



# Technical Safety



## RADIATION PROCEDURES MANUAL

### Procedure Cover Sheet

Procedure Title: 100 mrem Report

Procedure Number: TSO-08-01-REV 1

Effective Date: September 1, 2008

Approved By: Richard R. Bey Date: 19 May, 2009  
Technical Safety Office Director



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## A. INTRODUCTION

The NRC requires that the exposure to an individual member of the public not exceed 0.1 rem (100 mrem) in one year (10CFR20.1301(a)(1)). Additionally, the dose in any unrestricted area from external sources should not exceed 0.002 rem (2 mrem) in any one hour (10CFR20.1301(a)(2)). The State of Idaho requires that the exposure to an individual member of the public not exceed 0.5 rem (500 mrem) in one year (IDAPA 16.02.27.04b). No individual who is continuously in the area shall be exposed to a dose in excess of 100 mrem in any seven days (IDAPA 16.02.27.04a). No individual who is continuously in the area shall be exposed to a dose in excess of 2 mrem in any one hour (IDAPA 16.02.27.04ai).

The 100 mrem Report demonstrates compliance with the Federal public dose limits listed above. The conservative nature of Federal dose regulations means that compliance with Federal dose regulations also demonstrates compliance with State dose regulations. This report includes dose information from the following four sources:

- 1) Dosimeter area monitors
- 2) Annual NESHAPS Report internal exposure contributions
- 3) Survey of the AGN-201 Reactor Facility during reactor operation
- 4) Summary of AGN-201 reactor operations

## B. PURPOSE

The purpose of this procedure is to explain the process by which the 100 mrem Report is composed, including calculations, chart data and summary.

## C. REQUIRED MATERIAL(S)

Area dosimeter quarterly dose reports  
NESHAPS Report  
Annual AGN-201 full-power survey

## Summary of AGN-201 reactor operations

### D. PROCEDURE

The 100 mrem Report is written for the previous calendar year at the beginning of each year when all quarterly dose reports have been received from the dosimetry vendor (currently Landauer).

The procedure for writing the 100 mrem report is as follows:

#### Preparation:

1. Go into the "Radiation Safety Committee Documents" folder in *tsoshare*, then go into the "100mremRep" folder.
2. Open the 100 mrem Report completed in the previous year.
3. Save the report under a new name in the following the format:  
YEAR\_100mremrpt.
4. Scan for references in the text for old dates, years, and doses. Update or delete where necessary.

#### Table 1:

1. Gather the four quarterly dose reports for the area and environmental badges for the previous year by opening the "Exposure Reports" folder in *tsoshare*.
2. Fill in the doses for each quarter in Table 1. There are 3 types of dose reported for each area monitor in each quarter: the photon deep dose, photon skin dose and the total neutron dose (thermal plus fast). The numbers are separated by slashes. "M" means that the dose was below the reporting dose of 1 mrem, so enter these as zero. The eye doses are ignored for this report. If a neutron dose is not listed in the quarterly exposure report, enter a zero for the neutron dose.
3. Fill in the yearly dose totals (the last column in Table 1 of the 100 mrem Report). This is accomplished by adding the quarterly doses for the photon deep dose, photon skin dose and total neutron dose, respectively.
4. Verify that all area monitor locations were entered. It is best to cross-off each badge location on the quarterly dose reports as they are entered into the 100 mrem Report to ensure both that no area monitors were missed, and that no new area monitors were placed sometime during the year.

## **Table 2:**

Table 2 calculates the total dose for the year (mrem/yr) for each of the area monitors that are in locations of public access. These locations are marked with an asterisk (\*) in the quarterly dose reports. The formula used to complete Table 2 is shown on page 3 of the 100 mrem Report.

1. Fill in the "Total Exposure" column doses in mrem. This is the photon deep dose plus the neutron dose (thermal + fast), or the first value and the third value in the 100 mrem Report quarterly columns. If a new general public location monitor has been created during the year, be sure to add a row and include it in Table 2.
2. Calculate the values for the second column by dividing the first column numbers (mrem) by 8766, which is the number of hours in a year.
3. Verify the occupancy factors (hrs/yr) in column three. A list of occupancy factors are given on page 3 of the 100 mrem Report. These values need not be altered, unless a change in traffic pattern occurred during the year that affected the status of the area being monitored. If a new badge has been added, get the relevant occupancy factor from the list.
4. Calculate the doses for the "Total Dose" column by multiplying column 2 by column 3. These values should be in units of mrem/yr.

## **Conclusions:**

The final section of the 100 mrem report involves a summary of the data reported in Tables 1 and 2.

1. The first section of the conclusions discusses the highest total dose to the public. Rewrite the paragraphs to reflect the area monitor with the highest dose (Table 2, column 4). This value is also entered into the text at the beginning of the report and is bolded.
2. The second section of the conclusions discusses the highest total exposure to the public from radiation-producing machines. Look-up the highest dose in Table 2, column 1 that came from radiation-producing machines and rewrite the paragraph to include this value.
3. The final section of the conclusions reports the results from the NESHAPS Report.

*Note: There may be paragraphs in the old 100 mrem Report conclusions section that reflect specific event(s) that occurred during the previous year and are not*

*applicable to the current year being evaluated. Be sure to look for these paragraphs and delete if necessary.*

**Attachments:**

There are 3 items that should be attached to the 100 mrem Report.

1. NESHAPS Report – this report is kept in the *tsoshare* folder “NESHAPS.”
2. A copy of the full-power AGN-201 survey – the TSO keeps copies of these surveys in Dr. Bennion’s program file (program 27) in TSO office room 101A.
3. AGN-201 operating summary – this should include monthly operating hours and energies (watt-hr), plus a monthly listing of Ar-41 releases in  $\mu\text{Ci}$ .

**Approval & Filing:**

1. When the 100 mrem Report is complete, it should be sent to the RSO for review and approval.
2. Create a file folder with a label in the format of “YEAR 100 MREM.”
3. Place the final approved copy of the 100 mrem Report and its attachments in the folder and file it in the appropriate cabinet of TSO office room 101A.

**REFERENCES**

10 CFR 20

IDAPA 16.02.27



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## REVISION TRACKER

Revision 1	September 1, 2008	Original Procedure
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