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HPP 1602
Revision 3
09/13/76

THREE MILE ISLAND NUCLEAR STATION
STATION HEALTH PHYSICS PROCEDURE 1602
RADIATION DOSE RATE SURVEYS

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Unit 1 Staff Recommends Approval

Approval MA Date _____
Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval MA Date _____
Cognizant Dept. Head

Unit 1 PORC Recommends Approval

J. P. O'Connell Date 9-9-76
Chairman of PORC

PORC comments of _____ included
(date)

By _____ Date _____

Unit 2 PORC Recommends Approval

Norman Williams Date 9/10/76
Chairman of PORC

PORC comments of _____ included
(date)

By NA Date _____

Approved [Signature] 99001 6883/20 09-13-76
Station Superintendent/
Unit Superintendent

THREE MILE ISLAND NUCLEAR STATION
STATION HEALTH PHYSICS PROCEDURES
1602 - Radiation Dose Rate Surveys

1.0 PURPOSE

The purpose of this procedure is to explain in detail how to conduct a Radiation Dose Rate Survey.

2.0 DEFINITION

2.1 Dose rate is the radiation dose delivered per unit time.

2.2 The results of radiation dose rate surveys are used in the preparation of Radiation Work Permits so that adequate precautions may be taken to insure that personnel exposures are kept to a minimum.

2.3 Radiation dose rate surveys are conducted on a routine basis and whenever a specific need arises for both controlled and clean areas.

3.0 REFERENCES

3.1 Radiation Protection Manual Administrative Procedure 1003.

3.2 10 CFR 20

3.3 H.P.P. 1613

3.4 H.P.P. 1610

4.0 EQUIPMENT

4.1 Survey sheets filed in Health Physics Lab.

4.2 Portable G.M. Survey instrument.

4.3 Portable Ion Chamber

4.4 Portable Neutron Detector

5.0 OPERATING INSTRUCTIONS

5.1 Gamma or Neutron Survey

- 5.1.1 Select appropriate Gamma or Neutron detector and insure the instrument is calibrated and operating in accordance with applicable procedure.
- 5.1.2 Hold the appropriate detector at waist level when entering an area to be surveyed observing the meter indication, with the instrument on its highest range. If no meter response occurs, turn the range selector switch to the next lower detection range until a meter response is noticeable.

NOTE: When performing gamma surveys, the detector shield will be in the closed position.

- 5.1.3 Perform area survey at designated locations. Note hot spots and record results on an area survey map as to where the readings were taken. Record the reactor power level, in percent, on the survey map. Survey maps for all areas of the plant are available as per Item 4.1.
- 5.1.4 If the survey is being conducted for a RWP, take a general area survey and readings on all equipment to be worked on in the immediate area.
 - 5.1.4.1 When performing a survey in a noble gas environment (Xe-133, Kr-85, etc.) for purposes of determining stay time calculations for a Radiation Work Permit (RWP), a reading will be taken with the detector shield open.
 - 5.1.4.2 The value determined in 5.1.4.1 will be used to calculate a stay time as shown in Example 6.2.
- 5.1.5 Record all readings on area survey maps, indicating "hot spots," where applicable, and circle contact readings. See Figure 1602-1 for an example.

NOTE: Ensure that the area is properly posted per HPP
1610.

Record the reactor power level, in percent, on the survey map.

- 5.1.6 Forward the completed area survey map to Radiation Protection Supervisor/Foreman for approval.

5.2 Beta Survey

- 5.2.1 To conduct a Beta survey, use the Rad Owl-2 in the following manner.
- 5.2.2 Enter the area to be surveyed with the instrument on the highest range.
- 5.2.3 If no meter response is observed, switch to a lower range until a meter response is noticeable.
- 5.2.4 Close the beta shield on the base of the instrument and take a reading.
- 5.2.5 Open the beta shield on the base of the instrument and take a reading.
- 5.2.6 Take the shield closed reading obtained in step 5.2.4 and subtract it from the shield open reading obtained in step 5.2.5.
- 5.2.7 Take the remainder obtained in step 5.2.6 and multiply it by the Beta correction factor found posted on the side of the instrument. The resulting number is the beta exposure.
- 5.2.8 Record all readings on area survey maps, indicating "hot spots" where applicable and circle contact readings. Beta readings are to be identified by the letter "B" placed after the appropriate reading.

5.2.9 Ensure that all areas are properly posted per H.P.P. 1610.

6.0 EXAMPLE

6.1 Beta Dose Calculation

100 mrem/hr Open Window Reading

- 20 mrem/hr Closed Window Reading

80 mrem/hr

80 mrem/hr x 3.2 (Beta Correction Factor) = 256 mrem/hr Beta

6.2 Stay Time Calculation In A Noble Gas Environment

Beta Dose Calculation = 256 mrem/hr Beta

Stay Time = $300/256 = 1.17$ hours

Based on 300 mrem/week whole body administrative limit for a 40 hour work week.

Typical Area Survey Map

1602

5.0

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2.5

RX COOLANT
DRAIN HEAT EXCHANGER

RX COOLANT
DRAIN TANK

STEAM
GENERATOR

500

RCP'S

Contact Readings

VENT
EQUIP

1.5

RX COOLANT
DRAIN PUMP

STEAM
GEN.
DRAIN PUMP

REACTOR

LETDOWN
COOLERS

RX
DRAIN PUMP

REACTOR

450

RCP'S

B

STEAM
GENERATOR

SUMP

General Area Beta Reading

2.5 B

3.5

General Area Reading

FLOOR ELEV. 279'

BETA GAMMA READINGS IN MR/HR

CIRCLE ALL CONTACT READINGS

Reactor Power Level in %

DATE _____

TIME _____

INSTRUMENT _____

TECHNICIAN _____

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Figure 1602.1

TMI DOCUMENTS

DOCUMENT NO: TMM-072

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