

UNIVERSITY OF MISSOURI-ROLLA - NUCLEAR REACTOR

STANDARD OPERATING PROCEDURES

S.O.P.: 603

REVISED: 5-9-84

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TITLE: GUIDELINES FOR EMERGENCY EXPOSURES

A. Purpose

To give guidance to emergency personnel and radiation workers in the event of an emergency involving high radiation fields.

B. Precautions, Prerequisites, or Limitations

1. Situations involving the saving of life require separate criteria from that of actions required to recover deceased victims, or records and equipment.
2. Accurate estimations of dose levels should be determined before entry is made into emergency areas, this includes both internal and external exposures.
3. All personnel entering a high radiation area shall be equipped with personal monitoring devices to give a true account of exposures received.
4. Records will be taken on every person entering a high radiation area, these will include name, age, sex and exposure received.

C. Procedures**Actions Taken in Saving of Human Life**⁽¹⁾

This procedure applies to the search for and removal of injured persons, or entry to prevent conditions that would probably injure numbers of people.

1. If the Health Physicist is immediately available, he/she shall determine the amount of exposures that should be permitted to perform the emergency mission. If he/she is not immediately available, this judgement shall be left to the senior reactor staff member present or the person having emergency action responsibility.
2. Evaluation of the inherent risks should be based on:

The reliability of the prediction of radiation injury. This reliability cannot be any greater than

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reliability of the estimation of the dose. Therefore, consideration should be given to limits of error associated with the specific instruments and techniques used to estimate the dose rate. This is especially crucial when the estimated dose approximates 100 rem or more.

3. Planned whole body dose shall not exceed 100 rem.
4. Planned dose to hands and forearms, shall not exceed an additional dose of 200 rem (i.e. a total of 300 rem).
5. Internal exposure shall be minimized by the use of the best available respiratory protection, and contamination should be controlled by the use of protective clothing.
6. Rescue personnel shall be volunteers or professional rescue personnel (e.g. firemen who "volunteer" by choice of employment).
7. Rescue personnel should be broadly familiar with the consequences of exposure.
8. Women capable of reproduction should not take part in these actions.
9. Other things being equal, volunteers above the age of 45 should be selected.
10. Normally, exposure under these conditions shall be limited to once in a lifetime.
11. In the event that any person exceeds any exposure limit, the Health Physicist shall be notified. If whole body exposures greater than 25 rem are received, medical observation and subsequent actions based primarily on medical opinion should be taken.
12. Persons receiving exposures as indicated above, should avoid procreation for a period up to a few months.

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Actions Taken in Less Urgent Emergencies (1)

This procedure applies under less urgent circumstances where it is desirable to enter a hazardous area to protect facilities, eliminate further escape of effluents, or to control fires.

1. If the Health Physicist is immediately available, he/she shall determine the amount of exposures that should be permitted to perform the emergency mission. If he/she is not immediately available, this judgement shall be left to the senior reactor staff member present or the person having emergency action responsibility.
2. Evaluation of the inherent risks should be based on:
The reliability of the prediction of radiation injury. This reliability cannot be any greater than reliability of the estimation of the dose. Therefore, consideration should be given to limits of error associated with the specific instruments and techniques used to estimate the dose rate. This is especially crucial when the estimated dose approximates 100 rem or more.
3. Planned whole body dose shall not exceed 25 rem.
4. Planned dose of hands and forearms shall not exceed 100 rem, including the whole body component.
5. Internal exposure shall be minimized by respiratory protection, and contamination controlled by the use of protective clothing.
6. Persons performing the planned actions should be volunteers and familiar with the consequences of exposure.
7. Women capable of reproduction should not take part.
8. Normally, if the retrospective dose from these actions is a substantial fraction of the prospective limits, the actions should be limited to once in a lifetime.

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9. In the event that any person exceeds any exposure limit, the Health Physicist shall be notified. If whole body exposures greater than 25 rem are received, medical observation and subsequent actions based primarily on medical opinion should be taken.

D. References

1. NCRP #39, "Basic Radiation Protection Criteria", May, 1980.

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