Chapter 50: Non-ionizing Radiation

Radio Frequency Source Review Procedure

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URL: https://www-group.slac.stanford.edu/esh/eshmanual/references/nirProcedReview.pdf

1 Purpose

The purpose of this procedure is to protect workers from exposure to non-ionizing electromagnetic radiation (NIR) and fields in the radio frequency (RF) portion of the spectrum defined as from 3 kilohertz (kHz) to 300 gigahertz (GHz). It applies to the review of new and modified permanently installed sources of non-ionizing radiation capable of radiating over 1 Watt (W) at radio frequencies. This includes klystrons and waveguide systems; communications transmitters [not receivers]; and induction heaters and ultrasonic cleaners. Consumer items such as microwave ovens and cell phones are exempted. It applies to equipment owners and the non-ionizing radiation program manager.

2 Procedure

Review by the non-ionizing radiation program manager is required for all new RF sources and all significant reconfigurations of existing sources, with respect to frequency of operation, source power, or configuration that could change the exposure potential. Review may also be triggered by recognition of a hazard by line management or by the results of a non-ionizing radiation survey conducted by a qualified person, such as an industrial hygienist. (See Non-ionizing Radiation: Radio Frequency Source Review, Operation, and Maintenance Requirements.)

2.1 Review

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<th>Step</th>
<th>Person</th>
<th>Action</th>
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<td>1.</td>
<td>Equipment owner</td>
<td>Contacts the non-ionizing radiation program manager</td>
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| 2.   | Equipment owner         | Performs a preliminary hazard analysis of the RF source. The preliminary hazard analysis must review the amount of RF energy that could be generated by the source in both normal operating mode and during credible failures of engineered and other controls. The resulting calculated RF energy levels are then compared to the safety program initiation levels. (See Non-ionizing Radiation: Selected Radio Frequency Exposure Limits for safety program initiation levels and the exposure reference levels (ERLs) upon which they are based.)
  |            | ▪ If the hazard analysis demonstrates that the equipment poses no hazard (that is, will not generate levels of radiation exceeding safety program initiation levels), submits the analysis and supporting materials to the non-ionizing radiation program manager for approval (goes to Step 3) |
  |            | ▪ If the hazard analysis shows that RF radiation may exceed safety program initiation levels, develops a facility-specific radio frequency safety program (RFSP) (goes to Step 4) |
### Step 3: Non-ionizing radiation program manager

**Action:** Approves the source for the described use. The program manager's signature on a cover letter affixed to the submitted preliminary hazard analysis documents the approval. 

*Note: if the preliminary hazard analysis cannot definitively demonstrate that the source poses no hazard, because of the complexity of the system, because it closely approaches the action level, or for other reasons, then a more detailed risk analysis will be required and incorporated into the RFSP.*

### Step 4: Equipment owner

**Action:** Develops an RFSP

The required RFSP must include the elements listed in Non-ionizing Radiation: Radio Frequency Source Review, Operation, and Maintenance Requirements.

### Step 5: Equipment owner

**Action:** Submits the analysis, supporting materials, and RFSP to the program manager

### Step 6: Non-ionizing radiation program manager

**Action:** Reviews the RFSP. The program manager may invite other experts to participate in the review. Approves the RFSP once all safety measures are documented and reviewed. The program manager's signature on a cover letter affixed to the submitted RFSP documents the approval.

### Step 7: Equipment owner and non-ionizing radiation program manager

**Action:** Maintain separate copies of preliminary hazard analyses, cover letters, and approved RFSPs

### 3 Forms

The following forms are required by this procedure:

- None

### 4 Recordkeeping

The following recordkeeping requirements apply for this procedure:

- The non-ionizing radiation program manager and the equipment owner will each maintain copies of preliminary hazard analyses, cover letters, and approved RFSPs.

### 5 References

[SLAC Environment, Safety, and Health Manual](SLAC-I-720-0A29Z-001)

- Chapter 50, “Non-ionizing Radiation”
  - [Non-ionizing Radiation: Selected Radio Frequency Exposure Limits](SLAC-I-730-0A05S-001)