

# **FAQ: FREQUENTLY ASKED QUESTIONS ON SIRAD™**

## **Q&A RELATED TO SIRAD**

***Q. Can I use a SIRAD instead of TLD, film and quartz fiber dosimeters?***

A. The answer is clearly “No”. Those who use these and similar low dose dosimeters must continue using them. SIRAD is not a substitute for any low dose dosimeters. SIRAD is a high dose (e.g., 2 rads and above) dosimeter. It can be used along with dosimeters such as TLD and film in order to instantly know exposure to high dose.

***Q. Would a SIRAD detect a dirty bomb or radioactive material?***

A. No. It is not a radiation detector. It is a high dose dosimeter and it will not detect a dirty bomb or a radioactive material.

***Q. Would SIRADs be affected by conventional exposure to diagnostic X-ray (e.g., chest or dental) or X-ray machines used at airports?***

A. No. It will not be affected by normal exposures to diagnostic X-ray (e.g., chest or dental) or airport x-ray machines. They are very low (e.g., ~0.05 rads/exposure) dose while SIRAD monitors dose higher than a few rads.

***Q. Will a SIRAD monitor pre-radiated material or people?***

A. No.

***Q. Will a SIRAD prevent radiation induced cancer?***

A. No.

***Q. Will a SIRAD protect from ionizing radiation?***

A. No.

***Q. What should I do if the sensor of my SIRAD badge has developed color?***

A. First make sure that you are not using an expired badge and the color development is not due to prolonged exposure to high temperatures and/or UV/sunlight (false positive). If there are no false positive, then estimate the dose, immediately report to department/agency/organization issuing the dosimeter and seek medical help immediately, especially if the dose is higher than 25 rads. Inform an appropriate authority.

***Q. Should I buy a SIRAD badge?***

A. We recommend using SIRAD if you are potentially at risk of getting a high dose (higher than a few rads) of ionizing radiation.

***Q. How should I store SIRAD?***

A. Before issuing or once you receive SIRAD, store it at room temperature or below. Keep the dosimeter with you during your normal duty. Protect the sensor from prolonged (more than a few hours) exposure to direct sunlight.

***Q. How often should I read the SIRAD?***

A. If the threat is high you should read often, e.g., every day or more frequently if a radiation exposure is suspected.

***Q. Can a SIRAD be used for monitoring radon?***

A. No. Alpha particles emitted by radon and its daughters will be absorbed by the protective cover and will not reach the sensor.

***Q. Does JP Labs keep records of our radiation exposure?***

A. No. SIRAD is a disposable dosimeter and user or issuing organization is responsible for keeping record of exposure.

***Q. Who should I report the radiation exposure to?***

A. Report it to the department/agency/organization issuing the dosimeter. To the best of our knowledge, there is no one national or international phone number or organization to report individual exposure. However, if you are an individual user of the dosimeter, and if you are exposed to radiation, contact the followings: City police bomb squads and/or hazardous materials units, State police and/or emergency response divisions, or National Guard civil support teams.

**Q&A RELATED TO GENERAL INFORMATION**

***Q. What is radiation dose?***

A. Commonly used definition of dose is the amount of energy deposited in a unit of tissue or material. This measurement of dose can be used to represent the average dose to an organism, organ, tissue or even a cell. Another definition is the energy deposited at a point source and is useful in determining the dose distribution during cancer therapy.

***Q. Is a dose lower than 25 rads harmless and will it not induce cancer?***

A. Any exposure to radiation is harmful. Higher the dose, higher is the chance of getting cancer. On average, one person out of 1,000 will die due to induced cancer if they receive 25 rads.

***Q. Can any over-the-counter medicine be used for treating radiation exposure?***

A. No. There is no over-the-counter medicine for treating radiation exposures.

***Q. Should I take Prussian blue, diethylenetriaminepentaacetic acid (DTPA) or potassium iodide tablets, if I am exposed to ionizing radiation? Would it help?***

A. No. Potassium iodide tablets will help only if you are exposed to radioactive iodide which is usually released from nuclear detonation or a nuclear reactor accident. Use of diethylenetriaminepentaacetic acid (DTPA) and Prussian blue is reported for removing radioactive materials from the body but such therapy must be done by expert physicians only.

***Q. Is it true that there is no observable adverse health effect at doses below 10 rem?***

**A.** The Health Physics Society has issued a position statement that addresses this issue. The statement does not claim that “there are no observable health effects below 10 rem but that health risks, if they exist below 10 rem, are too small to be observed. The facts in the matter of radiation effects at low doses are very simple: no one knows whether there is any risk or not. All we can say now is that no one has detected any statistically significant effect at doses below about 100 mSv (10 rem)”. (1 rem is almost equivalent to 1 rad for tissue equivalent materials).

**Q: *Is the threshold dose for causing cancer is 15-20 rems?***

**A.** Some epidemiological studies suggest an increased risk of cancer in this dose range. However, the data suggest that risks in the 15-20 rem dose range are very small and difficult to measure. Above 10 rem there appears to be a significant risk of thyroid cancer due to radioactive iodine exposure in children 15 years of age and younger.

**Q: *What is the dose required to kill somebody almost instantly?***

**A:** There is no unique number; the best guess is 2,000-5,000 rad (20-50 Gy) and even then the death will not be instant as in breathing cyanide or carbon monoxide.

**Q. *What are the symptoms of exposure to high dose (higher than 25 rads)?***

**A.** It is well established that high dose ionizing radiation can cause cancer. Effect/symptoms of a high dose is shown below.(Adapted from IOM/NRC, 1999a)

**0 to 25 rads:**

- No easily detectable clinical effect in humans.
- However, at about 15 rads there could be temporary sterility (Testis).

**25 to 100 rads:**

- Slight short-term reduction in blood cells.
- Disabling sickness not common.

**100 to 200 rads:**

- Nausea and fatigue.
- Vomiting if dose is greater than 125 rads.
- Longer-term reduction in number of some types of blood cells.

**200 to 300 rads:**

- Nausea and vomiting on the first day of exposure.
- Up to a two-week latent period followed by appetite loss, general malaise, sore throat, pallor, diarrhea, and moderate emaciation.
- Recovery in about three months unless complicated by infection or injury.

### **300 to 600 rads:**

- Nausea, vomiting, and diarrhea in first few hours.
- Up to a one-week latent period followed by loss of appetite, fever, and general malaise in the second week.
- Followed by bleeding, inflammation of mouth and throat, diarrhea, and emaciation.
- Some deaths in two to six weeks.
- Eventual death for 50% if exposure is above 450 rems.
- Others recover in about six months.

### **Over 600 rem:**

- Nausea, vomiting, and diarrhea in the first few hours.
- Followed by rapid emaciation and death in 2<sup>nd</sup> week.
- Eventual death of nearly 100%.

### ***Q. Will I get cancer if I am exposed to ionizing radiation?***

A. It mainly depends on the dose. The risk for radiation exposure has been very widely studied. The general consensus of opinion for the induction of cancer by ionizing radiation is 10% increase in cancer rate/Sv when the dose is given over a short time with a decrease to 5% when the dose is protracted over an extended time period. (One Sv is equal to 1000 mSv and one mSv is equal to 100 mRem.) Therefore a 10% increase in cancer is related to a dose of 100,000 mrem with 5% if the dose is protracted over a longer period of time. At doses near background levels 370 mrem/year the risk from radiation induced cancer is 5%/Sv divided by 1000 Sv/mSv and divided again by 100 mSv/mrem, times the amount of radiation exposure.

## **QUESTIONS RELATED TO DIRTY BOMB**

### ***Q. What is a "dirty bomb"?***

A. A dirty bomb is not a nuclear bomb. It is a radiological dispersion device (RDD). It can be built, conventional explosive packed with radioactive material but very hard to find radioactive materials. When such a bomb is exploded, it will disperse a radioactive material.

### ***Q. How much radioactive material is required to make a dirty bomb?***

A. Ten to one hundred grams of highly radioactive material can be sufficient to do enormous damage

***Q. Will I die from a dirty bomb detonation?***

A. Most probably not. If you are very close to the blast, you could die from the explosion, falling objects or fire. There is a very little chance of you dying from the radiation exposure from a "dirty bomb". If you are very close to the bomb and are not killed by the blast then there is the potential for radiation sickness. If you are not close to the bomb you will not receive a large radiation dose or get sick and can be expected to live for a normal number of years.

***Q. How do I know if I have been exposed to radiation or radioactive materials?***

A. If you are contaminated with radioactive materials, the radioactive materials, can be detected with equipment, such as a simple Geiger counter. If physical measurements suggest that you have been exposed to high dose, there are predictable changes in your body that can be quickly measured. The number of blood cells, the frequency of chromosome aberrations in the blood cells and the amount of radioactive material in your urine, are examples of biomarkers that can quickly indicate if your exposure can be life threatening.

***Q. What can I do to protect if I am close to a dirty bomb detonation?***

A. If you are close to a dirty bomb detonation, the first thing to do is to get away from it as far and as fast as possible. If you are exposed and contaminated with radioactive materials, make sure that you change your clothes and take a shower. Taking a shower will remove the radioactive material from your skin. It would be wise to have a radiation test to determine if you have ingested or inhaled radioactive materials.

**References:**

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