A Generic Standard Operating Procedure

Title: **Radiation Detection and Metering S.O.P.**

Ref. Number: DRAFT 2.3

Effective: 05/13/03 **Authorized: C-4**

1.0 Background

In conjunction with the agency shall maintain and operate radiological detectors and metering devices. The purpose for this S.O.P. is to ensure safety and health of all patients and department members operating at a suspected radiological incident. Agency monitoring equipment will be used to: Warn members as they enter a radiation field, measure and quantify exposure and dose of radiation to members, assist in defining borders of the control area, survey patients for contamination; survey patients to monitor the adequacy of decontamination prior to loading and transport; survey agency personnel, vehicles and equipment after scene operations; and assist with survey of patients or staff at a hospital or any scene where the agency has been activated.

2.0 Authority

2.1 Only members trained in the operation of department owned detectors and meters will be allowed to operate the same.
2.2 Field Supervisors, Shift Commanders and Special Operations Division members will be responsible for storage and use of the radiation monitoring equipment.
2.3 Field Supervisors and Shift Commanders shall have a sound working knowledge of agency policies and procedures regarding MCI's, Hazmat incidents, and response actions at radiation incidents and the Incident Command System.

3.0 Equipment

3.1 Personal electronic dosimeters: a battery operated "pager style" electronic dosimeter will be worn by the Division Supervisor and Shift Commander when on duty. Personal electronic dosimeters may also be issued to any member operating in or near a radiation controlled area.
3.2 The current model is the "SAIC PD-31-S"; this model measures gamma radiation and is programmed to alarm at preset levels. This device is always "on" and will serve to warn the member as he or she approaches a gamma radiation source. The purpose of this device is to allow a member

to operate safely near a radiation source. The dosimeter measures exposure rates and dose and helps to calculate “stay time”. It may be necessary to conduct operations in an area that has an acceptable level of exposure or for members to receive an acceptable low dose. A personal dosimeter is required to measure the acceptable levels.

3.3 This device is sensitive and will respond to gamma radiation from a safe distance. It measures in uR [microrem], mR [millirem], and R [Rems]. This dosimeter measures rate of exposure to radiation and total dose of radiation received.

3.4 Initial alarm will sound (beep) when threshold of 10 mR/hr is detected. This indicates that the wearer is in a radiation field and receiving a dose at the rate of 10 mR per hour. This is determined to be a safe level for initial operations and the alarm will prompt the wearer to be aware, to investigate further, to notify police and fire and to relocate if possible. If the level of exposure continues to rises, the rate will be displayed.

3.5 The second alarm setting will be at 2.5 R dose. This indicates that the wearer has accumulated a dose of 2.5 REM. At this point the member should leave the radiation area. If necessary, continued operations that will result in an absorbed dose beyond 2.5 R, may be allowed by the incident commander. An example would be to continue with a life saving treatment or complete an important task.
Total accumulated dose is recorded on this unit as well . This value must be recorded when you exit the radiation controlled area. If you re-enter a radiation area, remember that your dose is cumulative.
Wearer must reset the device to zero before handing off device to another member.

3.6 T.L.D. Thermo Luminescent Dosimeter, when operating in an area of in creased radiation, the supervisor will issue aTLD to each member in the controlled area. The serial # of the TLD and the name of the employee must be recorded. The TLD is not to be exchanged or transferred between department members. Once issued it is designated for exclusive use by that member. After the incident is secured, the TLD is collected and sent for reading at a laboratory. This becomes the legal record of an employee’s exposure.

3.7 Self reading pocket dosimeters (pencil type) capable of reading 0-20 Rem, will be carried by the on duty Division Supervisor and issued to members operating at a radiological event. Prior to issue, these devices must be “charged” and the indicator set to zero. These devices are worn outside of clothing. They are read optically at intervals beginning fifteen minutes after entry to a controlled area.

3.8 Readings: If any dosimeter, electronic or self-reading dosimeter should begin to show an increase of measured radiation, closer monitoring of the

device will be required. As levels rise consider rotating teams of members to complete tasks. Exposure of radiation to the whole body should always be minimized.

Once a 2.5 Rem dose is accumulated, agency members should be removed from or replaced in the radiation controled area. If while conducting agency operations at a radiation incident a dosimeter should display 2.5 R accumulated dose or a self-reading pocket dosimeter read 2.5 R dose, all members should leave the area immediately.
While 2.5 R dose is considered a “turn around level”, this may also be a decision point for an I.C. Members may be allowed to work briefly at higher exposure rates if it is deemed necessary to finish a lifesaving task. A one-time total body exposure to 25 Rem may be authorized by the IC or safety officer if necessary to save a life. A member receiving a whole body exposure to 25Rem shall not be allowed to return to duty at a radiation incident.

3.9 Records – All names, times and subsequent reading of dosimeters assigned to personnel shall be recorded by a supervisor serving as the safety officer.

4.0 Survey Meters

Ludlum model 2241 meter has a digital readout which records with automatic ranging in counts per minute [CPK] and kilo-counts per minute . It comes with a handheld Gieger-Muller pancake probe that is used to survey surfaces such as equipment, clothing and skin for alpha, beta and or gamma radiation. The Ludlum survey meter is carried in the Division Supervisor, Shift Commander and Special Operations vehicles.

4.1 The meter shall be stored in the protective case. The batteries and meter should be stored together, with the batteries remaining uninstalled until the unit is ready to use. The instruction manual must remain with the unit.

4.2 To use the meter, remove it from the case. To install the required two “D” cell batteries, loosen the thumbscrew on the face of the meter and insert the batteries. Ensure proper polarity, as indicated on the inside of the battery compartment cover. After properly inserting the batteries, close the compartment and retighten the thumbscrew. Remove the red plastic protective cover from the pancake probe. Assemble the meter by attaching the handheld probe to the cable, and the cable to the meter. Switch the selector switch to “rate meter.” Flip the “F / S” switch to the “F” position. Flip the “AUD” switch (audio control) to the on position. Verify meter operation by placing the probe over the “check source” (the yellow plastic square located on the left side of the meter). Operation is verified if the meter readout displays digits and the audio output chirps at a high frequency.

5.0 Patient Survey Procedure

5.1 With PPE donned, approach patient with handheld pancake probe. Maintaining an arms-length distance from the patient, reach towards the patient with handheld pancake probe. Ensure the screen side of the probe is facing the patient. In order to detect some alpha and beta radiation you must get the probe close but not in contact with the subject of the survey. *If a contaminated source comes into direct contact with the pancake probe, the meter could become contaminated – rendering it inoperable.*

5.2 Beginning survey at the head and moving progressively toward the feet, sweep the pancake probe *slowly and methodically* over the subject at a distance of no more than one inch away from the surface and at a rate of 1-2 inches per second. An increase in the chirping and/or an increase in the numbers on digital readout are indicative of contamination. Note any and all sources of contamination. Pay particular attention to nose, eyes, ears, mouth, and any areas where contamination could be shielded from detection (i.e. armpits, groin, buttocks, back of knees, folds of skin, etc.). If patient condition allows, decontamination should be completed prior to treatment or transport. Lifesaving treatment should not be withheld.

5.3 After decontamination, if patient condition allows, re-survey the patient as explained above in 5.2. If contamination remains, the area of contamination should be noted and the meter reading recorded. To minimize the spread of contamination, cover the contaminated area utilizing, dressings and/or blankets. Notify the receiving facility of the contamination status.

5.4 Department members operating in radiation controlled areas should be surveyed prior to departure from the controlled area. Also, department members who transport a contaminated patient should be surveyed prior to returning in service. Pay particular attention to the soles of shoes, hands and arms, radio equipment and any other area that may have been contaminated.

5.5 Any area, surface, or piece of equipment in the ambulance that is suspected of having become contaminated should be surveyed prior to returning in service.