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January 2014

John C. Stennis Space Center
Health Physics Program
(Ionizing and Nonionizing Radiation)

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| | Effective Date: January 24, 2014 | |
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Approval/Concurrence

Katrina Wright

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NASA Health Physics Program Manager

Date

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| Basic | 02/01/2008 | John Lindsay x82557 | Initial release |
| Rev. 1 | 08/01/2009 | John Lindsay x82557 | 5.1 – Added STOP WORK authority for RSC, and requirement to report all significant changes to permits, licenses, inventories, or programs to the RSC. |
| Rev. 2 | 01/24/2014 | John Lindsay x82557 | Completely revised the document to reflect NPR 1800.1. Detailed information for ionizing and nonionizing radiation is included in two separate SCWIs. They are SCWI 8700-0004 and SCWI 8700-0005 respectively. |
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1.0 PURPOSE

This Work Instruction sets forth requirements for the Stennis Space Center (SSC) Health Physics Programs (ionizing and nonionizing radiation). The Programs are designed to maintain and preserve the health of the workforce by eliminating unnecessary and accidental exposures and minimizing necessary exposures to radiation. The Ionizing Radiation Program is described in SCWI 8700-004 and the Nonionizing Radiation Program is described in SCWI 8700-0005.

Personnel exposures shall be kept As Low As Reasonably Achievable (ALARA). The Program's objectives shall be achieved by the use of strict management controls, safe operating procedures, appropriate equipment, a comprehensive maintenance and surveillance program, adequate shielding, and limiting personnel exposure time.

The SSC Health Physics Program functions through the NASA Health Physics Program Manager (HPPM) and the Facility Operating Services Contract (FOSC) Health Physicist.

2.0 APPLICABILITY

This Work Instruction is directly applicable to all NASA/SSC organizations including civil service and support contractors and is applicable to other NASA tenants of the John C. Stennis Space Center to the extent formal agreement is reached between NASA and the tenant.

3.0 REFERENCES

- a. NASA Procedural Requirement, NPR 1800.1 NASA Occupational Health Program Procedures
- b. SCWI 8700-0004, Ionizing Radiation
- c. SCWI 8700-0005, Nonionizing Radiation

4.0 RESPONSIBILITIES

4.1 NASA Health Physics Program Manager (HPPM):

The NASA Health Physics Program Manager (HPPM) is responsible for:

- a. Providing oversight of the FOSC Health Physicist;
- b. The overall responsibility of this Instruction; and
- c. Approving/disapproving Source Use Requests;

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The NASA Health Physics Program Manager has Stop Work Authority over all Health Physics activities at Stennis Space Center (SSC).

4.2 FOSC Health Physicist (HP)

The FOSC Health Physicist is responsible for administering this Work Instruction in accordance with applicable directives and regulations.

4.2.1 The FOSC Health Physicist (HP) shall:

- a. Complete annual audits to determine the effectiveness of the Health Physics Programs (Ionizing and Nonionizing Radiation);
- b. Provide oversight for Area Radiation Safety Officers (ARSOs), Area Laser Safety Officers (ALSOs), and custodian/supervisors;
- c. Periodically (at least once per year in addition to the annual audit) assesses the activities of SSC Contractor organizations;
- d. Review each contractor's training material;
- e. Provide a copy of all licenses/permits and user qualifications to the HPPM;
- f. Approve/disapprove Source Use Requests;
- g. Approve/disapprove Source Use Authorizations; and
- g. Have Stop Work Authority over all Health Physics activities at Stennis Space Center (SSC).

4.3 Area Radiation Safety Officer (ARSO)

Each Area Radiation Safety Officer is responsible for the implementation of this Work Instruction in accordance with their licenses, permits, and procedures.

4.3.1 Each Area Radiation Safety Officer shall:

- a. Oversee ionizing radiation and radiation-generating equipment;
- b. Approve radioactive material usage;
- c. Ensure activities involving radioactive materials are conducted in accordance with applicable requirements of the Nuclear Regulatory Commission (NRC), The Occupational Safety Health Administration (OSHA), The Department of Transportation (DOT), International Air Transport Association (IATA), the state of Mississippi, and NASA, and take prompt corrective measures to appropriately manage and/or control hazards;

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- d. Provide a current copy of licenses/permits and user qualifications to the FOSC HP;
- e. Update and provide a copy of source inventories to the FOSC HP quarterly;
- f. Immediately report any regulatory inspection activity and any significant changes to licenses, permits, radioactive material inventories, or programs to the FOSC HP;
- g. Provide a copy of current training materials to the FOSC HP;
- h. Provide special instructions to female employees on the potential health risks of prenatal radiation exposure;
- i. Provide, to the FOSC HP, a copy of the letter certifying the name of the designated radioactive materials shipper;
- j. Provide information to develop, maintain, and update Source Use Authorization Forms for each radiation source and/or radiation-generating equipment; and
- k. Prior to initiating purchases of radioactive material (RAM) or radiation-generating equipment (RGE), the ARSO shall submit a Source Use Request to the HPPM for approval/disapproval.

4.4 Area Laser Safety Officer (ALSO)

Each Area Laser Safety Officer (ALSO) is responsible for the implementation of this Instruction in accordance with their licenses, permits, and procedures.

4.4.1 Area Laser Safety Officers shall:

- a. Provide a current list of users and user qualifications to the FOSC HP;
- b. Update and provide a copy of inventories to the FOSC HP quarterly;
- c. Immediately report any significant changes to inventories or programs to the FOSC HP;
- d. Prior to initiating purchases of Class 3B or Class 4 lasers, the ALSO shall submit a Source Use Request to the HPPM for approval/disapproval;
- e. Provide a copy of current training materials to the FOSC HP;
- f. Ensure activities involving laser and non-laser optical radiation sources are conducted in accordance with applicable OSHA, state, and NASA requirements;

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g. Take prompt corrective measures to eliminate hazards involving laser and non-laser optical radiation sources; and

h. Complete Use Authorization Approval and Radiation Source Use Request Forms

4.5 Custodian/Supervisor

Each custodian/supervisor is responsible for implementation of this Work Instruction in accordance with their licenses, permits, and procedures.

4.5.1 Each Custodian/Supervisor shall:

- a. Provide a current copy of licenses/permits and user qualifications to the FOSC HP;
- b. Update and provide a copy of source inventories to the FOSC HP quarterly;
- c. Immediately report any regulatory inspection activity and any significant changes to licenses, permits, radioactive material inventories, or programs to the FOSC HP;
- d. Provide a copy of current training materials to the FOSC HP;
- e. Provide special instructions to female employees on the potential health risks of prenatal radiation exposure;
- f. Provide, to the FOSC HP, a copy of the letter certifying the name of the designated radioactive materials shipper;
- h. Provide information to develop, maintain, and update Source Use Authorization Forms for each radiation source and/or radiation-generating equipment;
- i. Prior to initiating purchases of radioactive material (RAM) or radiation-generating equipment (RGE), the ARSO shall submit a Source Use Request to the HPPM for approval/disapproval;
- j. Immediately report any significant changes to inventories or programs to the FOSC HP;
- k. Ensure activities involving ionizing and nonionizing radiation sources are conducted in accordance with applicable OSHA, state, and NASA requirements; and
- l. Take prompt corrective measures to eliminate hazards involving ionizing and nonionizing radiation sources.

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4.6 Employees

Each employee/worker is responsible for satisfying training and other requirements in addition to working in a safe manner in accordance to this Work Instruction.

4.7 Users of Generally-Licensed Devices

Each user of a generally-licensed device (e.g. smoke detectors) is responsible for following the manufacturer's conditions established for the general license and for following applicable procedures for the device.

4.8 SSC Medical Clinic

SSC Occupational Medicine Clinic personnel are responsible for providing medical surveillance and post-exposure evaluation, as well as follow-up actions, in accordance with NPR 1800.1 and this Work Instruction. Records from such examinations/evaluations are to be retained for at least 30 years. Results of the examinations are to be discussed with employees as deemed necessary.

4.9 Health Physics Committee

At least one representative from each residential and contracting agency who has at least one ionizing and/or nonionizing source shall be a member of the Health Physics Committee.

4.9.1 The Committee shall:

- a. Meet quarterly
- b. Identify concerns and determine how to eliminate or minimize them;
- c. Communicate any lessons learned and corrective actions implemented during the previous quarter; and
- d. Provide notification of any upcoming initiatives or operations that affect the SSC Health Physics Program.

5.0 REQUIREMENTS

5.1 General Requirements

5.1.1 Physical examinations shall be conducted in accordance with the requirements of Chapter 2.9 of NPR 1800.

5.1.2 A comprehensive inventory of all hazardous ionizing, laser, and Radio Frequency (RF)/microwave sources shall be maintained and periodically verified.

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5.1.3 The Use Authorization Approval Process, based on hazards analyses shall be implemented prior to the authorization of any source of hazardous ionizing and nonionizing radiation.

5.1.4 Work activities shall be conducted as specified by the controlling written authorization.

5.1.5 To the maximum extent practical, hazards to personnel shall be eliminated by engineering design.

5.1.6 Exposures to ionizing and nonionizing radiation in excess of the applicable regulatory limits shall be reported to the HPPM, the FOSC HP, the appropriate regulatory authorities, and to OCHMO.

5.1.7 Written operating, maintenance, service, and emergency procedures shall be provided and maintained with the ionizing or non-ionizing radiation source for easily accessible reference. These procedures shall be commensurate with the hazards, activity, and the education, training, and skills of the individuals who are exposed to the hazards.

5.1.8 Records shall be maintained to document compliance with Chapter 4 of NPR 1800.1, applicable regulations and standards, and with the provisions of Center radiation protection programs. Unless otherwise specified in Chapter 4 of NPR 1800.1, records shall be retained until final disposition is authorized by NASA per NPR 1441.1D, NASA Record Retention Schedules.

5.2 Control of Ionizing and Nonionizing Radiation

5.2.1 All sources of ionizing and nonionizing radiation, whether in use or in storage, shall be controlled and secured from unauthorized access or removal according to the following criteria:

- a. Controls shall be commensurate with the hazards and provide flexibility for consideration of other hazards (e.g., industrial safety, industrial hygiene, environmental hazards);
- b. Use and storage locations shall afford adequate safety and security;
- c. Postings and labeling shall be done in compliance with applicable regulations, NPR 1800, and other appropriate NASA policies;
- d. Restricted areas shall be established and posted to warn individuals that they are entering areas controlled for radiation protection purposes. Access shall be limited to authorized personnel;
- e. Smoking, eating, and drinking are prohibited in restricted areas; and
- f. Any activity involving ionizing or nonionizing radiation determined to be a threat to health or property shall be immediately terminated.

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5.3 Monitoring and Surveillance

Personnel trained to evaluate and document the magnitude and extent of radiation emissions and potential radiological hazards and to verify the efficacy of controls and procedures shall periodically perform surveillance and monitoring of approved facilities, equipment, and operations in accordance with the following specifications:

- a. Surveillance and monitoring shall be conducted at a frequency based on applicable regulatory requirements, and license conditions and that is commensurate with the potential for changes in the radiation fields and the potential magnitude of the changes;
- b. Instrumentation that is used to perform radiation surveys shall be capable of measuring accurately the types of radiation, at the dose rates and under the environmental conditions that may be encountered;
- c. Instruments and equipment used for quantitative radiation measurements shall be calibrated for the radiation measured at intervals not to exceed 12 months or per the manufacturer's recommendation;
- d. When any component affecting the radiation safety of a system is serviced or replaced, a qualified expert shall perform a survey of the installation to ensure continuity of adequate personnel radiation safety; and
- e. Surveillance and monitoring results shall be evaluated and investigations initiated to resolve unexpected results.

5.4 Training

5.4.1 Only persons qualified by training shall be authorized to use ionizing or nonionizing radiation;

5.4.2 Training shall be commensurate with the potential hazards and provided prior to unescorted access to restricted areas and prior to receiving occupational exposure during access to restricted areas;

5.4.3 Initial and recurrent training shall provide the knowledge, skills, and abilities necessary for maintaining radiation individuals' doses below applicable limits. It shall also provide workers with an understanding of the risks associated with radiation and the means for recognizing and addressing workplace hazards that may lead to increased risks; and

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5.4.4 Female radiation workers who may be occupationally exposed to the radiation dose threshold (i.e., 100 millirem [mrem]) as well as their supervisors shall receive special instructions on the potential health risks of prenatal exposure to ionizing radiation.

6.0 ACRONYMS

| | |
|-------|---|
| ALARA | As Low As Reasonably Achievable |
| ALSO | Area Laser Safety Officer |
| ARSO | Area Radiation Safety Officers |
| CHMO | Chief Health and Medical Officer |
| DOT | Department of Transportation |
| FOSC | Facility Operating Services Contract |
| HP | Health Physicist |
| HPPM | Health Physics Program Manager |
| IATA | International Air Transport Association |
| LSO | Laser Safety Officer |
| mrem | millirem |
| NPR | NASA Procedural Requirement |
| NRC | Nuclear Regulatory Commission |
| OSHA | Occupational Safety and Health Administration |

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RAM Radioactive Material

RF Radio Frequency

SSC Stennis Space Center