Approved by: Kurt E. Krueger / David [illegible]

PROCEDURE

Subject: RADIATION PROTECTION PROGRAM

1.0 PURPOSE AND SUMMARY

Associates of and visitors to IT Corporation (IT) face a number of potential hazards both at IT facilities and at client sites where IT personnel are working. While these hazards may not be eliminated entirely, they can be minimized through the development and implementation of prudent safety practices. Exposure to ionizing and non-ionizing radiation are two such hazards.

It is the responsibility of IT Corporation to provide a workplace environment in which all associates, visitors, contractors, and subcontractors are adequately protected from all hazards including the hazards associated with exposure to ionizing radiation, non-ionizing radiation and radioactive material.

The primary purpose of the IT policy (HS-700) for radiological protection is to minimize the total risk of harm or injury incurred by associates, contractors, or visitors as a result of work-related activities. However, this goal is only achievable if each IT associate, visitor, and contractor assumes some responsibility for ensuring radiological safety at IT or client facilities by integrating the following three principles into all aspects of routine company operations. These principles are designed to govern all work activities with the potential for exposure to radiation or radioactive materials:

- No activity or operation involving exposure to radiation shall be conducted unless its performance is necessary for the completion of the assigned task.
- All radiation exposure shall be kept as low as reasonably achievable (ALARA) based on economic and societal considerations.
- No individual shall receive radiation doses in excess of federal or administrative limits.

Safety requirements proposed by a client will be respected and followed if they are more stringent or equal to the IT safety requirements. If those requirements are not at least equal to IT requirements and do not increase the hazards, IT will follow client procedures and overlay with IT requirements.

To aid in this action, this Radiation Protection Program Plan has been developed to guide generation and implementation of IT Standard Operating Procedures for Radiation Protection. The following sections contain a description of the IT program elements. These sections describe the IT Radiation Protection Program.

2.0 TABLE OF CONTENTS

3.0 RESPONSIBILITIES

3.1 Corporate Director, Health and Safety (Director)

3.1.1 Formulates and guides management implementation of a radiological protection program that, as a minimum, provides a framework for compliance with regulatory requirements.

3.1.2 Maintains sufficient organizational independence to review and evaluate IT activities involving the use of radioactive materials, radiation-producing machines, and project sites where radioactive materials are present.

3.1.3 Maintain copies of all IT licenses/permits (plus attachments and amendments) for radioactive materials and radiation-producing machines. Note: License maintenance is the responsibility of the RSO, including updates to the corporate files.

3.1.4 Maintains direct access to the President for health, safety, and quality issues.

3.2 Regional Health Physics Professionals (HPP)

3.2.1 Assist the Director in formulating and implementing a radiation protection program that, as a minimum, provides compliance with regulatory requirements, this Radiation Protection Program, and standard industry practice.

3.2.2 Advise Fixed Facility and Project Radiation Safety Officers regarding nuclear-related issues as part of proposal and work efforts.

3.2.3 Maintain direct access to the Director for radiation protection purposes.

3.3 Radiation Safety Officers (RSO)

3.3.1 Fixed Facility Radiation Safety Officers

3.3.1.1 Under the direction of the individual fixed facility (i.e.; Laboratories) managers, formulate and implement a radiation protection program that, as a minimum, provides compliance with pertinent regulatory requirements, license provisions, and this Radiation Protection Program. The requirements of this Radiation Protection Program may be incorporated as part of the Chemical Hygiene Plan for Laboratories.

3.3.1.2 Maintain direct access to the facility manager on matters relating to radiological protection.

3.3.1.3 Maintain sufficient organizational independence to review and evaluate activities involving the use of radioactive materials and radiation-producing machines.

3.3.1.4 Provide Authorized Users and radiation workers with the instruments, protective devices, dosimetry, training, and other items needed to perform their work in accordance with the radiological protection program elements.

3.3.1.5 Solicit assistance, as needed, from the HPP.

3.3.1.6 Maintain direct access to the HPP for radiation protection purposes.

3.3.2 **Project Radiation Safety Officers**

3.3.2.1 Under the direction of the Regional HPP, formulate and implement a radiation protection program that, as a minimum, provides compliance with pertinent regulatory requirements and this Radiation Protection Program.

3.3.2.2 Maintain direct access to Project/Program Managers on matters relating to radiological protection.

3.3.2.3 Provide Authorized Users with the instruments, protective devices, dosimetry, training, and other items needed to perform their work in accordance with the radiological protection program elements.

3.3.2.4 Maintain direct access to the HPP for radiation protection purposes.

3.4 **Authorized Users (AU)**

3.4.1 Under the direction of the RSO, maintain familiarity with and adhere to the requirements specified in licensing documents, facility/site/project radiation protection plans, and this Radiation Protection Program.

3.4.2 Report to the RSO for radiation protection purposes.

3.5 **Regional/Divisional Health and Safety Managers**

3.5.1 Through Health and Safety professionals, review project proposals so that appropriate health and safety issues have all been addressed.

3.5.2 Consult with the HPP about the appropriate radiation safety steps to take for project proposals.

4.0 DEFINITIONS

4.1 **Airborne Radioactivity Area** - A room, enclosure, or area in which airborne radioactive materials in concentrations in excess of the derived air concentrations (DACs) specified in Appendix B, 10 CFR 20.1001-2401.

4.2 **Authorized Users (AU)** - Individuals who, by virtue of training and/or experience, have been authorized by the RSO and/or licensing agency to use or directly supervise the use of radioactive materials under the requirements of a specific radioactive materials license or IT work plan.

4.3 **Contamination Area** - Any area which contains removable activity that is greater than 200 disintegrations per minute (dpm) beta and/or gamma per 100 square centimeters (cm^2) above background, and/or greater than 20 dpm alpha per 100 cm^2 above background; any area which contains fixed activity that is greater than 1000 dpm per 100 cm^2 beta and/or gamma above background, or greater than 100 dpm per 100 cm^2 alpha above background; or as specified in U.S. Nuclear Regulatory Commission (USNRC) Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors".

4.4 **Health Physics Professionals (HPP)** - Individuals who, by virtue of their education, and experience, approve and provide oversight for work involving or pertaining to radioactivity. The HPP shall be certified by the American Board of Health Physics (Comprehensive).

4.5 **Planned Special Exposures** - An infrequent exposure to radiation separate from and in addition to the annual dose limit.

4.6 **Radiation Area** - Any area accessible to personnel, where radiation levels exist such that a major portion of the body could receive a dose equivalent in excess of five (5) millirem in any one hour at 30 cm from the radiation source or from any surface that the radiations penetrate.

4.7 **Radiation Safety Officers (RSO)** - Individuals who, by virtue of training and/or experience, have been authorized to develop, administer and implement a radiation protection program. Fixed facility RSOs are specified by federal or state license requirements, and shall not be changed without notification of the appropriate licensing authority. Fixed facility RSOs include RSOs for sealed sources that require licensing by the USNRC or agreement state. Fixed facility RSOs are authorized to use or directly supervise the use of radioactive materials under the specifications of a specific radioactive materials license. Project RSOs shall be IT Technical Associates in Health Physics or an associate knowledgeable in health physics designated by an HPP.

4.8 **Radiation Worker** - An individual with the potential to receive in excess of 100 millirem, total effective dose equivalent, within one calendar year.

5.0 TEXT

5.1 Control of Work with Radioactive Materials or Radiation Producing Machines

Prior to initiating any work involving radioactive materials or radiation producing machines, a task or location-specific hazard control plan shall be in place with appropriate approvals. Such plan shall be prepared in accordance with one of the sets of requirements listed below, as appropriate.

- **HS052 Health and Safety Plans (HASP)**
  The HASP shall address all hazards associated with the work, including exposure to radiation. Radiation protection aspects of the HASP shall comply with HS700 and its associated Standard Operating Procedures, as applicable.

- **HS012 Chemical Hygiene Plan**
  Laboratories may incorporate radiation protection requirements with their Chemical Hygiene Plan. Compliance with applicable provisions of HS 700 is required.

- **Location-Specific Radiation Protection Program**
  IT locations where potential exposure to radiation is the only hazard to associates, other than normal office hazards, may prepare a stand-alone Location-Specific Radiation Protection Program which complies with the requirements of this procedure.

5.2 Training in Radiation Protection

Unless documented training in radiation protection has been provided elsewhere, all personnel with unescorted access to radiologically-restricted areas of IT or a client site shall be trained in radiation protection in accordance with IT procedure HS-050. This training may consist of General Employee Training in Radiation Protection (GET), Radiation Worker Training, Authorized User Training, and/or special briefings. Other site-specific (e.g., DOE) or license-specific (e.g., USNRC or individual state) training delivered on a project-specific basis may be substituted for training pursuant to HS-050 and this Radiation Protection Program.

General Employee Training in Radiation Protection: GET is designed to provide an awareness of IT radiation protection practices to all associates who may encounter radiological hazards as a result of their job description or work location, but who are not considered to be radiation workers. GET consists of 1-2 hours of classroom training in the following topics:

- Basic radiation protection concepts;

- Applicable Federal, State, and IT radiation protection policies and procedures;

- Associates and management responsibilities for radiation safety;
- Identification of radiological postings, barriers, labels, boundary control stations, and monitors; and
- The risk of low-level occupational radiation exposure;
- The risk of pre-natal radiation exposure;
- Emergency procedures.

Radiation Worker Training: Radiation Worker Training provides comprehensive knowledge of radiation protection activities at **IT** or at client sites where such training is not provided. Radiation Worker Training is provided to all employees, visitors, or contractors permitted unescorted access to radiation areas, contamination areas, airborne radioactivity areas, or to personnel with the potential to receive in excess of 100 millirem in one calendar year. Radiation Worker Training will consist of approximately eight hours of formal classroom training in the following topics:

- Radioactivity and radioactive decay;
- Characteristics of ionizing radiation;
- Man-made radiation sources;
- Acute effects of exposure to radiation;
- Risks associated with occupational radiation exposures;
- Special considerations in the exposure of declared pregnant women;
- Dose equivalent limits;
- Modes of exposure (internal and external);
- Dose equivalent determinations;
- Basic protection measures (time, distance, shielding);
- Specific **IT** procedures for maintaining exposures as low as is reasonably achievable;
- Orientation regarding the Radiation Work Permit form (see Attachment C).
- Radiation survey instrumentation, calibration, and limitations;

- Contamination control, including the use of protective clothing and equipment, and workplace design;
- Personnel decontamination;
- Emergency procedures;
- Warning signs, labels, barriers, and alarms;
- Responsibilities of associates and management;
- Interactions with the Director and other radiation protection personnel;
- Operational procedures associated with specific job assignments.

Authorized User Training: In addition to Radiation Worker Training, advanced training in radiation protection shall be provided to AUs who are not otherwise qualified by previous training and experience. Authorized User training consists of 40 hours of formal classroom, site-specific and on-the-job training, as well as a detailed briefing on the contents of location-specific hazard control plans and Standard Operating Procedures for Radiation Protection.

Special Briefings: Special briefings and job mock-ups shall be required for those personnel involved in work activities associated with a significant radiological hazard. The need for special briefings shall be specified on Radiation Work Permit (Attachment C) or as determined by the RSO for fixed facilities and by the Regional Health and Safety Manager for project-related activities.

All forms of training shall be updated annually. Training records shall be maintained by the RSO, with copies forwarded to the IT Training Department. These records shall include: attendance sheets; results of proficiency examinations; copies of proficiency examinations; and course lesson plans.

5.3 Radiation Exposure Control

Activity-Specific/Client-Specific Training: Where specific client requirements exist, and/or the HPP or RSO determines that additional training is require to ensure safety, the requirement shall be established in the Health and Safety Plan or Radiation Protection Program or Chemical Hygiene Plan covering that activity.

External Exposure Limits: External exposure limits for IT associates, visitors and contractors shall be consistent with those established by the USNRC in 10 CFR 20.1201. In developing the radiation protection requirements for a facility or project, the RSO or HPP shall specify the appropriate requirements. Administrative goals for exposure of IT associates, visitors, and contractors shall be 10% or less of the regulatory limits.

Associates under 18 years of age are not permitted access to radiologically-restricted areas at **IT** fixed facilities or client locations. Therefore, annual external exposure limits for minors shall not exceed the limits shown in 10 CFR 20.1207.

Exposure of the Unborn: Exposure limits for the unborn child shall not exceed those established by the USNRC in 10 CFR 20.1208 for the entire gestation period.[1/] Associates working with radioactive material shall be informed of the potential effects that may result to an embryo-fetus at low exposure levels. Associates shall be encouraged to notify the RSO regarding suspected or confirmed pregnancies. When pregnancy is declared, evaluation shall be performed by the RSO to determine the potential for the associate to exceed the regulatory exposure limit during the nine month gestation period. If the potential exists or if an associate's request for transfer is approved, the associate will be transferred to a different job assignment during the pregnancy pursuant to the guidelines found in **IT** procedure HS-041.

External Exposure Monitoring: All associates, visitors and contractors permitted unescorted access to radiologically-restricted areas of **IT** or a client site shall be assigned a personnel dosimeter to wear while on site. The personnel dosimetry program shall be accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). All personnel dosimeters used for the external dose of record for each associate, visitor, or contractor shall consist of thermoluminescent dosimeters (TLDs). A formal investigation shall be performed by the RSO in the event that a whole body or area dosimeter shows an exposure in excess of 10 percent of the limits specified in 10 CFR 20.1201 or if a dosimeter is lost.

Internal Exposure Limits: Internal exposure limits for **IT** associates, visitors and contractors shall be consistent with those established by the U. S. Nuclear Regulatory Commission in 10 CFR 20.1201. Administrative goals for intakes by **IT** associates, visitors, and contractors are not to exceed 10% of the regulatory limits, however the basic policy of **IT** is that all internal exposures are preventable.

Internal Exposure Monitoring: **IT** associates, visitors and contractors shall participate in a program of internal exposure monitoring whenever required by radiological conditions, by the provisions of 10 CFR 20.1502, by pertinent license requirements, or as recommended by the RSO. Monitoring shall be performed whenever an administrative limit may have been exceeded or a nasal smear reveals the presence of detectable radioactivity. Monitoring methodologies and frequencies shall be appropriate for detecting the types and quantities of radioactive materials in use by the associate, and shall be determined by the regional HPP.

Internal Dose Assessment: Internal radiation doses shall be assessed for each **IT** associate, visitor or contractor involved in the bioassay program at least once per year. Internal radiation doses shall be reported as committed effective dose equivalent, assigned in the year

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1/ The dose to an embryo or fetus shall be taken as the sum of the deep-dose equivalent to the declared pregnant woman, and the dose to the embryo or fetus from radionuclides incorporated in the embryo or fetus.

in which the dose was received.[2/] Dose assessments shall be performed by the RSO and/or the regional HPP.

5.4 ALARA Program

While the majority of occupational radiation exposures incurred by associate, visitors or contractors of IT are historically low, all exposures are assumed to entail some risk. Therefore, the following three principles to govern work activities with the potential for exposure to radiation or radioactive materials shall be adopted:

- No activity or operation shall be conducted unless its performance will produce a net positive benefit.
- All radiation exposures shall be kept as low as reasonably achievable (ALARA) considering economic and societal costs.
- No individual shall receive radiation doses in excess of federal or administrative limits.

The ALARA principle is the basis for much of IT's radiation protection program. The following basic elements shall be addressed in the ALARA program:

- Policy and management commitment
- Organization and responsibilities
- Administrative exposure control levels
- ALARA training
- Plans and procedures
- Internal audits
- Methodology for cost/benefit optimization
- Radiological design review
- Radiological work planning
- Records

2/ Committed doses to individual organs may also be maintained, at the discretion of the HPP.

Each location performing work involving radioactive materials shall establish a radiation protection subcommittee in their safety council. This subcommittee shall review the ALARA program at their location to verify that it is effectively implemented. (NOTE: For project offices infrequently handling radioactive materials, this subcommittee should be active only when such work is being planned or executed.)

5.5 Contamination Control

IT has adopted specific concentration limits for radioactive materials which may exist on equipment and surfaces located in "unrestricted areas" and "contamination areas". Unrestricted areas may include, but are not limited to, laboratory floors, benches, equipment, and materials released from potentially contaminated areas for unrestricted use. Contamination surveys shall be performed in accordance with license or project requirements to confirm that concentrations of radioactive materials in unrestricted areas satisfy the contamination limits shown below.

Contamination areas shall be clearly defined and may include, but are not limited to, designated benches, equipment, hood areas, or glove boxes in a radiation area or a contaminated area. Temporary control zones may be established by the AU or RSO in order to minimize the spread of contamination.

Loose Contamination Limits: Loose radioactive contamination shall be maintained at concentrations that are as low as reasonably achievable (ALARA). Areas where loose contamination is detected shall be classified as follows:

- Unrestricted Areas: Less than 200 dpm beta and/or gamma per 100 cm^2 above background; and/or less than 20 dpm alpha per 100 cm^2 above background.

- Contamination Areas: Greater than 200 dpm beta and/or gamma per 100 cm^2 above background; and/or greater than 20 dpm alpha per 100 cm^2 above background.

Loose contamination shall be measured with dry disc smears wiped over a suspect surface area of at least 100 cm^2 and counted in an appropriate counting device.

Fixed Contamination Limits: Fixed radioactive contamination shall be maintained at concentrations that are as low as reasonably achievable (ALARA). Areas where fixed contamination is detected shall be classified as follows:

- Unrestricted Areas: Less than 1000 dpm per 100 cm^2 beta and/or gamma above background; or 100 dpm per 100 cm^2 alpha radiation detected by direct survey.

- Contamination Areas: Greater than 1000 dpm per 100 cm^2 beta and/or gamma above background; or greater than 100 dpm per 100 cm^2 alpha above background.

Fixed contamination shall be measured by direct survey with portable radiation survey instruments sensitive to beta/gamma radiation (e.g., thin wall G-M instrument or equivalent) or alpha radiation (e.g., alpha probe and rate meter).

Decontamination: Contamination found in excess of the stated limits for unrestricted areas shall be decontaminated to acceptable limits. The area shall be restricted until the decontamination can be completed. Decontamination methods and correct area postings shall be determined by the RSO. Material and/or equipment that cannot be decontaminated below the limits specified shall be properly labeled and protected (i.e., bagged, stored, barricaded, etc.).

Control of Work in Contamination Zones: Work with radioactive materials shall be planned in advance to minimize the potential for spread of contamination. Work personnel are responsible to ensure that all necessary materials and equipment are readily and easily available prior to the start of an operation. All work areas shall be surveyed and cleaned following the operation. Absorbent, disposable materials shall be placed on working surfaces, and reagent containers and equipment may be wrapped in plastic prior to use, when applicable.

The engineering controls, administrative controls, and personal protective equipment requirements shall be established in the Health and Safety Plan, Radiation Protection Program, or Chemical Hygiene Plan applicable to the task.

Work involving concentrated liquid radioactive standards shall be performed in a fume hood. Once the standards have been diluted, analytical work may proceed in or outside the laboratory hood, as determined by the RSO.

5.6 Instrumentation and Surveillance

Instrumentation: Instrumentation used by IT associates to assess radiation exposure levels and/or contamination levels shall be of sufficient sensitivity and accuracy to assess radiation exposure levels at IT or client facilities. Instrumentation shall be tested and calibrated as recommended in ANSI N323.[y] Radiation protection instruments shall be calibrated at the frequency specified in the licensing documents and/or at least annually. RSOs are responsible for providing calibrated instruments for use. Calibration and repair records shall be maintained in the project files or fixed facility records, by the RSO.

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[y] American National Standards Institute, ANSI N323-1978, "Radiation Protection Instrumentation Test and Calibration".

Fixed laboratory instrumentation used for analysis of samples shall be checked for satisfactory performance pursuant to vendor instruction manuals. Acceptable performance shall be demonstrated by measurement of background counting rates and by the response of the instruments to appropriate calibration sources and/or check sources.

Surveillance: Radiation and swipe surveys of IT premises or client locations where radioactive materials are handled shall be performed on a planned and periodic basis. Non-routine surveys shall be performed at the discretion of the RSO or any time there is reason to suspect that radiation levels may have changed or that contamination is present. Periodic leak tests of sealed radiation sources shall be performed as required in 10 CFR 30 or pertinent license requirements.

5.7 Radiological Areas and Posting

Radiological area definitions and posting/labeling requirements throughout IT or client facilities shall be as described in 10 CFR 20, Subpart J. All personnel permitted unescorted access to the radiologically-restricted areas of IT or client facilities shall be trained in recognition of posting/labeling.

A radiation area is defined as any area accessible to personnel, where radiation levels exist such that a major portion of the body could receive an external dose equivalent in excess of five (5) millirem in any one hour at 30 cm from the radiation source or from any surface that the radiations penetrate. A radiation area shall be posted with signs that are magenta (purple) and yellow in color, and bearing the words "CAUTION - RADIATION AREA" along with the three-blade radiation symbol. Personnel entering a radiation area shall wear a personnel radiation dosimeter.

A high radiation area is defined as an area, accessible to personnel, in which radiation exposure rates should result in an individual receiving a dose equivalent in excess of 100 millirem in any one hour at 30 cm from the radiation source or from any surface that the radiations penetrate. Such areas shall be posted with magenta and yellow signs bearing the words "CAUTION (or DANGER) -- HIGH RADIATION AREA" and the three-blade radiation symbol. Personnel entering a high radiation area shall wear a personnel dosimeter. Each entrance or access point to a high radiation area shall be locked and controlled in accordance with 10 CFR 20.1601.

A contaminated area is defined as an area accessible to personnel, where there exists fixed and/or removable contamination in excess of the limits established for unrestricted access. Such areas may occur anywhere in the restricted areas, and shall be posted with magenta and yellow sign and/or tape bearing the words "CONTAMINATED" or "INTERNAL CONTAMINATION". The boundaries of these areas shall be clearly visible. The RSO shall approve all work in contaminated areas prior to its start.

Each area or room in which licensed radioactive materials are stored in quantities that are greater than 10 times the quantity of such materials shown in 10 CFR Appendix C of 20.1001-2401 or Category II or III samples as defined below shall be posted with the

magenta and yellow symbol and the words "CAUTION: RADIOACTIVE MATERIAL(S)" at each entrance point.

Samples containing radioactive materials shall be classified with respect to handling requirements in order to limit personnel exposure to radiation. Sample classifications shall be one of the following:

- Category I: Gross alpha less than 0.01 μCi/sample; gross beta less than 0.1 μCi/sample; total activity less than 0.002 μCi/gram

- Category II: Less than 0.1 mR/hr on contact; Less than 0.01 μCi/g total activity; Gross alpha, greater than 0.01 but less than 0.1 μCi; Gross beta, greater than 0.1 but less than 1 μCi.

- Category III: Greater than 0.1 mR/hr on contact; Greater than 0.01 μCi/g total activity; Gross alpha, greater than 0.1 μCi; Gross beta, greater than 1 μCi.

At sites or facilities which contain licensable radioactive materials, USNRC Form 3, "Notice to Employees" (see Attachment D), or applicable state equivalent, shall be posted in prominent locations, including but not limited to the break room and employee bulletin boards. Radiation Work Permits shall be posted at the entrance to controlled zones or radiation areas.

Caution signs may not be necessary in areas/rooms containing radioactive materials for a period of less than eight (8) hours, provided that the materials are attended throughout this period by an individual who has been trained in the precautions for radiation exposure of personnel. The RSO shall make this determination.

5.8 Control of Radiological Work

Control of work involving radioactive materials is accomplished by establishing radiological standards and responsibilities, using first-line supervisors and radiological protection personnel to monitor performance of radiological work, training workers in recognition of radiation hazards and their responsibility to prevent their occurrence, and providing personnel with operating procedures and/or Radiation Work Permits that include the radiological protection measures and controls necessary for safe completion of the job.

For work at client facilities, Radiation Work Permits (RWP) shall be initiated by the Supervisor and approved (Attachment C). For fixed facilities, RWP shall be initiated for work with all Category III samples, and shall be approved by the RSO. Prior to performing work under a RWP, workers shall sign a statement signifying they have read the RWP, fully understand all requirements and radiological conditions, and agree to comply with the requirements. RWP and associated records shall be maintained in a retrievable, legible form by the RSO for fixed facilities. For projects, all RWP shall be maintained in the project file.

Changes in the manner of work performance shall require a review of the RWP in accordance with Attachment C.

5.9 Engineered Controls and Respiratory Protection

As required in 10 CFR 20, Subpart H, engineered controls shall be the primary means whereby intake of airborne radioactivity by workers and/or exposure to external radiation is minimized. Workers shall not be subject to the increased physical stress and loss of work efficiency by wearing respirators unless engineered controls or administrative controls are determined to be ineffective. In the event that respirator usage is required, the following conditions shall apply:

- Users shall receive a medical examination within the last year which indicates that the user is medically fit to wear a respirator.
- Users shall receive training on the topics of respiratory protection and respirators.
- Users shall pass an acceptable qualitative or quantitative fit test for all types of negative pressure masks in use at the IT or specific client facility.
- Users shall be clean-shaven on all sealing surface areas under the respirator.
- Users shall comply with the provisions of the IT Respiratory Protection Program as described in HS-601.

5.10 Receipt, Handling and Identification of Radioactive Materials

Incoming packages, known or suspected to contain radioactivity shall be monitored for exposure rate and removable external contamination, pursuant to 10 CFR 20.1906. Radioactive material shall be marked as such to ensure proper handling and storage. Markings may include tags or stickers (in yellow and magenta) indicating "Internal Contamination" or "Radioactive Materials".

Items identified as radioactive materials shall be maintained in a radioactive material storage area established for this purpose within a restricted area. Radioactive standards shall be stored in a standard storage cabinet within a restricted area.

Radioactive materials received by IT in excess of the limits specified in 10 CFR 30.71, Schedule B, shall be entered in a radioactive material inventory log as required by Federal or State regulations or specific licensing requirements. If the log is required, it shall be maintained to track and demonstrate compliance with maximum possession limits established in the applicable license, and update radioactive material inventory as specified.

5.11 Packaging and Transportation of Radioactive Materials

Radioactive material which is shipped from IT shall be packaged and shipped in a manner which minimizes radiation exposure to the shippers, the general public, and to the environment. Shipments shall be packaged, surveyed, and labeled in accordance with Department of Transportation (DOT) regulations, 49 CFR 173.400, Subpart I. Prior to shipment of radioactive material from an IT facility or project, the RSO shall determine that the receiver is licensed to receive the type, quantity and form of radioactive material present in the shipment. A copy of the receiving facility's license or a certification that the facility is licensed for possession of the material is required prior to shipment.

5.12 Control of Radioactive Waste

Control of radioactive waste materials shall be accomplished by: Preventing materials from becoming unnecessarily and/or excessively contaminated; decontaminating and reusing items such as tools and equipment; identifying, controlling, and promptly repairing leaks from radioactive systems or from other sources of contamination; monitoring materials for radioactivity and removing non-radioactive materials prior to disposal; and using waste volume reduction techniques when practical. Waste segregation practices shall be implemented in order to assure separation of radioactive materials from non-radioactive materials, exclusion of liquids from the waste stream, and minimization of the volume of mixed (hazardous/radioactive) wastes generated.

All radioactive waste shall be disposed of in containers deemed appropriate for solid or liquid waste. All radioactive waste containers shall comply with Department of Transportation (DOT) specifications. Plastic liners and absorbent material shall be routinely used. The isotope(s), activities, and volumes of all materials placed in the waste containers should be recorded in the container inventory log at the time of the addition. Waste containers shall be labeled and maintained in an area established for that purpose.

Radioactive waste shall be disposed of by one of the following means:

- Transfer to a waste disposal service which is licensed to receive such waste in accordance with 10 CFR 20.2001.
- Transfer to the original supplier which is properly licensed to receive radioactive materials;
- Release into the sanitary sewer in conformance with 10 CFR 20.2003.
- Other means specifically approved in advance by the USNRC pursuant to 10 CFR 20.2002, or a specific license requirements.

5.13 Radiation Protection Records

Records shall be maintained in order to document implementation of this Radiation Protection Program and to demonstrate compliance with the USNRC or state license requirements. Records relating to a fixed facility radiological control program shall be maintained for the duration of the USNRC or state license, or disposed of as authorized by the USNRC or applicable state agency. Records shall include:

- Training records on each worker indicating time of training, test results, instructor name/company name, test used and course lesson plans;
- Radiation Work Permits and associated records;
- Radiation exposure records on each worker including both internal and external exposure results in accordance with 10 CFR 20, Subpart L.
- Calibration records for instrumentation;
- All documentation on dose estimates;
- Bioassay results for all samples submitted by **IT** employees, visitors, or contractors;
- Site monitoring data (i.e., ambient surveys, contamination surveys, airborne radioactivity surveys, environmental monitoring surveys, etc.) collected by **IT** personnel.

Associate exposure records shall be on file at the employee's "home" location through the Health and Safety department, and personnel exposure records shall be maintained by **IT** for the duration of employment plus 30 years, per IT Procedure HS102. These records shall include:

- Training records on each worker indicating time of training, test results, instructor name/company name, test used and course lesson plans;
- Radiation exposure records on each worker including both internal and external exposure results in accordance with 10 CFR 20, Subpart L.
- All documentation on dose estimates;
- Bioassay results for all samples submitted by **IT** associates, visitors, or contractors;

Associates, visitors and contractors have the right to review their personnel exposure records upon request. Exposure reports shall be prepared by the HPP and, if requested, provided to each individual at the time of employment termination. If the most recent monitoring

results are not available at that time, a written estimate of the dose shall be provided, together with a clear indication that it is an estimate rather than a dose of record.

5.14 Program Documentation

This procedure (HS700) shall control all work within IT Corporation involving radiation or radiation producing machines. The Standard Operating Procedures listed below shall also be implemented to control this work unless location-specific written alternative guidelines are received and approved by the HPP.

RPP-001	Internal Exposure Control
RPP-002	External Exposure Control
RPP-003	Contamination Control
RPP-004	Instrumentation and Surveillance
RPP-005	Radiological Areas and Posting
RPP-006	Sample Screening and Classification
RPP-007	Receipt, Handling and Identification of Radioactive Materials
RPP-008	Engineered Controls and Respiratory Protection
RPP-009	Packaging and Transportation of Radioactive Materials
RPP-010	Radiation Protection Records
RPP-011	Control of Standard Operating Procedures for Radiation Protection
RPP-012	Emergency Response and Notifications
RPP-013	Handling Sealed Radiation Sources
RPP-014	Quality Assurance in Radiological Protection
RPP-015	Control of Radiological Work

5.15 Emergency Response and Notifications

For emergencies where radioactive materials may be involved, consideration shall be given to exposure to radioactive materials and ionizing radiation, in addition to the other hazards present. Advance planning and preparation for potential emergencies shall be stressed to

personnel in order to ensure that the initial response to an emergency is proper and not hampered by lack of facilities or equipment.

The appropriate responses for the following incidents or emergencies as they pertain to the safe use of radioactive materials shall be as described in the project Health and Safety Plan, license requirements, or facility plan. Management review and follow-up shall be as described in IT procedure HS-020:

- Electrical power failures
- Minor spills (liquid or dry)
- Major spills
- Accidents involving radioactive dusts, mists, fumes, vapors or gases
- Injuries to personnel involving radioactive contamination
- Fires or other emergencies
- Fire prevention

In addition, radiological incidents may include lost or damaged TLDs or accidental over-exposures. Associates shall promptly notify the RSO of lost or damaged TLDs. The RSO shall issue a new dosimeter for that monitoring period, evaluate/estimate the radiation exposure incurred from the beginning of the monitoring period until the time of loss damage, and record all pertinent information in the employee's dosimetry records. It may be necessary to limit the exposure of the individual involved until the investigation is completed.

If it is known or suspected that radioactive material has been taken into the body, the RSO shall be notified immediately. The RSO, the HPP and the Director shall evaluate the amount of material ingested/inhaled and the resulting exposure. This investigation may include airborne activity sampling and analysis, bioassays, or whole body counting, as needed.

The RSO, with guidance from the regional HPP, shall notify the USNRC as required by 10 CFR 20.2201, 20.2202 and 20.2203 of any incident involving licensed material which has caused or threatens to cause certain conditions or effects as delineated in license requirements or applicable regulations. Planned Special Exposures, if authorized by the Director, shall be reported pursuant to 10 CFR 20.2204. Reports of personnel overexposure and Planned Special Exposures shall be retained as permanent records, with copies forwarded to the associate. Additional exposure of an individual involved in an overexposure incident shall be restricted to ensure that the individual does not exceed any applicable regulatory limits. The health aspects of the specific exposure received shall be presented by the RSO to the involved individual.

Injuries or illnesses occurring on the job will be responded to as for other injury or illness incidents, in that medical or hospital assistance will be enlisted from nearby facilities. Injuries or illnesses involving radioactive materials and warranting emergency professional medical care will be handled in a manner commensurate with their severity. The HPP will provide consultation for such emergencies by direct involvement.

5.16 Quality Assurance in Radiological Protection

All activities conducted as part of this Radiation Protection Program shall be subject to quality assurance requirements. The quality assurance provisions for radiological protection will provide consistency/accuracy of results and documentation/verification of the effectiveness of the Radiation Protection Program. These provisions shall include the following:

- Facility or project-specific procedures shall be developed to implement this Radiation Protection Program.
- Audits/assessments shall be conducted by the Director or a designee to determine compliance with USNRC regulations, applicable state regulations, applicable license requirement, and this Radiation Protection Program.
- The IT radiation protection program shall be audited/assessed at least annually by the Director or designee.

An Employee Communication Program exists which permits IT associates to report items, activities, or procedures which they deem inconsistent with regulatory and/or administrative requirements, and the provisions of this Radiation Protection Program. This program is called Dialogue. Elements of the Dialogue program should include:

- Documentation of the problem;
- Supervisory review;
- Corrective action and recurrence control;
- Response back to the initiating employee.

IT management shall ensure that there are no punitive consequences resulting from an employee's participation in Dialogue.

6.0 Exception Provisions

Variances and exceptions shall be permitted pursuant to the provisions of IT procedure HS-013, "Health and Safety Procedure Variances".

7.0 Cross References

7.1 Requirements and Specifications

Title 10, Code of Federal Regulations, Part 19, "Notices, Instructions, and Reports to Workers; Inspections"

Title 10, Code of Federal Regulations, Part 20, "Standards for Protection Against Radiation"

U. S. Department of Energy N-5480.6, "Radiological Control Manual"

U. S. Department of Energy Order 5480.11

Title 10, Code of Federal Regulations, Part 835

USNRC and Agreement State Licenses

7.2 Related IT Procedures

HS-001, "Safety Policy"

HS-013, "Health and Safety Procedure Variances"

HS-020, "Accident Prevention Program: Reporting, Investigation and Review"

HS-022, "Accident Prevention Program: Review of New Proposals, Projects, Construction, and Jobs by Heath and Safety"

HS-040, "Stop Work Authority"

HS-041, "Embryo-Fetus Protection Program"

HS-050, "IT Associate and Subcontractor Training Requirements"

HS-051, "Tailgate Safety Meetings"

HS-052, "Health and Safety Plans"

HS-060, "Hazard Communication"

HS-310, "Hazardous Waste Operations at Uncontrolled Waste Sites"

Other applicable IT Health and Safety procedures

7.3 Others

American National Standards Institute Report No. ANSI N323-78, "Radiation Protection Instrumentation Test and Calibration"

National Council on Radiation Protection and Measurement, Report No. 59, "Operational Radiation Safety Program"

National Council on Radiation Protection and Measurements, Report No. 71, "Operational Radiation Safety - Training"

International Commission on Radiological Protection, Publication No. 35, "General Principles of Monitoring for Radiation Protection of Workers"

USNRC Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors"

USNRC Regulatory Guide 1.144, "Auditing of Quality Assurance Programs for Nuclear Power Plants"

USNRC Regulatory Guide 8.2, "Administrative Practices in Radiation Monitoring"

8.0 Attachments

A. Responsibility Matrix
B. Approval Authority
C. Radiation Work Permit (This form is mandatory unless alternate form specified in location license is available.)
D. USNRC Form 3

ATTACHMENT A

INTERNATIONAL TECHNOLOGY CORPORATION

RADIATION PROTECTION PROGRAM
Responsibility Matrix

Action	Procedure Section	Responsible Party					
		Director	HPP	RSO	AU	Regional/ Divisional HS	Supervisor
•Formulate/guide management implementation of radiation protection procedures	3.1.1, 3.3.1.1, 3.3.2.1	X		X			
•Review/evaluate activities involving radiation	3.1.2	X					
•Maintain copies of IT licenses & permits	3.1.3	X					
•Advise management of nuclear-related issues during proposal preparation	3.2.2		X				
•Ensure all associates are properly trained	5.2, 5.3		X	X		X	
•Provide Authorized Users with appropriate equipment	3.3.1.4			X			
•Ensure adherence to requirements of license & radiation protection plan/procedures	3.4.1				X		
•Review proposals to ensure Health & Safety compliance	3.5.1					X	
•Ensure exposure monitoring is recorded as appropriate	5.3			X			
•Establish contamination control zones	5.5			X	X		
•Ensure proper calibration of instruments	5.6			X			
•Determine radiological areas & postings	5.7			X			
•Initiate/obtain approval of Radiation Work Permits	5.8						X
•Ensure handling, packaging & transportation of radiological materials/waste is appropriate per this procedure	5.10-5.12			X			
•Radiation protection records shall be retained for duration of USNRC or state license or disposed of as authorized by USNRC or applicable state agency	5.13			X		X	
•Employee exposure monitoring records to be retained for duration of employment + 30 years	5.13, HS102			X		X	

ATTACHMENT B - APPROVAL AUTHORITY

Action	Approval Required *
USEPA Level A PPE	Project Manager
IDLH	Project/Location HS Staff[2/]
Corporate procedure variance	Region/Division HS Manager[3/]
Special circumstances	CIH
Potential for personnel radiation exposure to exceed 500 mrem (TEDE) within one calendar year	*RSO[4/]*
	HPP
Planned special exposures	*Director*
USEPA Level B PPE	Project Manager
Potential for personnel radiation exposure to exceed 100 mrem (TEDE) within calendar year	Project/Location HS Staff
	Region/Division HS Manager
Access to airborne radioactivity areas	CIH
	RSO
	HPP
USEPA Level C or D PPE	Project Manager
Access to Radiation, Contamination, or Radioactive Materials areas (posted or unposted)	Project/Location HS Staff (other than the writer)
	RSO
Access to areas with ambient exposure rates in excess of 0.06 millirem per hour	

* For any action in the left hand box, the approval of all listed managers in the right hand box is required, except that RSO/HPP approvals only apply where potential radiation exposures exist.

2/ Project/Location HS staff must be a degreed health and safety professional to execute this approval level.

3/ Region, division, and corporate level professional are authorized to designate an alternate professional reviewer to act in their place, and to permanently delegate this approval authority to individual IT health and safety professionals.

4/ RSOs shall be IT Technical Associates in Health Physics, radiation protection professional designated by an HPP, or a Fixed Facility RSO.

ATTACHMENT C - RADIATION WORK PERMIT

INTERNATIONAL TECHNOLOGY CORPORATION

RADIATION WORK PERMIT

Release Number:_____

Location:

Job Description:

Job Supervisor: | Phone #:

Job Start/Finish Dates:

SITE CHARACTERIZATION

LOCATION	RADIATION LEVELS			CONTAMINATION	
	Type	Contact (mrem/hr)	Work Area (mrem/hr)	Type	Activity (dpm/100 cm²)

AIRBORNE	OTHER HAZARDS	
Activity (μCi/ml)	Type	Levels

PERSONAL PROTECTIVE EQUIPMENT

BODY & HANDS	X	FEET	X	HEAD	X
Coveralls: 1pc; 2pc Lab Coat Plastic Suit Paper Coveralls Cloth Liners Rubber Gloves Surgical Gloves Tape Gloves to Coveralls		Shoe Covers (canvas) Plastic Booties Rubber Shoes Paper Shoe Covers Tape Booties to Coveralls No Personal Outer Clothing		Surgical Cap Canvas Hood Plastic Hood Face Shield Goggles Hard Hat	
HS COVERAGE	**X**	**RESPIRATORY PF**	**X**	**DOSIMETRY**	**X**
None Start of Job End of Job Continuous		Dust Mask N/A Half Face 10 Full Face 50 Air-Fed Hood 2K Airline Full Face 2K Self-Contained 10K Lapel Air Sampler Per Individual Per Group		TLD Dosimeter 0-200 mR Dosimeter (high) range _____ Extremity TLD Neutron Badge Digital Alarming Dosimeter Per Individual Per Group	

Special Instructions:	Waste Handling:

Preparer:

Approval *(Project Radiation Safety Officer)*

Expiration Date: | Termination Date:

IT Form HS700B

ATTACHMENT D - USNRC FORM 3

UNITED STATES NUCLEAR REGULATORY COMMISSION
Washington, D.C. 20555

NOTICE TO EMPLOYEES

STANDARDS FOR PROTECTION AGAINST RADIATION (PART 20); NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS (PART 19); EMPLOYEE PROTECTION

WHAT IS THE NUCLEAR REGULATORY COMMISSION?

WHAT IS MY RESPONSIBILITY?

WHAT DOES THE NRC DO?

HOW DO I REPORT VIOLATIONS?

WHAT RESPONSIBILITY DOES MY EMPLOYER HAVE?

MAY I SEE A RECORD OF MY RADIATION EXPOSURE?

WHAT IF I WORK IN A RADIATION AREA?

HOW ARE VIOLATIONS OF NRC REQUIREMENTS IDENTIFIED?

CAN I BE FIRED FOR TALKING TO THE NRC?

MAY I TALK WITH AN NRC INSPECTOR?

MAY I REQUEST AN INSPECTION?

HOW AM I PROTECTED FROM DISCRIMINATION?

HOW DO I CONTACT THE NRC?

WHAT WILL THE NRC DO?

WHAT FORMS OF DISCRIMINATION ARE PROHIBITED?

WHAT CAN THE LABOR DEPARTMENT DO?

UNITED STATES NUCLEAR REGULATORY COMMISSION REGIONAL OFFICE LOCATIONS

A representative of the Nuclear Regulatory Commission may be assigned at the following address and telephone numbers. The Regional Office will accept written telephone calls from employees who wish to register complaints or concerns about radiological working conditions or other matters regarding compliance with Commission rules and regulations.

Regional Offices

REGION	ADDRESS	TELEPHONE
I	U.S. Nuclear Regulatory Commission Region I 475 Allendale Road King of Prussia, PA 19406-1415	(215) 337-5000
II	U.S. Nuclear Regulatory Commission Region II 101 Marietta St., N.W., Suite 2900 Atlanta, GA 30323	(404) 331-4000
III	U.S. Nuclear Regulatory Commission Region III 801 Warrenville Road Lisle, IL 60532-4351	(708) 790-5500
IV	U.S. Nuclear Regulatory Commission Region IV 611 Ryan Plaza Drive, Suite 400 Arlington, TX 76011-8064	(817) 860-8100
V	U.S. Nuclear Regulatory Commission Region V 1450 Maria Lane, Suite 210 Walnut Creek, CA 94596-5368	(510) 975-0200

To report incidents involving fraud, waste or abuse by an NRC employee or NRC contractor:

OFFICE OF THE INSPECTOR GENERAL
HOTLINE
1-800-233-3497

NRC FORM 3 (7-91)