	3,000-9,700
	771'	U-1 LPI Cooler Room (Rm108)	1,200-19,400
	771'	U-1 Corridor @Freight Elevator	

*Ceiling tile that acted like a filter

**Multiply corrected counts per minute (ccpm) by 10 to obtain dpm equivalent.

NOTE

All air samples taken during the event indicated airborne radioactivity was less than 25 percent of maximum permissible concentration (MPC) level.

Table 1

Units 1 and 2 Control Room Cabinets Inspected

Reactor Protection System Channels (RPS)
- RPS Channel No. D2
- RPS Channel No. D1
- RPS Channel No. C2
- RPS Channel No. C1
- RPS Channel No. B2
- RPS Channel No. B1
- RPS Channel No. A2
- RPS Channel No. A1
- RPS Channel No. E

Engineered Safeguards (ES) Logic Channels
- ES Logic Channel No. 6/8
- ES Logic Channel No. 2/4
- ES Logic Channel No. 5/7
- ES Logic Channel No. 1/3

Engineered Safeguards Analog Channels
- ES Analog Channel No. A
- ES Analog Channel No. B
- ES Analog Channel No. C

Integrated Control System (ICS)
- Cabinets No. 4 through 11

ICS ES Channels
- ICS ES Even Channel Normal Cabinet No. 9
- ICS ES Odd Channel Normal Cabinet No. 8
- ICS Cabinets No. 12 through 14
- ICS Cabinets No. 1 through 3

Fire Protection Panels
- Honeywell Fireprotection Panel
- Fire/Smoke Detection and Alarm System [PYR-A-LARM] Panel

ICS Simulator Cabinets
- ICS Simulator Cabinets No. 1 through 3

Table 2

Unit 2 Cable Room Cabinets Inspected

Transducer Termination Cabinets
- Cabinet No. 2TDC1
- Cabinet No. 2TDC2
- Cabinet No. 2TDC3

Switchyard Control Termination Cabinets
- Cabinet No. 2SCTC5
- Cabinet No. 2SCTC6

Events Recorder Cabinets
- 2CCTV Cabinet Nos. 1 and 2
- 2SCTC Cabinet Nos. 5 and 6

Engineered Safeguards Cabinets
- ES Odd Channel Relay Cabinet No. 2ESTC1
- ES Even Channel Relay Cabinet No. 2ESTC2

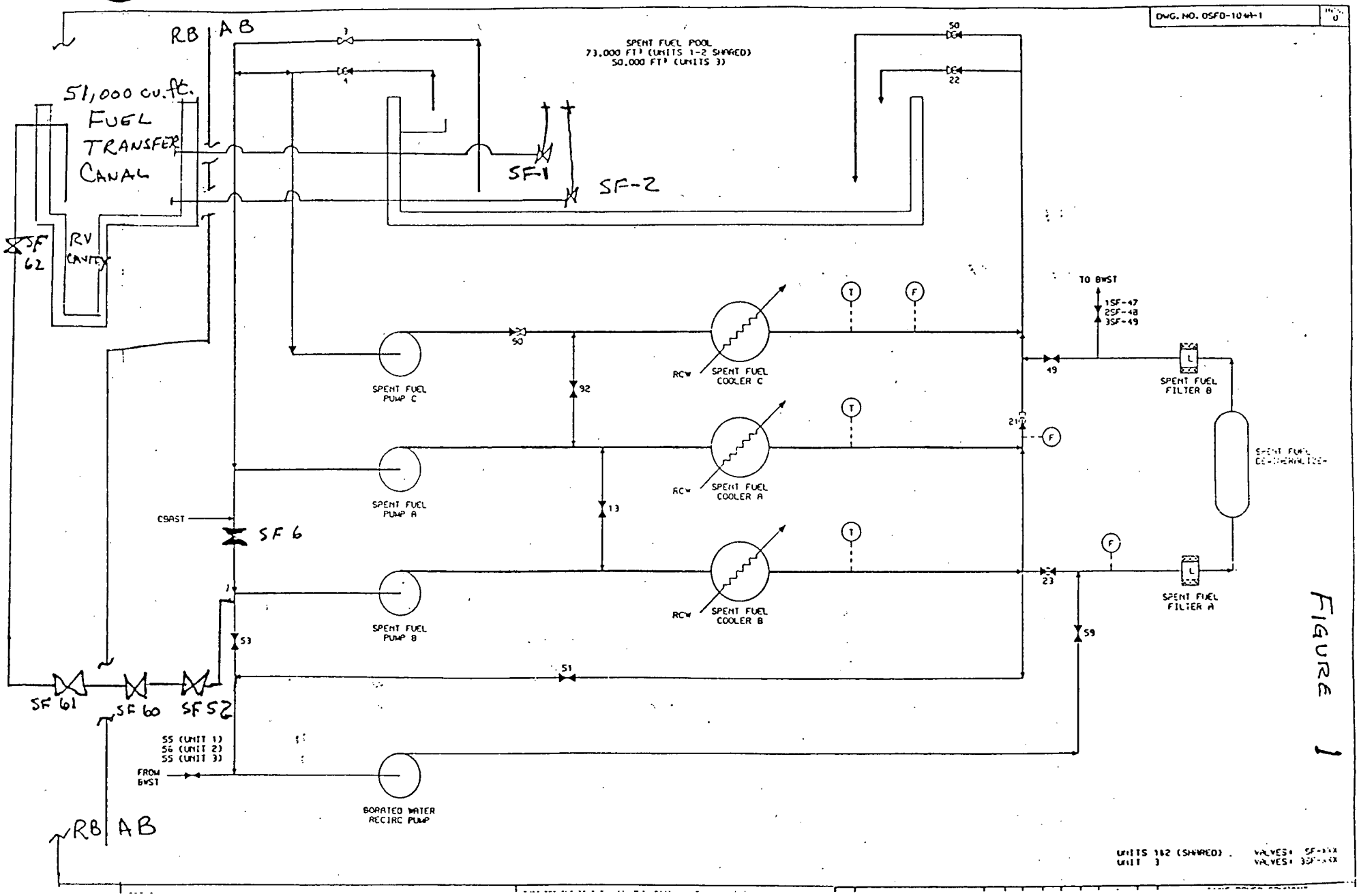

DWG. NO. 05FD-104-1
RB AB
51,000 cu.ft.
FUEL
TRANSFER
CANAL
SF 62
RV
CAVITY
SPENT FUEL POOL
73,000 FT² (UNITS 1-2 SHARED)
50,000 FT² (UNITS 3)
SF-1
SF-2
SPENT FUEL
PUMP C
SPENT FUEL
PUMP A
SPENT FUEL
PUMP B
RCW
SPENT FUEL
COOLER C
SPENT FUEL
COOLER A
SPENT FUEL
COOLER B
TO BWST
1SF-47
2SF-48
3SF-49
SPENT FUEL
FILTER B
SPENT FUEL
FILTER A
SPENT FUEL
DEMINERALIZER
CSAST
SF 6
SF 61
SF 60
SF 52
SS (UNIT 1)
SS (UNIT 2)
SS (UNIT 3)
FROM
BWST
BORATED WATER
RECIRC PUMP
RB AB
UNITS 1&2 (SHARED) . VALVES: SF-XXX
UNIT 3 VALVES: 3SF-XX

FIGURE 1

— DECONNED AREAS AS OF 5/19 ≃ 5 P.M.

SHADED PORTION SHOWS EXTENT OF CONTAMINATION

6th

SF Pool 844
6th Level 838'

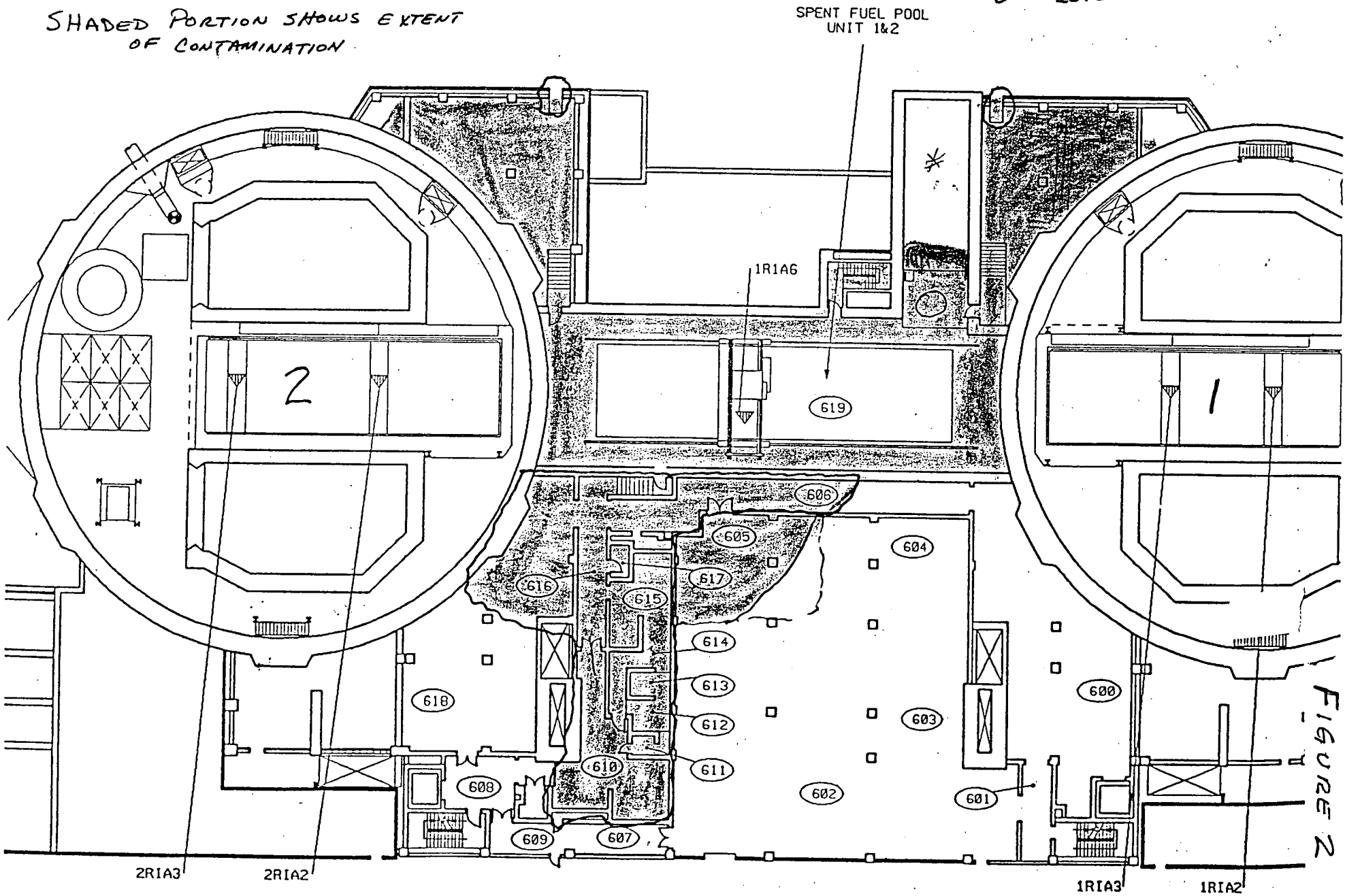


FIGURE 2

DECONNED AREAS AS OF 5/19/90 ≈ 5. P.M.

SHADED PORTION SHOWS EXTENT OF CONTAMINATION

5th

5th LEVEL 822'

— DECONNED AS OF 5/19

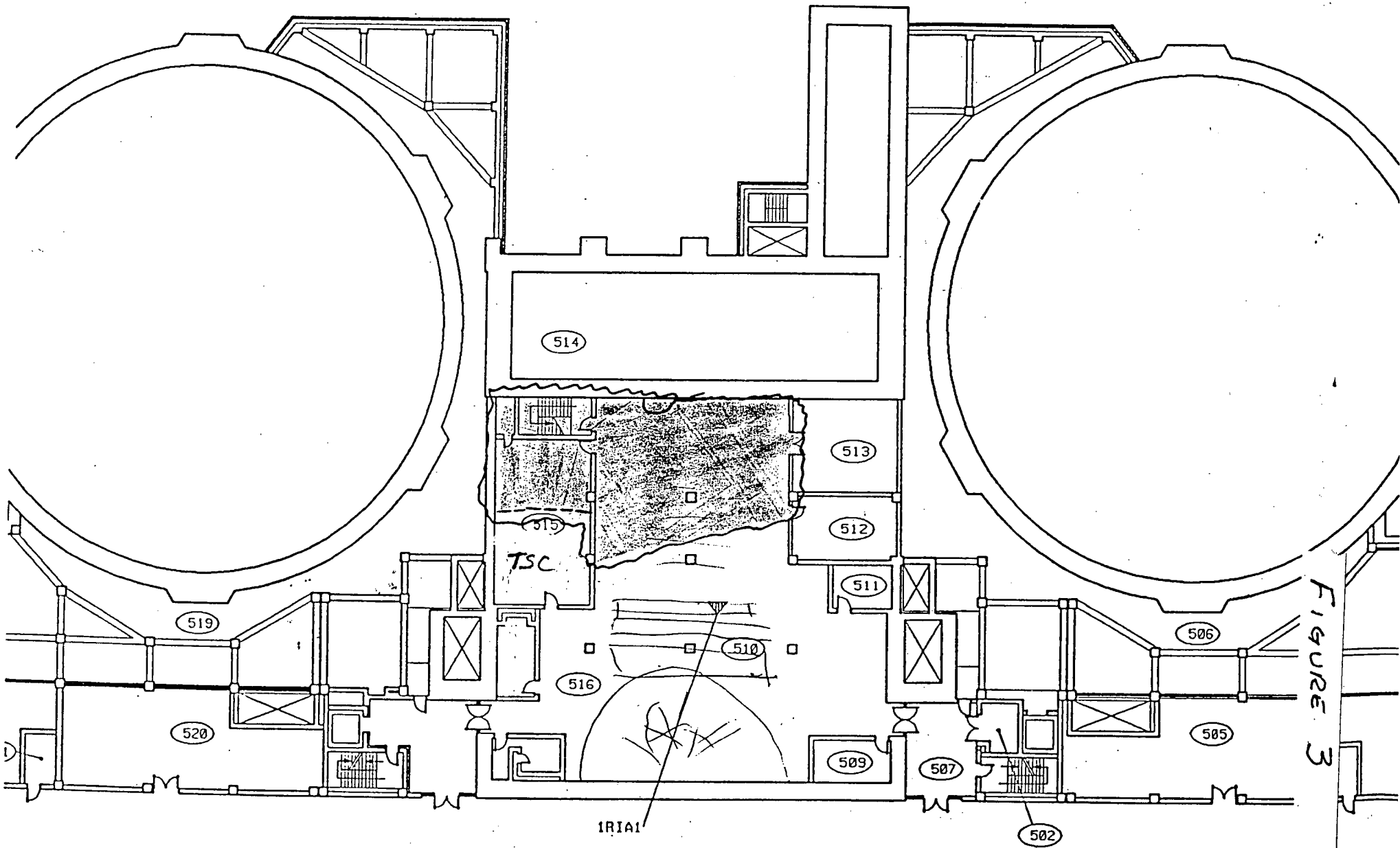


FIGURE 3

DECONNED AREAS AS OF 5/19/90 ≈ 5 P.M.

SHADED PORTION SHOWS EXTENT OF CONTAMINATION

4th

4th LEVEL 809'

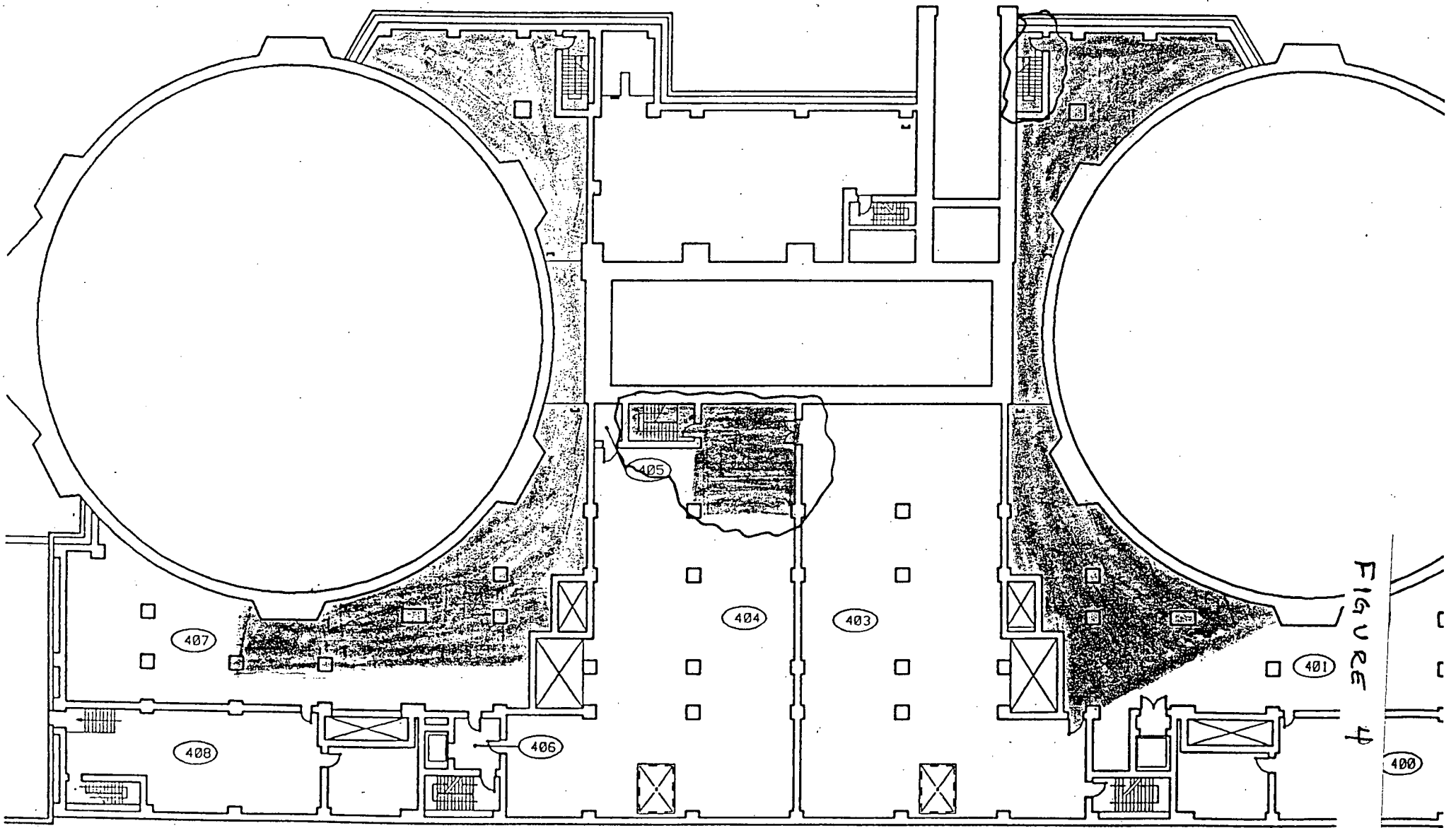


FIGURE 4

— DECONNED AREAS AS OF 5/19/90 ≈ 5 P.M.

SHADED PORTION SHOWS EXTENT OF CONTAMINATION

3ED

GRD LEVEL - 796'

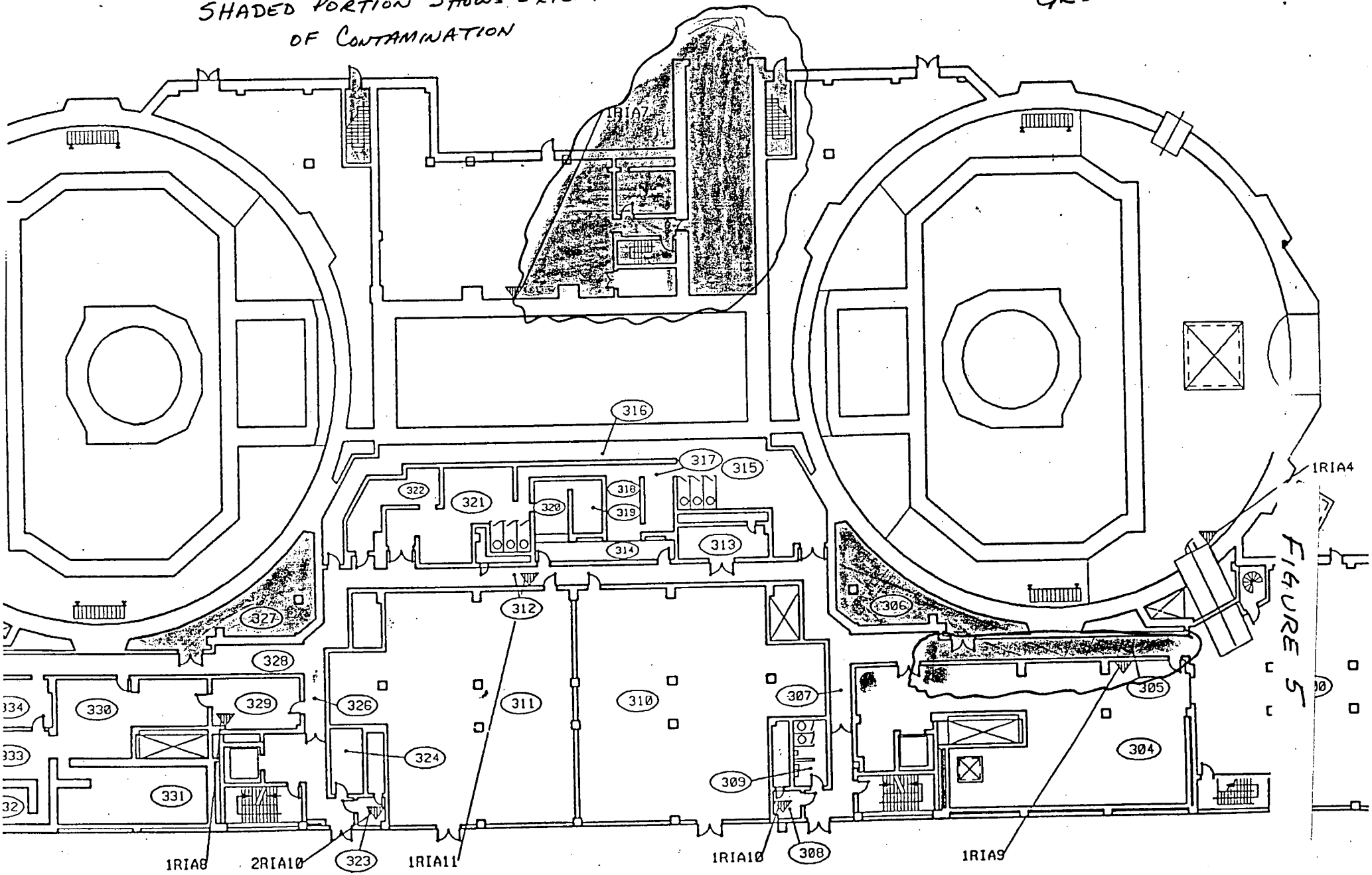


FIGURE 5

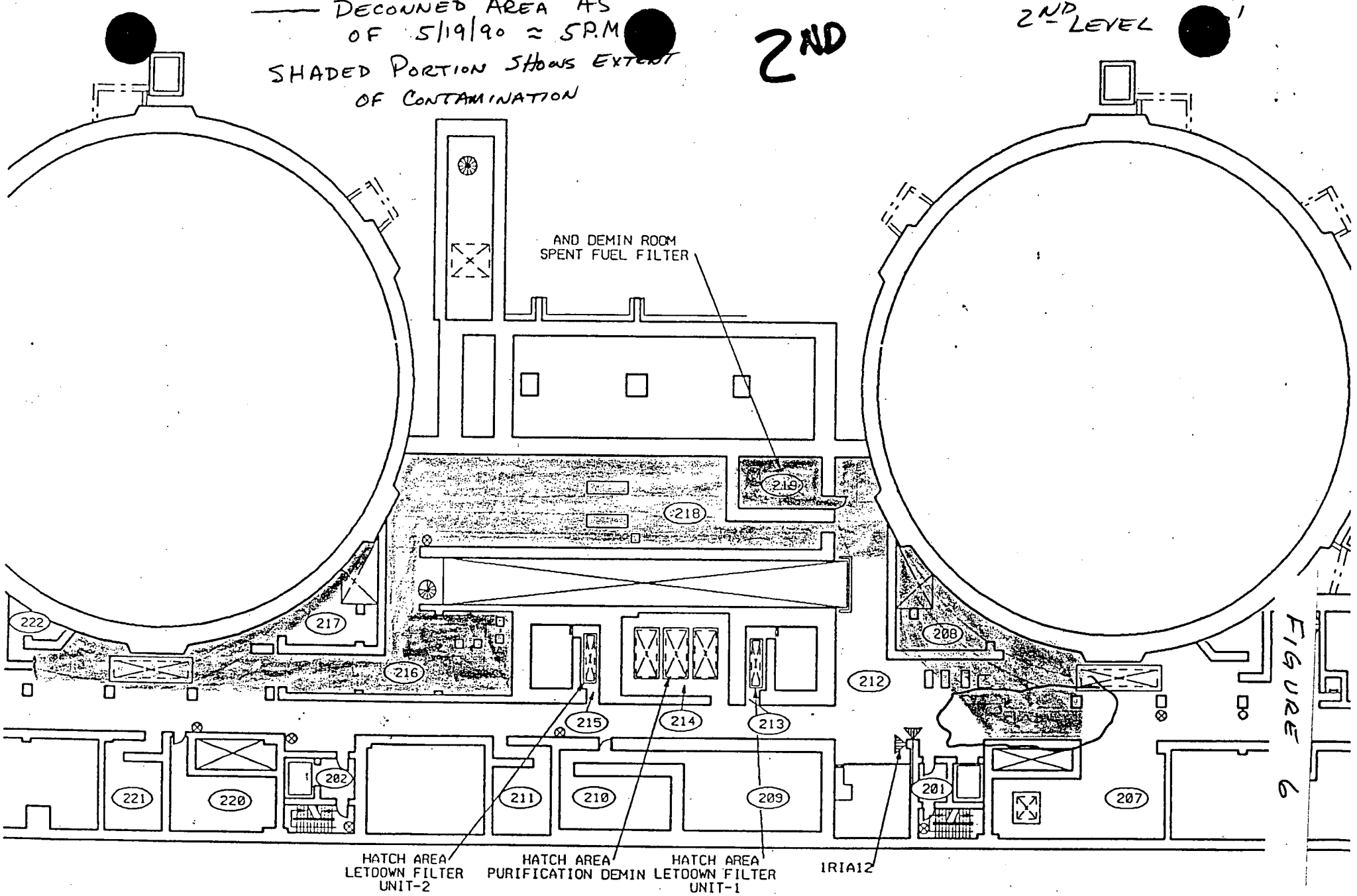

DECONNED AREA AS OF 5/19/90 ≈ 5P.M
SHADED PORTION SHOWS EXTENT OF CONTAMINATION
2ND
2ND LEVEL
AND DEMIN ROOM
SPENT FUEL FILTER
219
218
222
217
216
208
212
215
214
213
221
220
202
211
210
209
201
207
HATCH AREA LETDOWN FILTER UNIT-2
HATCH AREA PURIFICATION DEMIN
HATCH AREA LETDOWN FILTER UNIT-1
1RIA12

FIGURE 6

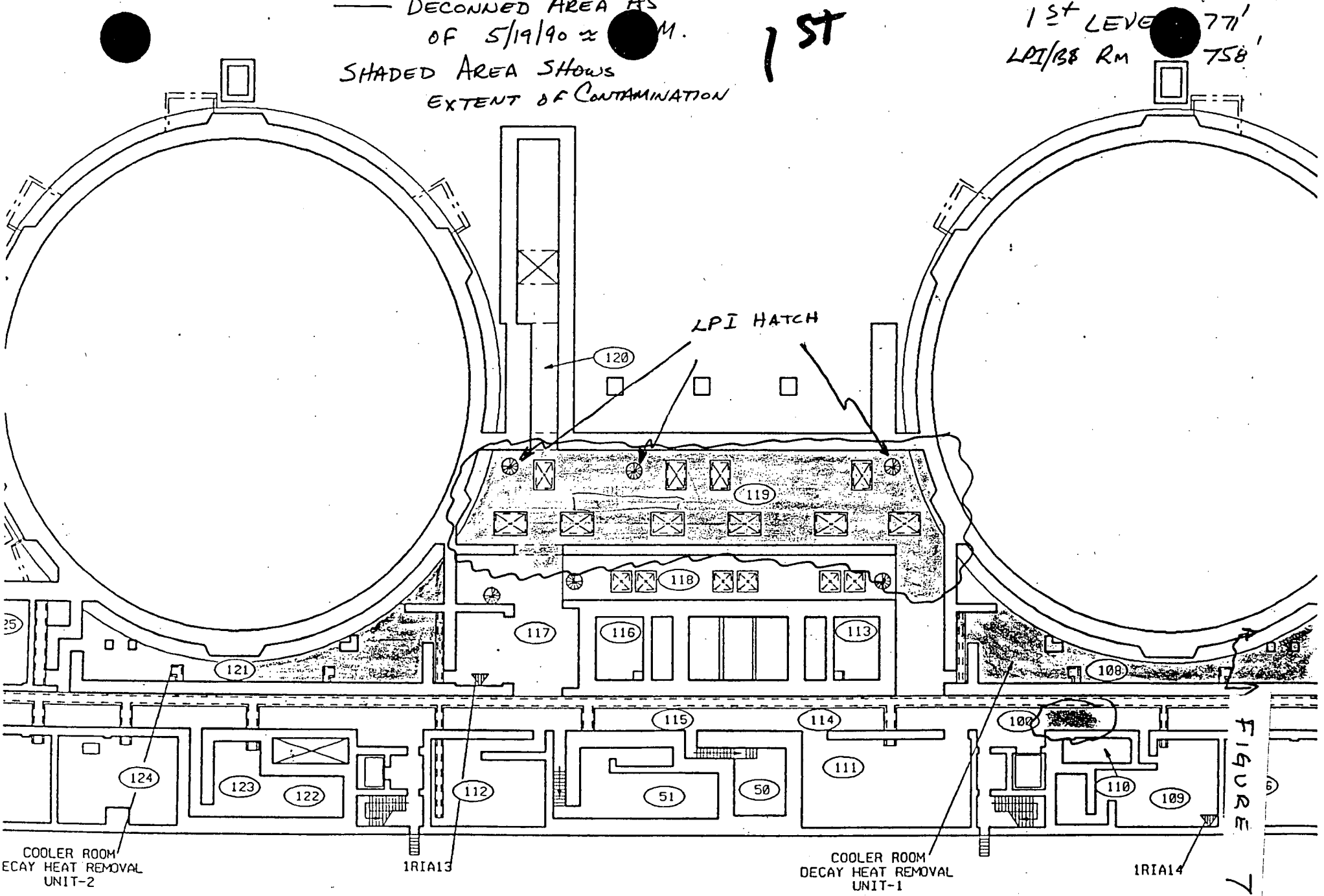

—— DECONNED AREA AS OF 5/19/90 ± M.
SHADED AREA SHOWS EXTENT OF CONTAMINATION
1ST
1ST LEVEL 771'
LPI/RB RM 758'
LPI HATCH
120
119
118
117
116
113
121
108
115
114
100
124
123
122
112
51
50
111
110
109
COOLER ROOM DECAY HEAT REMOVAL UNIT-2
1RIA13
COOLER ROOM DECAY HEAT REMOVAL UNIT-1
1RIA14

FIGURE 7

FIGURE 8

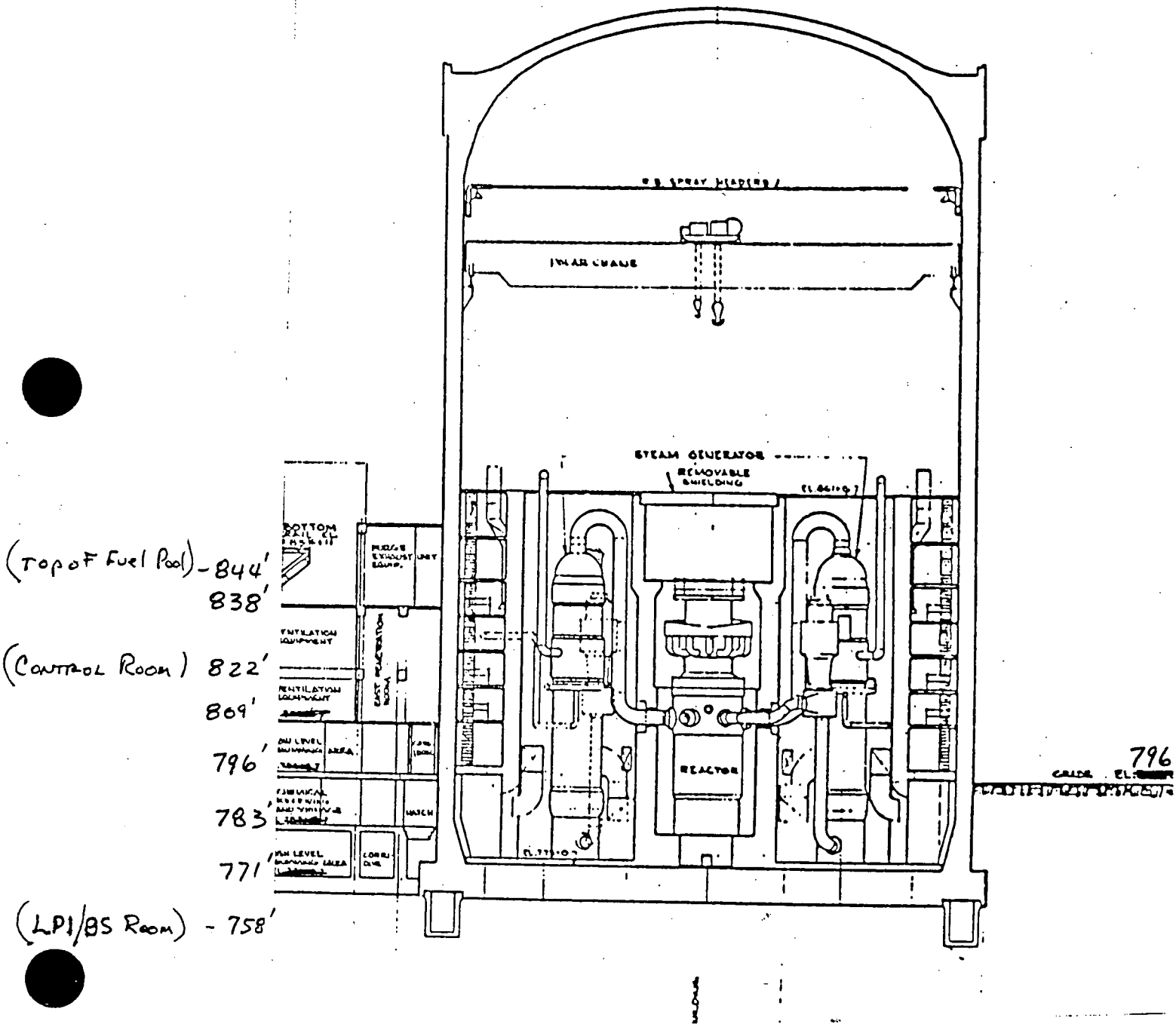
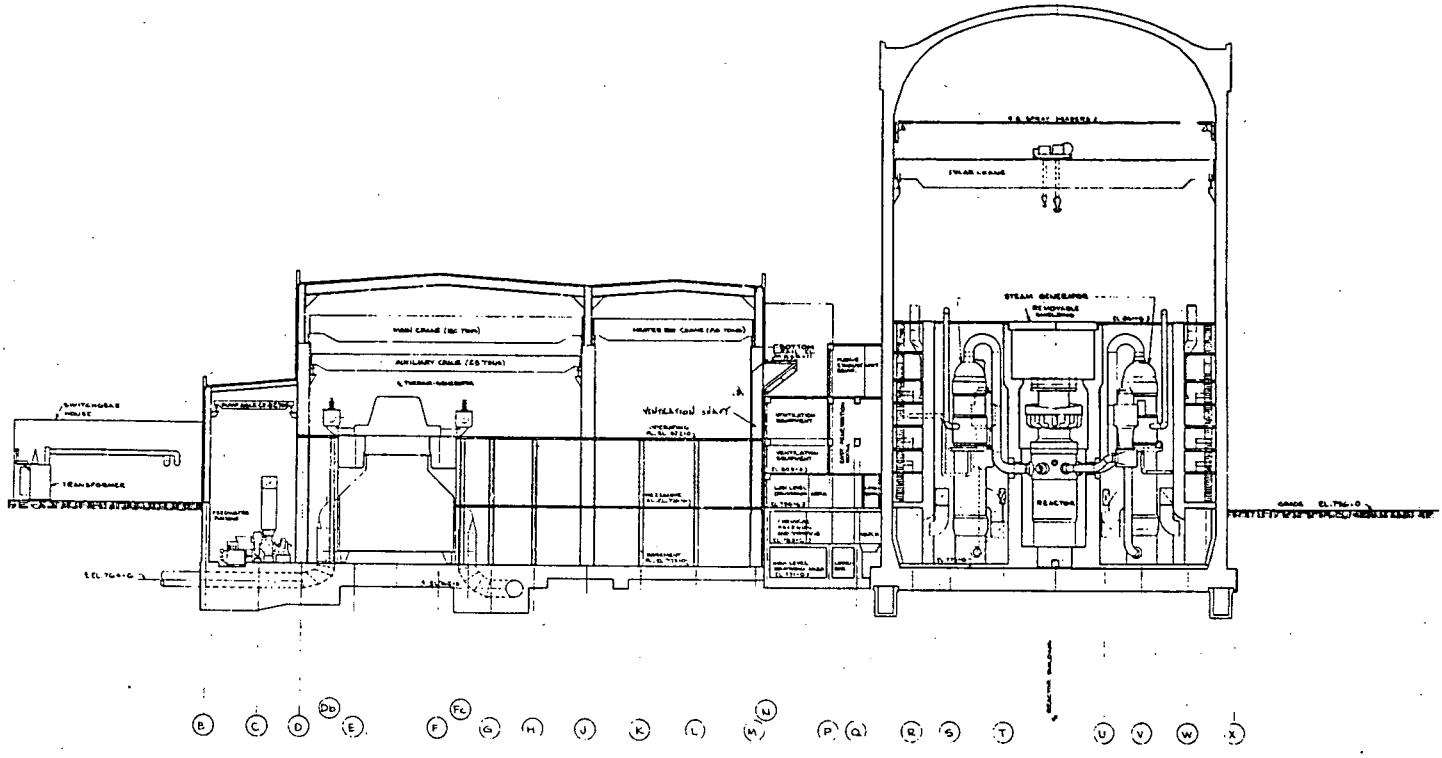
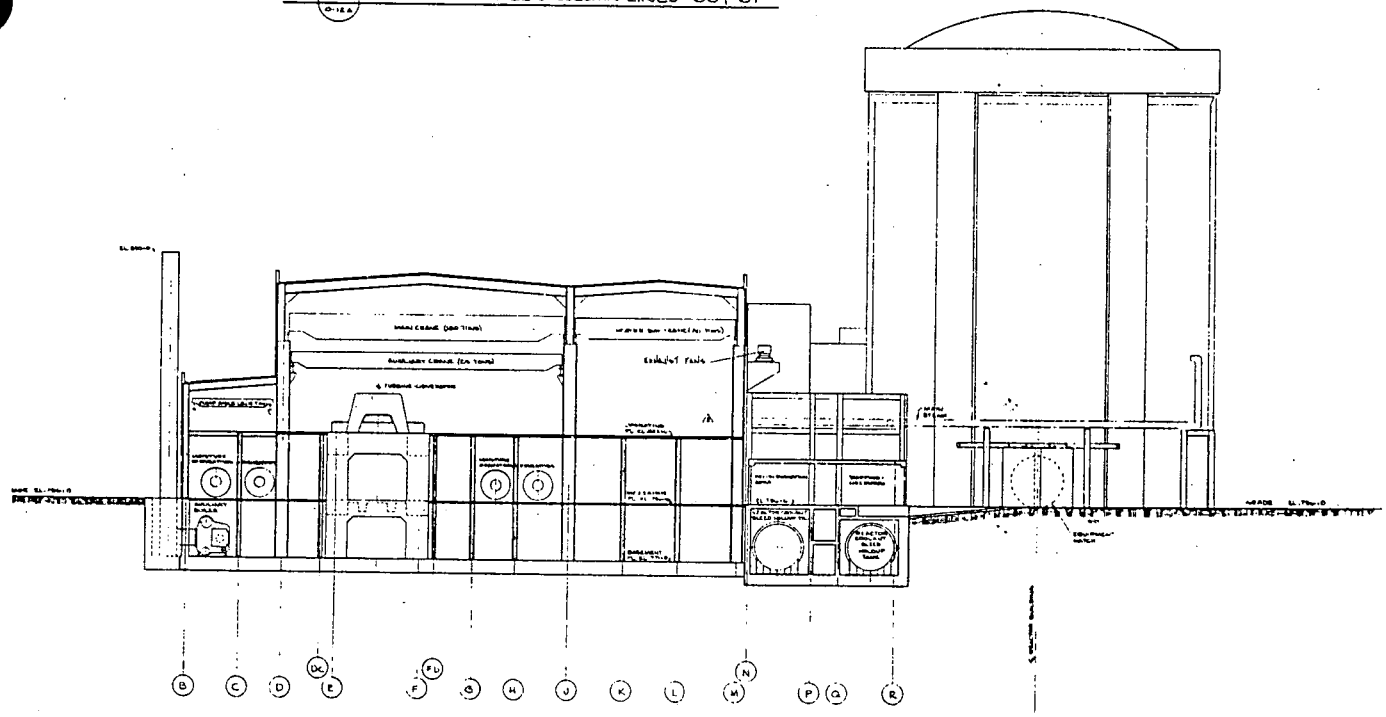

(Top of Fuel Pool) - 844'
838'
(Control Room) 822'
809'
796'
783'
771'
(LPI/BS Room) - 758'
INCORE CHASE
STEAM GENERATOR
REMOVABLE SHIELDING
REACTOR
796
GRADE EL.

FIGURE 9



2 SECTION BETWEEN COLUMN LINES '66' & '67'



1 SECTION BETWEEN COLUMN LINES '61' & '62'