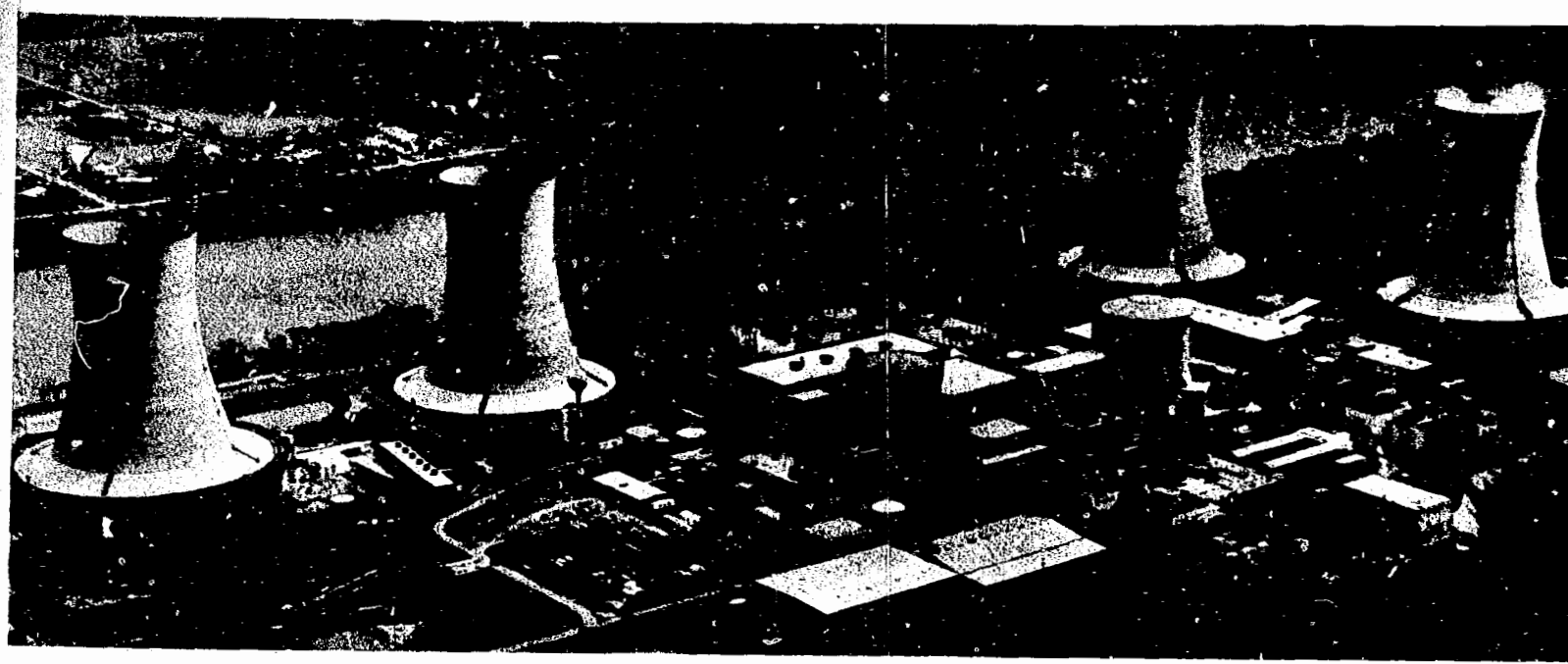


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**MASTER**

**GEND-INF- 007**  
**TIO-QLR**  
August 1981



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General Public Utilities • Electric Power Research Institute • U.S. Nuclear Regulatory Commission • U.S. Department of Energy

QUICK LOOK REPORT  
ENTRY 7  
THREE MILE ISLAND UNIT 2

Bechtel Northern Corporation/  
General Public Utilities Nuclear Corporation

Prepared for the  
U.S. Department of Energy  
Three Mile Island Operations Office  
Under Contract No. DE-AC07-76ID01570

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## ABSTRACT

This report summarizes tasks performed during Entry 7 at Three Mile Island Unit 2. During the entry into containment, which was made on March 17, 19, and 20, 1981, samples of sump water were collected, water was processed via the resin column test equipment, the LPR-3B contactor was jumpered for additional floor lighting on Elevation 347, large purge valves were surveyed, the in-core tunnel area was surveyed and photographed, the CRDM service structure was surveyed, CCTV cables between cameras were rerouted, and a high volume air sample was taken on Elevation 305.

This report provides raw data from the entry, and no attempt is made to provide interpretations or conclusions from the data.

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QUICK LOOK REPORT  
ENTRY 7  
THREE MILE ISLAND UNIT 2  
MARCH 17, 19, AND 20, 1981

ENTRY SUMMARY

The major accomplishments of Entry 7 into containment at Three Mile Island Unit 2 are as follows:

1. Three 1-liter and one 150-ml samples of sump water were taken
2. Five gallons of water were processed via the resin column test equipment
3. The LPR-3B contactor was jumpered to provide additional floor lights on Elevation 347
4. Large purge valves were surveyed
5. In-core tunnel area was surveyed and photographed
6. CRDM service structure was photographed
7. Cables between CCTV cameras and their control boxes were rerouted as needed, and CCTV camera connections were verified
8. A high volume air sample was taken on Elevation 305.

Table 1 shows the Entry 7 Task Summary Sheet. Table 2 is the Entry 7, Elevation 305 Radiation Survey; and Table 3 is the Radiation Survey for Elevation 347. The Entry 7 Surface Contamination is listed in Table 4. Table 5 shows the Preliminary TLD Readings for the entry. The Equipment List for Entry 7 is shown in Table 6.

TABLE 1. ENTRY 7 TASK SUMMARY SHEET

| Data Acquisition Task Number | Task Description                            | Task Accomplished              | Problems Encountered  | Comments/ Significant Findings   |
|------------------------------|---|--------------------------------|---|--|
| 20B                          | Sump water samples                          | Samples taken                  | None  | <p>Sample cart and pump were left in containment. During operation the 3/8-in. ID tubing was less than 2 rem/hr <math>\gamma</math> on contact. Once filled, the sample bombs had the following contact readings:</p> <p>No. 1 - 1 liter - 2 rem/hr <math>\gamma</math> contact</p> <p>No. 2 - 1 liter - 1 rem/hr <math>\gamma</math> contact</p> <p>No. 3 - 1 liter - 1 rem/hr <math>\gamma</math> contact</p> <p>No. 4 - 150 ml - 1.5 rem/hr <math>\gamma</math> contact</p> <p>All readings were taken with a teletector. All of the sample bombs were wrapped with lead.</p> |
| 23, 27                       | Survey and smears of CRDM service structure | Survey and smears complete     | Tools to implement back-up method for taking head readings were the wrong size. | None   |
| 45                           | Survey and pictures of incore tunnel area   | Survey and pictures were taken | Lack of light in area made task very difficult.                                 | None   |

TABLE 1. (continued)

| Data Acquisition Task Number | Task Description                                     | Task Accomplished                          | Problems Encountered   | Comments/ Significant Findings   |
|------------------------------|--|--|--|--|
| 42B                          | Decontamination test control smears and acetate pads | Completed                                  | Nikonas camera was inadvertently set with too high a shutter speed causing pictures to be 1/2 frame; pictures slightly fogged. | Control smears were taken by removing the smear and acetate pads from their protective bags and rebagging them without being used. |
| 25, 26                       | Survey and smears inside inside A D-ring             | Not performed                              | Due to heat stress problems encountered on March 17, 1981, this task was not performed.  | None   |
| 20                           | Resin column test                                    | 5 gallons of processed water were obtained | On March 17, 1981, attempts sump pump into sump failed;  | Radiation measurements following test are given in Figure 2.   |

TABLE I. (continued)

| Data Acquisition Task Number | Task Description | Task Accomplished | Problems Encountered   | Comments/ Significant Findings |
|------------------------------|------------------|-------------------|--|--------------------------------|
|                              |                  |                   | additional attempts on March 19, 1981, were successful.  |                                |
|                              |                  |                   | Loss of video on camera No. 1 caused an additional entry to be made on March 19, 1981, to reconnect video on camera No. 1 and verify operation of column test. |                                |
|                              |                  |                   | On March 20, 1981, an entry was made to retrieve the 10 gallon carboy which contained the 5 gallons of processed water.  |                                |

TABLE 1. (continued)

| Data Acquisition Task Number | Task Description                                   | Task Accomplished   | Problems Encountered   | Comments/ Significant Findings |
|------------------------------|--|---------------------|--|--------------------------------|
| Maintenance                  | Jumper LPR-3B                                      | Jumpering completed | None   | None                           |
| Operations                   | Plant surveillance purge valves AHV-2A, 2B, 3A, 3B | All valves oiled    | Some difficulty in performing oiling; first attempt on March 17, 1981, partially completed task; task was completed on March 19, 1981, by shutting down the purge to allow the oiling to proceed; once complete the purge valves cannot be oiled while in the open position. | None                           |



TABLE 1. (continued)

| Data Acquisition Task Number | Task Description  | Task Accomplished                      | Problems Encountered   | Comments/ Significant Findings   |
|------------------------------|---|--|--|--|
| Operations                   | Plant surveillance of chemical addition valves CA-1 CA-2, CA-3. | Valves were located, but not serviced. | Once location of valves was made, it was determined that physical access was not possible due to restricting clothing required for radiological hazards. | If these valves are to be serviced, an alternate route for access will be required.  |
| 1                            | Verify cabling on CCTV and reroute as needed                    | Cabling rerouted as needed             | None   | Connectors on CCTV units do not always make proper contact; use of duct tape to secure several connectors was made   |
| N/A                          | High volume air sample  | Sample taken                           | Results are suspect as actual on-off times may be in error when retrieved air sampler was off and unit was cool  | Airborne concentrations were as follows:<br>Sr/Y 90: 2.65-11 $\mu\text{Ci}/\text{cm}^3$<br>Cs 134 : 7.9-11 $\mu\text{Ci}/\text{cm}^3$<br>Cs 137 : 7.19-10 $\mu\text{Ci}/\text{cm}^3$ |

TABLE 1. (continued)

| Data Acquisition Task Number | Task Description | Task Accomplished | Problems Encountered                        | Comments/ Significant Findings |
|------------------------------|------------------|-------------------|---|--------------------------------|
|                              |                  |                   | indicating premature shutdown had occurred. |                                |

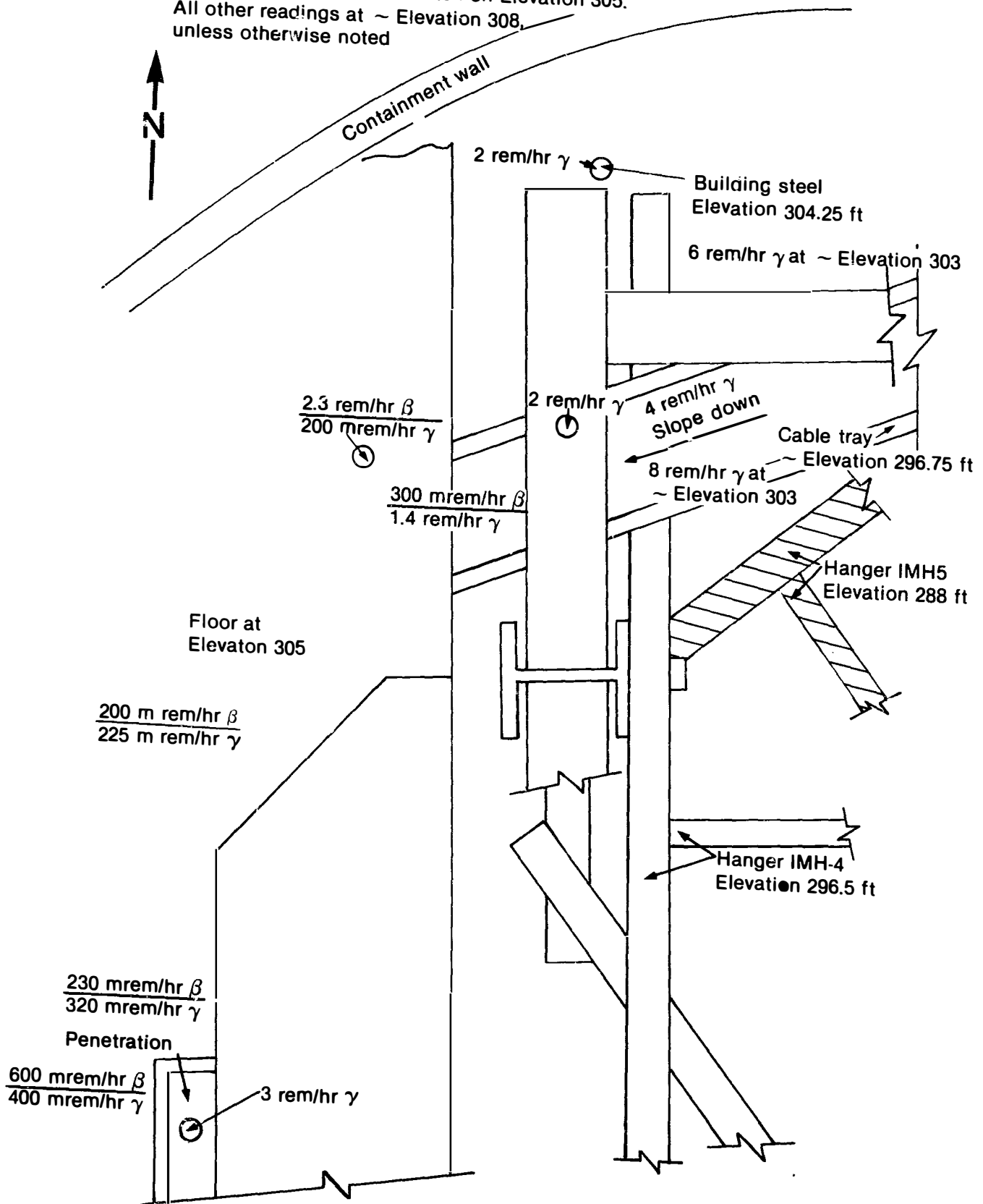
Note: Containment temperature, 62°F; containment pressure, 0.2 in. Hg; relative humidity, <100%; airborne activity, <MPC.

7

TABLE 2. ENTRY 7, ELEVATION 305 RADIATION SURVEY

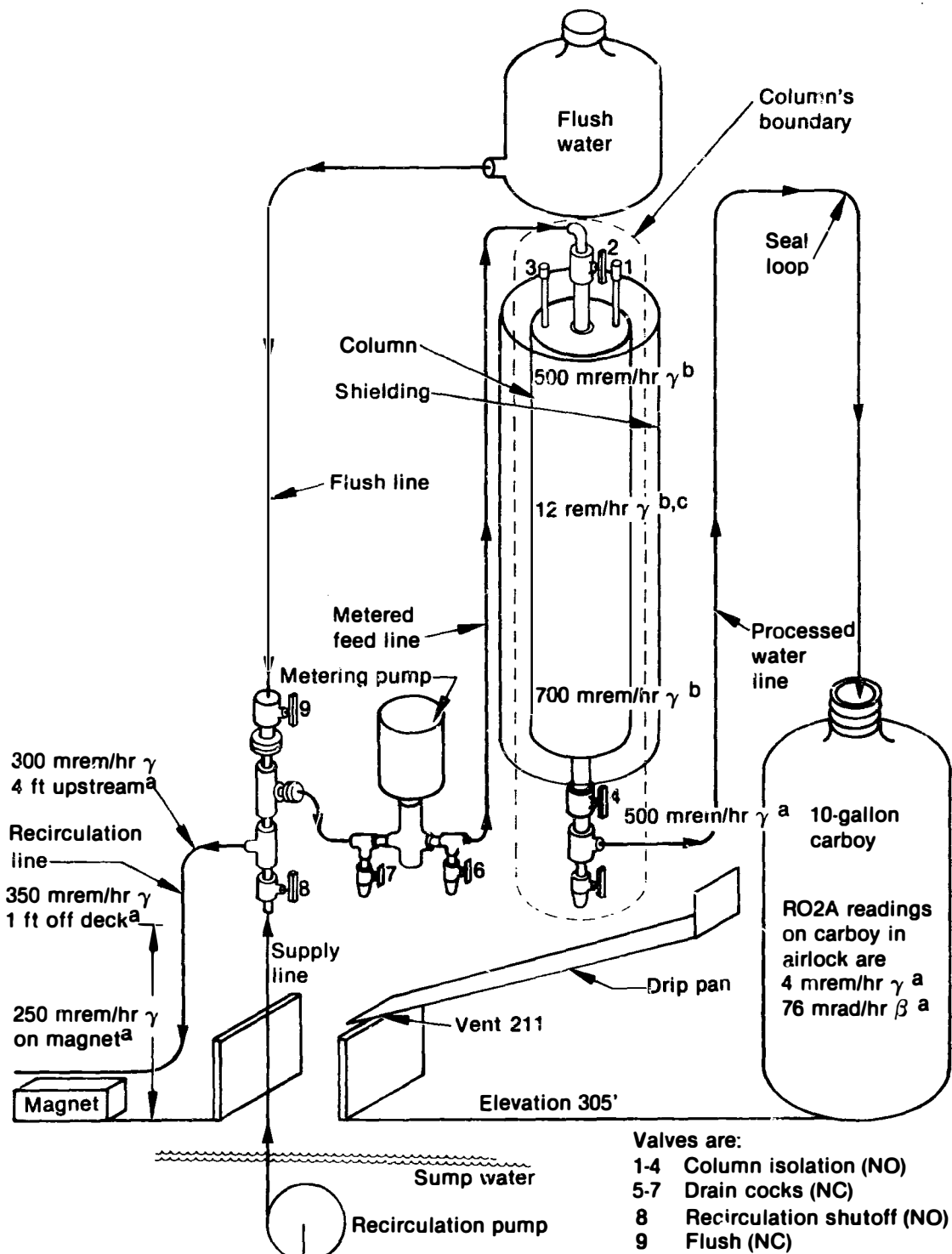
| <u>Data Acquisition</u><br><u>Task Number</u> | <u>Location</u><br><u>Figure 1</u> | <u>Instrument</u> | <u>Gamma</u><br><u>Dose Rate</u> | <u>Beta</u><br><u>Dose Rate</u> | <u>Location</u> |
|---|------------------------------------|-------------------|----------------------------------|---------------------------------|-----------------|
| 45  | As Noted on Figure 1               |                   | As Noted on Figure 1             |                                 |                 |
| 20  | As Noted on Figure 2               |                   | As Noted on Figure 2             |                                 |                 |

a. Readings with circles were taken on Elevation 305.  
 All other readings at ~ Elevation 308,  
 unless otherwise noted



INEL-A-19 018

Figure 1. Elevation 305, reactor building in-core instrumentation cable chase-structural design.

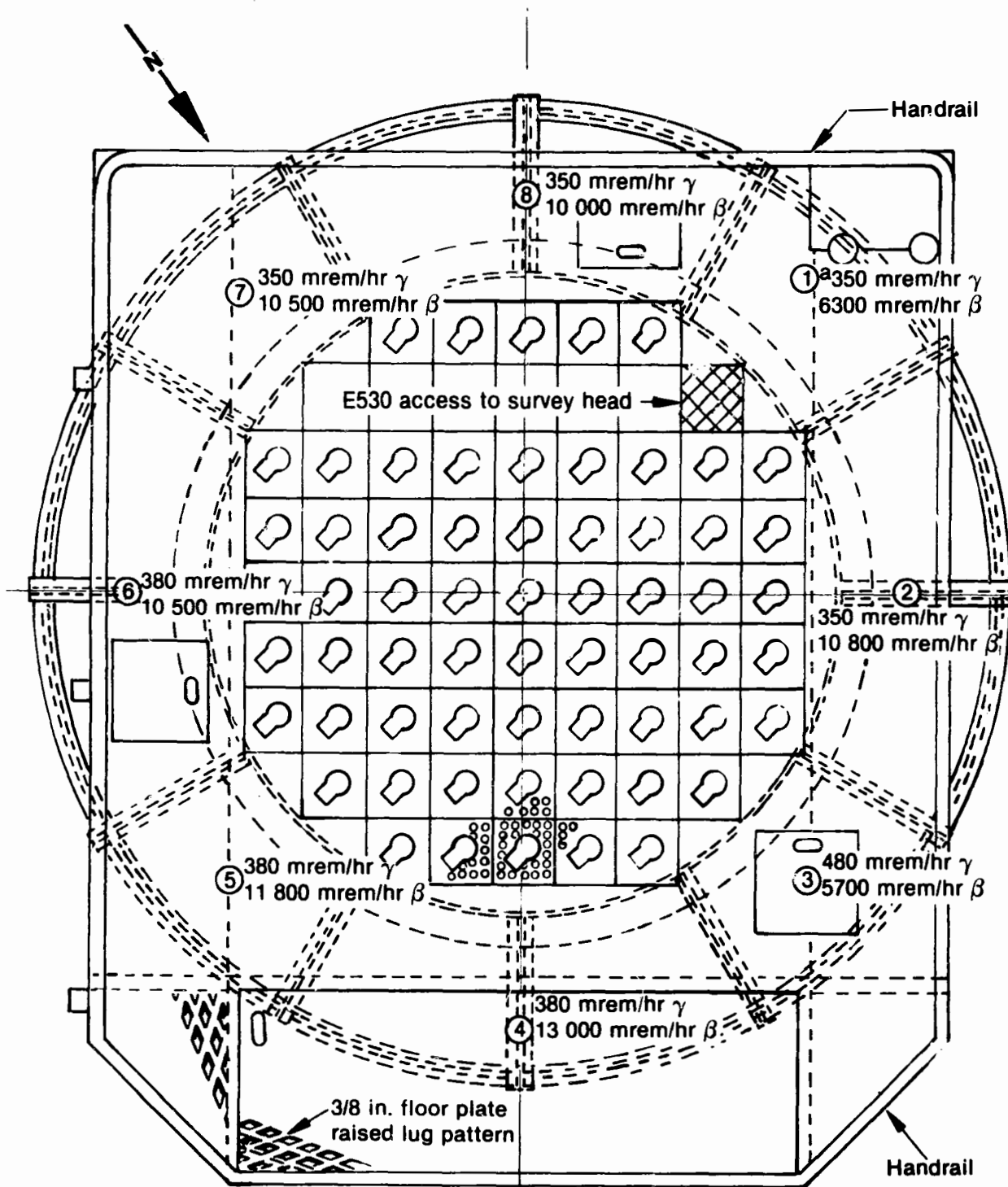


INEL-A-19 016

Figure 2. Reactor building sumpwater resin column experiment--system flow diagram.

TABLE 3. ENTRY 7, ELEVATION 347 RADIATION SURVEY

| <u>Data Acquisition Task Number</u> | <u>Location Figure 2</u>          | <u>Instrument</u> | <u>Gamma Dose Rate</u> | <u>Beta Dose Rate</u>             | <u>Neutron Reading</u> | <u>Location</u> |
|-------------------------------------|-----------------------------------|-------------------|------------------------|-----------------------------------|------------------------|-----------------|
| 23, 27                              | As noted on Figure 3 and Figure 4 |                   |                        | As Noted on Figure 3 and Figure 4 |                        |                 |



a. Numbers correspond to those shown in Table 4.  
 All readings were taken with an RO2A on contact.

INEL-A-19 019

Figure 3. Reactor vessel service structure control rod drive mechanism.

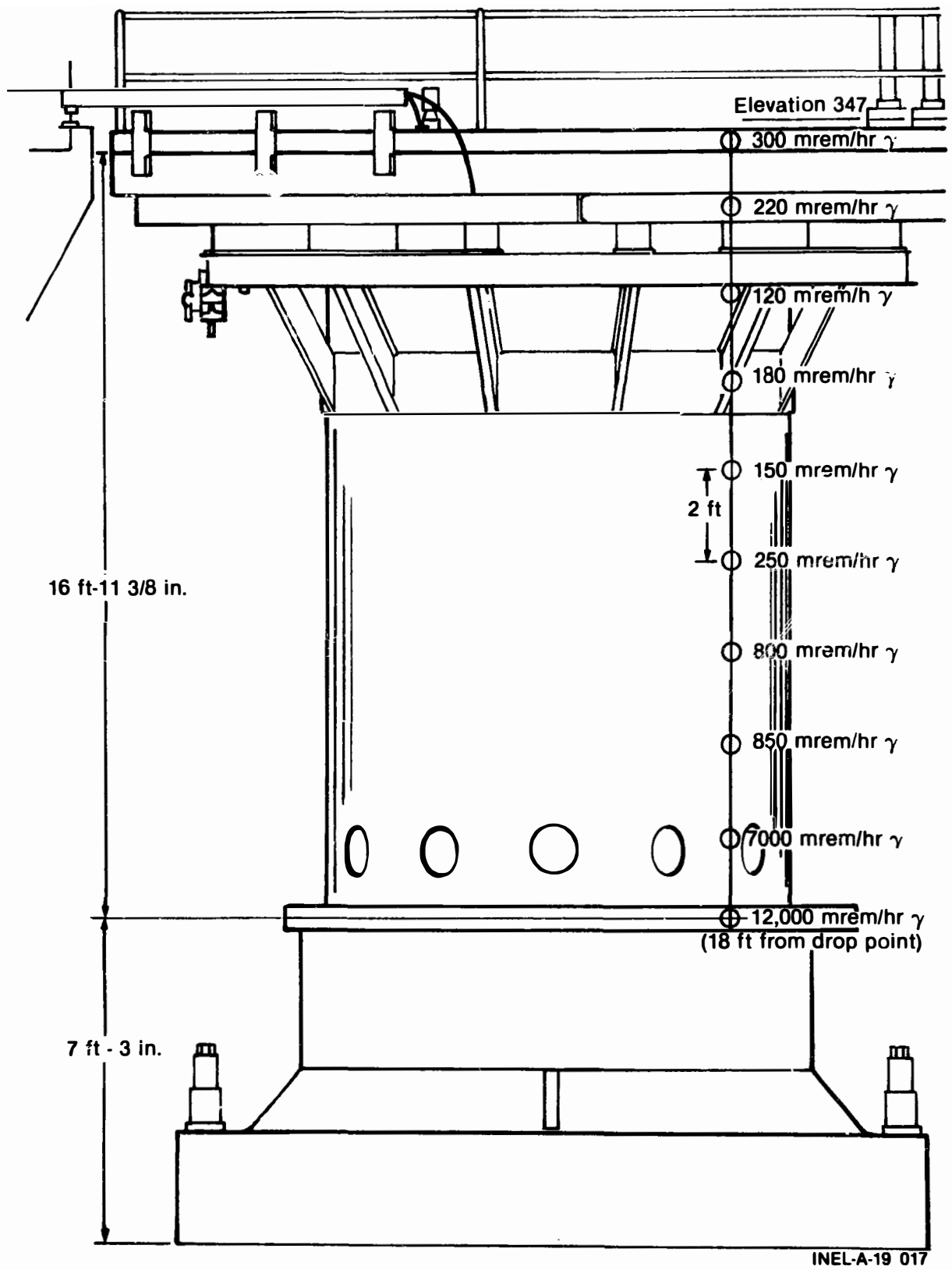


Figure 4. Reactor vessel service structure inside of barrel.



TABLE 4. ENTRY 7 SURFACE CONTAMINATION

| Data Acquisition Task Number | Specimen           | Sample Number | Location <sup>b</sup>  | Cs-134 ( $\mu\text{Ci}$ ) | Cs-137 ( $\mu\text{Ci}$ ) |
|------------------------------|--------------------|---------------|--|---------------------------|---------------------------|
| 27                           | smear <sup>a</sup> | 58731         | 1  | 2.3 <sup>-1</sup>         | 1.8 <sup>0</sup>          |
| 27                           | smear              | 58732         | 2  | 3.8 <sup>-1</sup>         | 3.0 <sup>0</sup>          |
| 27                           | smear              | 58733         | 3  | 6.1 <sup>-1</sup>         | 4.9 <sup>0</sup>          |
| 27                           | smear              | 58734         | 4  | 5.8 <sup>-1</sup>         | 4.3 <sup>0</sup>          |
| 27                           | smear              | 58735         | 5  | 7.7 <sup>-1</sup>         | 5.9 <sup>0</sup>          |
| 27                           | smear              | 58736         | 6  | 6.1 <sup>-1</sup>         | 4.7 <sup>0</sup>          |
| 27                           | smear              | 58737         | 7  | 2.7 <sup>-1</sup>         | 2.2 <sup>0</sup>          |
| 27                           | smear              | 58738         | 8  | 5.5 <sup>-1</sup>         | 4.2 <sup>0</sup>          |
| 27                           | smear              | 58739         | Position indicating cables on access bridge to service structure | 4.9 <sup>-1</sup>         | 3.7 <sup>0</sup>          |

The following are control smears in area of CRDM service structure<sup>c</sup>

|    |       |       |  |                   |                   |
|----|-------|-------|--|-------------------|-------------------|
| 27 | smear | 58727 |  | 1.6 <sup>-3</sup> | 1.1 <sup>-2</sup> |
| 27 | smear | 58728 |  | 2.0 <sup>-3</sup> | 1.5 <sup>-2</sup> |
| 27 | smear | 58729 |  | 2.1 <sup>-3</sup> | 1.8 <sup>-2</sup> |
| 27 | smear | 58730 |  | <LLD              | 3.8 <sup>-4</sup> |

The following are control smears and acetate pads on Elevation 305 and Elevation 347 as noted<sup>a</sup>

|     |                  |       |               |                   |                   |
|-----|------------------|-------|---------------|-------------------|-------------------|
| 42B | smear            | 58741 | Elevation 305 | 2.3 <sup>-4</sup> | 2.4 <sup>-3</sup> |
| 42B | pad <sup>d</sup> | 58744 | Elevation 305 | --                | =7 <sup>-4</sup>  |
| 42B | smear            | 58742 | Elevation 347 | 2.4 <sup>-3</sup> | 1.6 <sup>-2</sup> |
| 42B | pad              | 58745 | Elevation 347 | --                | =1 <sup>-3</sup>  |

TABLE 4. (continued)

| Data Acquisition   |                 |                      |                             |                     |                     |
|--------------------|-----------------|----------------------|-----------------------------|---------------------|---------------------|
| <u>Task Number</u> | <u>Specimen</u> | <u>Sample Number</u> | <u>Location<sup>b</sup></u> | <u>Cs-134 (μCi)</u> | <u>Cs-137 (μCi)</u> |
| 42B                | smear           | 58743                | Elevation 347               | 7.7-4               | 7.9-3               |
| 42B                | pad             | 58746                | Elevation 347               | --                  | 1-3                 |

a. Smear data is total activity on the smear; smeared area was approximately 100 cm<sup>2</sup>.

b. Numbers correspond to those shown in Figure 3.

c. Control smears and acetate pads were removed from their protective bags and rebagged without being used.

d. Acetate pad data is total activity on the pad, pad area is approximately 10 cm<sup>2</sup>.

TABLE 5. ENTRY 7 PRELIMINARY TLD READINGS

| <u>Team Member</u> | <u>Whole Body</u><br>(mrem) | <u>Skin</u><br>(mrem) | <u>Maximum Extremity</u><br>(mrem) |             | <u>Approved Dose Limit</u><br>(mrem) |
|--------------------|-----------------------------|-----------------------|------------------------------------|-------------|--------------------------------------|
|                    | <u>Gamma</u>                | <u>Beta</u>           | <u>Gamma</u>                       | <u>Beta</u> |                                      |
| <u>Team 1</u>      |                             |                       |                                    |             |                                      |
| Eng #1             | 590                         | 0                     | 730                                | 0           | 1000                                 |
| HP #1              | 510                         | 0                     | 570                                | 0           | 1000                                 |
| Ops #1             | 150                         | 0                     | 160                                | 0           | 1000                                 |
| <u>Team 2</u>      |                             |                       |                                    |             |                                      |
| Eng #2             | 580                         | 0                     | 670                                | 0           | 1000                                 |
| Tech #1            | 570                         | 0                     | 580                                | 0           | 1000                                 |
| HP #2              | 560                         | 0                     | 640                                | 0           | 1000                                 |
| <u>Team 3</u>      |                             |                       |                                    |             |                                      |
| Elec #1            | 290                         | 0                     | 450                                | 0           | 1000                                 |
| Ops #2             | 410                         | 0                     | 470                                | 0           | 1000                                 |
| HP #3              | 600                         | 0                     | 710                                | 0           | 1000                                 |
| Eng #3             | 350                         | 0                     | 420                                | 0           | 1000                                 |
| <u>Team 4</u>      |                             |                       |                                    |             |                                      |
| Eng #4             | 150                         | 0                     | 120                                | 0           | 1000                                 |
| Eng #5             | 100                         | 0                     | 120                                | 0           | 1000                                 |
| HP #4              | 55                          | 0                     | 60                                 | 0           | 1000                                 |

TABLE 6. ENTRY 7 EQUIPMENT LIST

| <u>Survey Equipment</u> |                 | <u>Protective Clothing</u>            |                 | <u>Tools and Other Equipment</u>         |                 |
|-------------------------|-----------------|---------------------------------------|-----------------|--|-----------------|
| <u>Type</u>             | <u>Quantity</u> | <u>Type</u>                           | <u>Quantity</u> | <u>Description</u>                       | <u>Quantity</u> |
| RO-2A                   | 3               | PC's w/hoods, gloves                  | 2               | Column test equipment                    | 1               |
| Teletector              | 2               | Fireman's boots, pair                 | 1               | Grease gun                               | 1               |
| E530                    | 1               | Wet suits (7 men only)                | 1               | Oiler                                    | 1               |
| PNC-4                   | 1               | MSA purifer or particulate respirator | 1               | Clipboards                               | 6               |
|                         |                 | BZA samplers                          | 1               | High volumn air sampler                  | 1               |
|                         |                 |                                       |                 | Gallon bottles filled with 25 lb of lead | 14              |
|                         |                 |                                       |                 | Nikonos III camera w/flash (35 mm)       | 1               |
|                         |                 |                                       |                 | Airlock ramp                             | 2               |
|                         |                 |                                       |                 | CCTV connector tester                    | 1               |
|                         |                 |                                       |                 | Sump sampler equipment                   | 1               |
|                         |                 |                                       |                 | Lead lined powdex buckets                | 4               |
|                         |                 |                                       |                 | Simpson volt meter                       | 1               |
|                         |                 |                                       |                 | Set of jumpers for LPR-3B                | 1               |
|                         |                 |                                       |                 | Spotlight                                | 1               |

TABLE 6. (continued)

| Survey Equipment |          | Protective Clothing |          | Tools and Other Equipment       |          |
|------------------|----------|---------------------|----------|---------------------------------|----------|
| Type             | Quantity | Type                | Quantity | Description                     | Quantity |
|                  |          |                     |          | Two way radios/minimum per team | 1        |
|                  |          |                     |          | Small lights/individual         | 1        |
|                  |          |                     |          | Pencil dosimeter/individual     | 1        |
|                  |          |                     |          | Digital dosimeter/individual    | 1        |

## OBSERVATIONS AND RECOMMENDATIONS

The following are the results of the debriefing session. Response action has been assigned as noted.

| <u>Response Action</u> | <u>Item</u>  |
|------------------------|--|
| Safety                 | More training concerning heat stress and how to avoid it.  |
| CAG                    | Physical effort level to be better simulated during mock-up training in full dress.  |
| CAG                    | Reading of digital dosimeters to be attempted during mock-ups to determine best location for each individual.  |
| CAG                    | Turn on of small back-up lights to be done during mock-up training.  |
| CAG                    | Waist belts are to be secured in a manner to preclude slipping.  |
| CAG                    | Those who are to wear radios should do so during mock-up training.   |
| CAG                    | Smaller clipboards secured around the neck may be easier to use.   |
| CAG                    | Use of scenarios which provide each individual with his specific tasks to be performed with the time frame indicated in a very brief form. Detailed and integrated scenarios to be utilized in the command center. |
| CAG                    | All equipment should be staged on a table in the entry room prior to start of entry. If more than one team is to make an entry, equipment should be grouped and designated as to which team it belongs to.         |
| CAG                    | Ante-room support personnel should have a team by team airlock loading schedule for all equipment.   |
| CAG                    | All team members should have extra booties in order to accommodate unforeseen transits into the airlock.   |
| CAG                    | Wet suits if used should be two piece with bib type pants.   |
| CAG                    | Need to include a signal during training which signifies to the undressers that there is an urgent need for rapid undressing.  |

OBSERVATIONS AND RECOMMENDATIONS (continued)

| <u>Response<br/>Action</u> | <u>Item</u>   |
|----------------------------|---|
| CAG                        | Wet suit should be sliced open immediately in order to allow cooling.   |
| CAG                        | Department that is to perform task should provide required tools.   |
| CAG                        | Some type of handling bracket should be provided for aircraft light.  |
| CAG                        | Area in ante-room should be designated for survey clipboards.   |
| CAG                        | Alternate methods for attaching equipment (clipboards, survey instruments, etc.) should be developed.                       |
| None                       | Minimum floor surface clearance on Elevation 305 between open stairwell and containment seismic gap is fourteen inches.     |
| Plant<br>Maintenance       | LPR-3A is extremely noisy.  |
| CAG                        | Notify maintenance that scaffolding on Elevation 305 between open stairwell and containment seismic gap is fourteen inches. |
| Plant<br>Maintenance       | No tags were installed on LPR-3B jumpers.   |
| CAG                        | Additional means should be provided to ensure that radio earphones are secured properly.                                    |

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