NRC Sponsored Training Courses Available to Agreement State and Master Material Licensee Students

COURSE INFORMATION

Health Physics for Uranium Recovery (F-104)

This is a 4.5-day course that includes at least one tour of a uranium mine/milling facility after three days of instruction by a contractor, ORAU, that conveys a fundamental understanding of health physics for uranium recovery facilities. Health physics practices and issues for uranium mining, milling, and in-situ leach extraction type facilities are discussed. Topics include: brief review of radiation units and terminology; naturally-occurring radioactive decay chains; special properties and hazards of uranium and its decay products; general facility descriptions; radiation issues and hazards involving radon-222 releases and windblown tailings; radiation dose limits, including the weekly limit for soluble uranium; working level concept for radon decay products; contamination control, including instrumentation and scan MDCs; external dose controls; and internal dose controls, including bioassay and air sampling programs. The course includes speakers from the NRC and Agreement State(s) in addition to presenter(s) from ORAU. This provides the attendees with an up-to-date status within the Agreement State and specific details of uranium recovery activities. The course is typically conducted at an Agreement State facility. Once scheduled, the address will be provided.

Exam: Multiple choice - 70% passing
Mobile: Yes

Inspection Procedures (G-108)

This course provides an understanding of materials related health physics inspections. Course topics include: how to prepare for, schedule, and conduct a routine inspection; enforcement; inspection documentation; incident inspections and handling allegations. The main portion of the course is devoted to inspection of the following licensees; medical, R&D, industrial radiography, gauges, well logging, irradiators. A mock inspection exercise is conducted. Although not required, attendees will get the maximum benefit from this Regulatory Skills course if they have previously attended the following technology courses so that they will better understand the licensing concepts discussed. At a minimum, familiarity with the terminology and activities conducted in these areas is strongly recommended. Material covered in the Inspection Course will assume either some basic understanding of the concepts presented in these courses or experience with the activities being inspected: Diagnostic and Therapeutic Nuclear Medicine (H-304); Brachytherapy, Gamma Knife and Emerging Technologies (H-313); Safety Aspects of Industrial Radiography (H-305).

Exam: No (team inspection and oral briefing)
Mobile: No

Licensing Practices and Procedures (G-109)

This course covers licensing procedures for portable and fixed gauges, medical applications, academic/R&D, well logging, irradiators and industrial radiography. The course includes 4 - 8 hours of self-study material that is provided to students prior to the course. The self-study allows students to learn general concepts that they will be expected to apply during licensing exercises that are conducted throughout the classroom portion of the course. Lectures and exercises are provided by Senior NRC License Reviewers. Although not required, attendees will get the maximum benefit from this Regulatory Skills course if they have previously attended the following technology courses so that they will better understand the licensing concepts discussed:

- Diagnostic and Therapeutic Nuclear Medicine (H-304)
- Brachytherapy, Gamma Knife and Emerging Technologies (H-313)
- Safety Aspects of Industrial Radiography (H-305)

At a minimum, familiarity with the terminology and activities conducted in these areas is strongly recommended. Material covered in the Licensing Course will assume either some basic understanding of the concepts presented in these courses or experience with the activities being licensed.

Exam: No (team activities)
Mobile: No

Root Cause Workshop (G-205)

This workshop provides attendees with an introduction to root cause analysis, events and causal factors analysis, interviewing witnesses, failure recognition and analysis, change analysis, energy (hazard)-barrier-target analysis, analytical trees, personnel reliability, MORT analysis, assembling facts and conclusions and building a defendable argument (oral briefing). Emphasis is placed on conducting information gathering interviews; model videotapes are used to illustrate specific interviewing techniques. Case studies are used to illustrate methods, foster teamwork, and practice interviewing and briefing techniques.

Exam: No (preparation of a team report and an oral briefing is required)
Mobile: Yes

Characterization and Planning for Decommissioning (H-115)

This course emphasizes site evaluation, data planning, survey implementation and tools, data interpretation, and decision making processes involved in the historical site assessment, scoping survey, and characterization survey phase of decommissioning. Much of the course involves planning sessions and individual and class exercises. Topics include: site assessment, surveys for radiological and chemical contaminants, data quality objectives and assessments, safety evaluations, planning and budgeting.

Exam: Multiple choice - 70% passing
Mobile: Yes

Introductory Health Physics Self-Study Course (H-117S)

This introductory self-study course provides a basic understanding of health physics and radiation protection principles. Furthermore, this course provides an overview of the various uses of radioactive material in industry and discusses the history of health physics. For a complete list of the modules, please contact AStrainingandtravel@nrc.gov.

Exam: Multiple choice - 70% passing
Mobile: No

MARSAME: Multi-Agency Radiation Survey and Assessment of Materials and Equipment (H-120S)

This course provides students with an overview and basic understanding of the methodology described in the Multi-Agency Radiation Survey and Assessment of Materials and Equipment Manual (NUREG-1575, Suppl. 1), known as MARSAME. The course both reviews the basic concepts and principles described in the MARSSIM Manual (NUREG-1575), and highlight the differences in MARSAME. Preliminary surveys, action levels, survey designs, uncertainty, and statistical decision-making are discussed in detail. Throughout the course, students work example problems demonstrating individual aspects of MARSAME, which lead to a final class exercise that develops a MARSAME plan for a site on which various items were stored pending final disposition. Students are expected to have some familiarity with the MARSSIM methodology.

Exam: Multiple choice - 70% passing
Mobile: No

MARSSIM: Multi-Agency Radiation Survey and Site Investigation (H-121S)

Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) course provides a standardized approach for implementing the necessary radiological surveys for decommissioning nuclear facilities. A multi-agency committee representing the NRC, DOE, EPA and DOD produced the guidance document known as the MARSSIM manual. The recommended protocols are quite different from ordinary radiation surveys. This course will familiarize attendees with the theory and implementation of the MARSSIM manual. It emphasizes the decision-making processes involved in the design and implementation of a MARSSIM-based decommissioning survey. Topics include an overview of radiological survey types, the data quality objectives process, background reference area selection, survey instrument detection sensitivity, area classification, and survey statistical design. Significant statistics and calculations are associated with the successful completion of this course.

Exam: Multiple choice - 70% passing
Mobile: No

Fundamental Health Physics Self-Study Course (H-122S)

This course involves self-paced study of 45 eLearning instructional modules and the completion of three online exams (overall average of 70% required to receive credit for the course). The instructional modules cover fundamental health physics theory and principles. For a complete list of the modules, please contact AStrainingandtravel.Resource@nrc.gov. **This course is a prerequisite for the Fundamental Health Physics Labs (H-122) course and needs to be completed at least four weeks prior to the Fundamental Health Physics Labs Course (H-122).** Because this is a self-study training course, there are no associated webinars or office hours. There is a discussion forum, however, to allow students to interact with TTC HP Instructors and/or other students.

Exam: Three exams
70% passing, weighted-average of the three exams
Mobile: No

Fundamental Health Physics Labs Course(H-122 Labs)

The H-122 Labs course fulfills the requirements for completion of the H-122 training course. The complete H-122 training course consists of two parts: 1) The instructional modules which must be completed online (H-122S), and, 2) The 1-week of lab activities that are delivered at the NRC's Technical Training Center (TTC). Access to the online course modules requires registering for the Fundamental Health Physics Self-Study Course (H-122S). H-122S must be completed at least four weeks before attending this course, H-122 Labs. Together, the successful completion of H-122S and the H-122 Labs will complete the H-122 course qualification requirements.

Exams:
Mobile: No

Environmental Monitoring and Air Sampling for Radioactivity Self-Study Course (H-130S)

NOTICE: THIS SELF-STUDY COURSE IS ONE COMPONENT OF A BLENDED CURRICULUM THAT HAS REPLACED THE ENVIRONMENTAL MONITORING AND RADIOACTIVITY COURSE (H-111) AND AIR SAMPLING FOR RADIOACTIVITY MATERIALS COURSE (H-119)

This course involves self-paced study of 26 instructional modules and an online exam (overall average of 70% required to receive credit for the course). The instructional modules cover methods used to sampling and analyze for the presence of radioactive materials. For a complete list of the modules, please contact AStrainingandtravel.Resource@nrc.gov. **This course is a prerequisite for the Environmental Monitoring and Air Sampling for Radioactivity Lab Course (H-130L) and needs to be completed at least four weeks prior to the Environmental Monitoring and Air Sampling for Radioactivity Lab Course (H-130L).** Upon completion of this course you should be familiar with the methods used to sample and analyze for the presence of radioactive material in the air and in various media found within the environment (e.g., soil, vegetation, water sources). Because this is a self-study training course, there are no associated webinars or office hours. There is a discussion forum, however, to allow students to interact with TTC HP Instructors and/or other students.

Exam: Online exam (70% or better required for passing)
Mobile: No

Environmental Monitoring and Air Sampling for Radioactivity Lab Course (H-130L)

NOTICE: THIS COURSE IS ONE COMPONENT OF A BLENDED CURRICULUM THAT HAS REPLACED THE ENVIRONMENTAL MONITORING AND RADIOACTIVITY COURSE (H-111) AND AIR SAMPLING FOR RADIOACTIVITY MATERIALS COURSE (H-119)

The complete training curriculum consists of two parts:

1) An online self-study course consisting of 26 interactive modules (H-130S), and

2) This four-day lab course that is delivered by Oak Ridge Associated University (ORAU) staff in Oak Ridge, TN. The lab course is composed entirely of hands-on activities and field exercises that allow students to apply the knowledge they have learned in the H-130S self-study course.

IMPORTANT: The H-130S self-study course must be completed at least four weeks before attending this lab course.

Exam: No exam (course is entirely lab and field activities)
Mobile: No

Advanced Health Physics (H-201)

This is the final course in the NRC Health Physics Series of courses. This intensive 4.5-day course provides a detailed understanding of health physics principles through calculations associated with complex problems. The course includes technical topics such as: methods for estimating external dose to the body and skin; serial decay; neutron activation; point, line and area source calculations; shielding design; use of portable survey instruments and air samplers; implementation of approved methods for quantifying effective dose equivalent from external sources; methods for calculating dose from submersion; and health physics statistics.

An understanding of basic and mid-level mathematical concepts such as exponentials, logarithms and inverse tangents is required. A hand-held calculator with exponential, logarithmic and trigonometric functions is required to be brought to class. Also, it is strongly recommended that you bring your own laptop or other device to the course to allow review of the course materials outside of the classroom. Please note that the likelihood of success is significantly increased if the items listed above are satisfied. If you have any questions regarding the level of difficulty of this course please contact the Course Director at the Technical Training Center. Priority enrollment is given to those who need this course to fulfill a formal qualification program.

***** Prior completion of the Fundamental HP Self-Study Course (H-122S) is now required to register for this course. H-122S must be completed at least *four weeks* before the scheduled offering of H-201. Students who have previously completed the Applied Health Physics (H-109) course are waived from this pre-requisite.*****

Exam: Long Answer (word problem) Exam – 70% passing
Mobile: No

Health Physics Statistics Self-Study Course (H-301S)

This course involves self-paced study of 12 online instructional modules and an online exam. The Health Physics Statistics Self-Study Course (H-301S) will introduce you to various applications of statistics to operational health physics. The topics that are covered in the course include an introduction to basic statistical concepts, descriptive statistics, uncertainty propagation, hypothesis testing, and selection of statistical tests. The course includes practical exercises, introduces statistical software applications, and provides additional references if you would like to dive deeper in a given subject area. The applied health physics problems and exercises that are provided will illustrate the application of statistics to environmental monitoring, effluent release, site assessment, laboratory applications, and dosimetry.

Exam: Online exam (70% or better required for passing)
Mobile: No

Diagnostic and Therapeutic Nuclear Medicine (H-304)

This course intended to give a clinical perspective of the different nuclear medicine technologies and procedures that are licensed by the NRC and Agreement States. The course focuses on the facilities and equipment used in nuclear medicine departments; clinical diagnostic and therapeutic procedures involving the administration of radiopharmaceuticals to patients; safe handling of patients and the protection of staff and visitors; patient release; and medical events. The manufacturing and transport of radiopharmaceuticals, associated quality assurance practices, dose calibrations, and waste disposal are also covered. Opportunities are provided for tours of nuclear medicine departments and hands-on activities.

Exam: Multiple choice - 70% passing
Mobile: No

Safety Aspects of Industrial Radiography (H-305)

This course provides an understanding of radiography principles, sources, techniques and equipment, regulatory and licensing requirements for radiographic activities, regulatory requirements for handling, storing, shipping and transporting radiography sources, radiography incidents, inspection techniques for radiography activities, and field industrial radiography operations. Opportunities are provided for hands-on experience.

Exam: Multiple choice - 70% passing
Mobile: No

Transportation of Radioactive Materials (H-308S)

This course provides a detail overview of the Department of Transportation Hazardous Materials Regulations (49 CFR Parts 100 to 177) pertaining to the transportation and packaging of Radioactive Materials. The course covers the roles of the NRC and DOT as they relate to the packaging and transportation of radioactive materials. Basic concepts of package activity limits, package and vehicle radiation and contamination limits, hazardous materials communications requirements, transportation safeguards, NRC inspection requirements, and emergency response are presented. Topics covered include the definition and classification of limited quantities of radioactive material, instruments and articles, Type A and Type B packaging, normal and special forms of radioactive materials, low specific activity (LSA) and surface contaminated objects (SCO) for radioactive materials. The course includes several packaging exercise problems that students may work that affords an opportunity to gain more familiarity and understanding of the hazardous material regulations in order to properly classify and package radioactive materials for transportation. Scientific Calculator required.

Exam: Multiple choice - 70% passing
Mobile: No

Internal Dosimetry (H-312S)

This course is designed to provide students with a thorough understanding of current methods for determining radiation doses resulting from intakes of radioactive materials by workers. The course covers the basic concepts and principles of internal dose assessments, and describes the ICRP internal dose assessment methodology and intake models currently in use in the U.S. and internationally. Bioassay methods (both direct and indirect) are reviewed and bioassay interpretation is discussed in detail. The specific application of internal dosimetry program requirements for nuclear power plants, uranium facilities, and medical and research facilities is presented. Regulations and regulatory guidance is discussed, including the design of bioassay programs and methods for demonstrating regulatory compliance. Finally, quality assurance and methods for program evaluation are covered. Throughout the course, students work detailed example problems covering all aspects of internal dose assessment.

Exam: Multiple choice - 70% passing
Mobile: No

Brachytherapy, Gamma Knife, and Other Medical Uses (H-313)

This course is intended to give a clinical perspective of the different medical technologies and treatments that are licensed by the NRC and Agreement States. The course focuses on Manual Brachytherapy, High Dose Rate Afterloaders and Stereotactic Radiosurgery, and is taught by practicing medical physicists and physicians. Topics covered include: Principles of Radiobiology, Radiation Therapy Terminology, Brachytherapy, Gamma Knife and Other Medical Uses Licensed Under 10CFR35.1000, Quality Control Concepts, Patient Dosimetry, Safety Procedures, Devices and Instruments. Site visits and opportunities for hands-on activities are provided. Case studies will be reviewed and licensing and inspection tools will be discussed by regulatory guest speakers.

Exam: Multiple choice - 70% passing
Mobile: No

Safety Aspects of Well Logging (H-314)

This course provides an understanding of the principles of well logging in the gas and oil industry. NRC and Texas State regulations and inspection procedures, well logging equipment and operations, procedures related to retrieval of lost sources and irretrievable sources are also covered. Itinerary includes visiting a full-scale training well site, watching a demonstration of source (dummy) changeout, touring a contractor's manufacturing facility and source recovery facility.

Exam: Multiple choice - 70% passing
Mobile: No

Irradiator Technology (H-315)

This course provides an understanding of the basic operation of research and industrial irradiators including all safety and regulatory requirements; cobalt-60 source loading; safety systems; audits and self inspection items; equipment; control room and irradiator maintenance; radiation safety officer and operator responsibilities; wipe tests and radiation surveys; emergency procedures; commercial applications; dosimetry; regulations; licensing and inspections; and public and media relations. Opportunities are provided for hands-on experience. Attendance is limited to States that have panoramic wet-source-storage irradiators governed by Part 36.

Exam: Multiple choice - 70% passing
Mobile: No

RESRAD OVERVIEW (H-408)

This course is only being presented virtually. As such, additional information (e.g., access to course materials, links to course sessions, etc.) will be sent to enrollees 1-2 weeks before the session begins by the Course Director and/or the instructor(s).

This course provides students with an overview of the RESRAD suite of codes, including the history of the codes, their calculation methodology, input parameter requirements, and regulatory applications (emphasis on RESRAD and RESRAD-OFFSITE). This is a computer-based course and students will be provided opportunities to use the RESRAD codes throughout the course. During the course, the air and groundwater transport models used by the codes will be discussed in detail, as well as the off-site accumulation of radionuclides in soils and surface water bodies. The deterministic and probabilistic dose analysis techniques built into the codes will also be covered in detail, as well as special features of the codes, such as sensitivity analysis. Interactive computer demonstrations will guide the participants through data input and output steps. Instructor support will help the students complete the hands-on problem solving sessions throughout the course. This course combines two shorter courses that used to cover RESRAD (H-410) and RESRAD-Offsite (H-411) separately.

Exam: No formal exam is proctored, but instructors facilitate guided exercises using the software and provide feedback to students.
Mobile: Yes

Advanced RESRAD Training Workshop (H-412)

This course is only being presented virtually. As such, additional information (e.g., access to course materials, links to course sessions, etc.) will be sent to enrollees 1-2 weeks before the session begins by the Course Director and/or the instructor(s).

This course workshop that will provide in-depth training on the RESRAD computer code. The majority of the workshop will focus on realistic D and D scenarios for a variety of facility types and sites, including actual D and D experiences for NRC licensed facilities. Interactive computer demonstrations will guide the participants through data input and output steps. Instructors will help the students complete the hands-on problem solving sessions throughout the workshop.

IMPORTANT It is recommended that attendees first take the RESRAD Overview Course (H-408) or have some previous experience with the RESRAD computer code before taking this advanced course.

This course is typically only being offered once every other year.

Exam: No formal exam is proctored, but instructors facilitate guided exercises using the software and provide feedback to students.
Mobile: Yes

MILDOS-Area Training Workshop (H-413)

This course is only being presented virtually. As such, additional information (e.g., access to course materials, links to virtual sessions, etc.) will be sent to enrollees by the Course Director and/or the course instructor(s) approximately 1-2 weeks before the session begins.

This course includes the parameters, methods, and calculations required to determine source term values for uranium mining, milling, and in situ recovery (ISR) operations (wellfield, satellite, and processing facility operations). The course will enable participants to understand the operating parameters needed to calculate a source term using the MILDOS-AREA computer code. In addition, participants will learn to use the MILDOS-AREA code to determine doses to individuals and demonstrate compliance with 10 CFR 20.1301. Discussions and demonstrations will include using the MILDOSE-AREA code to determine the location of highest predicted airborne radionuclide concentration as specified in Regulatory Guide 4.14 for environmental monitoring sampler placement. Interactive computer demonstrations will guide the participants through data input and output steps using the code, and instructors will assist participants in completing hands-on problem solving sessions throughout the workshop.

This course is only being offered once every other year.

Exam: No formal exam is proctored, but instructors facilitate guided exercises using the software and provide feedback to students.
Mobile: Yes

Visual Sampling Plan (H-500)

This course is designed to train NRC personnel on the use of VSP, a computer software program developed by Pacific Northwest National Laboratory, which is used to develop sample plans for hard-to-detect nuclides at decommissioning and soil remediation projects. The course consists of both a basic section as well as an advanced section. The first two and a half days are basic training while the last day and a half is advanced training. This course is part of the qualification programs for Decommissioning Technical Reviewers and Program Managers.

Exam: No
Mobile: Yes

NRC Materials Control & Security System & Principles (S-201)

This course serves to provide attendees with a basic understanding of physical protection systems and the NRC's security requirements for materials licensees that are authorized to possess risk significant quantities of radioactive materials. This course provides instruction on a performance-based methodology to evaluate and assess the adequacy of a physical protection system to protect against theft, sabotage or diversion of risk significant quantities of radioactive materials. The course provides participants with the security competencies necessary to function in their security discipline. The course is made up of 17 modules conducted over a one-week training period. Training will include, but is not limited to, the following subjects: malicious uses of radioactive materials; introduction to physical protection systems and identification of critical components of a physical protective system for detection; target identification; interior and exterior intrusion detection sensors; security lighting; access control systems; barriers; locking systems; and response forces. Participants will also gain a working knowledge of the regulatory requirements and guidance documents associated with the inspection program for risk significant quantities of radioactive materials. Classroom and laboratory exercises and tours related to the subject areas are provided for students to reinforce their study assignments and classroom materials. Instructional assistance will be provided by subject matter experts from Sandia National Labs and from within the NRC, as appropriate. This course is required for NRC Materials Health Physics Inspectors and is also attended by Agreement State personnel and NRC Master Materials Licensee personnel who conduct inspections on licensees which at any given time possess risk significant quantities of radioactive materials. The course is also attended by NRC and Agreement State license reviewers as well as by individuals involved with the management of materials inspection and licensing programs.

Exam: Multiple choice - 70% passing
Mobile: No