WM2026 Workshops

Workshop 1: Nuclear & Radiation Basics and Applications to the Waste Management Industry

Time: Sunday 1000 – 1500 – break provided

Description:

This workshop is designed to provide an introduction in the areas of nuclear radiation science and engineering. Participants in the workshop are not expected to have an advanced degree in a particular science or engineering discipline but should be familiar with some of the basic principles related to the nucleus and the atom. The main goal is to provide participants with a broad scope of topics that are relevant within the nuclear waste management community.

The workshop is broken up into 4 modules, each lasting 50-60 minutes. The general topic headings are (1) nuclear fundamentals, (2) applications of nuclear science and technology, (3) waste streams in the nuclear and radiological sciences, and (4) advancing fields in nuclear and radiological science. Within these modules, we will spend time discussing a wide range of topics including nuclear material production (uranium for reactor fuel, radioisotopes for medical uses), nuclear waste streams (starting with mining/milling/enrichment and up to reprocessing), regulations that govern use of radiological and nuclear material (ranging from NORM to LLW/ILW/HLW).

Learning Objectives:

1. Learners will be able to describe all basic types of radioactive particles and their sources
2. Learners will be able to differentiate between natural and manmade radioactive material
3. Learners will be able to understand risks related to the extraction, processing, and utilization of nuclear and radiological material
4. Learners will be able to discuss potential pathways for disposal, reprocessing, and minimization of nuclear and radiological waste streams

Audience:

Target audience includes anyone who is interested in learning more about the fundamentals related to nuclear and radiological material

Prerequisites:

There are no prerequisites required relative to the learning topic prior to attendance.

Instructors:

Daniel LaBrier

Workshop 2: RESRAD Family of Dose/Risk Assessment Codes

Time: Sunday 0900 – 1700 - breaks and lunch provided

Description:

Human activities involving the use of radiation and radioactive materials can be linked with radiation exposure of the public and the environment. The assessment of radiological impact to the environment and the public due to radioactive releases is a required task which can be facilitated by use of computer models to estimate radiation doses and risks from residual radioactive materials. The RESRAD family of codes, developed at Argonne National Laboratory, USA, is designed to analyze potential radiation exposures for humans and biota resulting from environmental contamination by residual radioactive materials. The focus in this workshop will be on RESRAD-ONSITE and RESRAD-OFFSITE, which employ pathway analysis to systematically assess radiation exposure, associated risks, and establish cleanup criteria or authorized limits for radionuclide concentrations in the contaminated source medium.

Learning Objectives:

1. Describe and discuss the basics and applications of RESRAD-ONSITE and RESRAD-OFFSITE codes for the evaluation of radiation exposure to humans.
2. Use and implement the codes to example scenarios to ensure the protection of people and the environment at radioactively contaminated sites, as well as ensuring compliance with regulatory requirements.
3. Examine and compare various scenarios to determine contributions of radionuclides and pathways and to determine sensitivity of the results to input parameters

Audience:

CHPs, regulators, licensees, and contractors involved with developing cleanup and D&D plans

Prerequisites:

There are no prerequisites required relative to the learning topic prior to attendance

Instructors:

Charley Yu, David LePoire

Workshop 3: EPA Superfund Radiation Dose Assessment

Time: Sunday 0800 – 1700 - breaks and lunch provided

Description: The US EPA Superfund Radiation Dose Assessment course is an interactive, full-day advanced program that addresses specific technical and regulatory challenges faced by site managers (e.g., Regional Project Managers, On-scene Coordinators) and technical staff (e.g., risk assessors, health physicists) involved in managing sites within the US Environmental Protection Agency's Superfund remedial program. While the focus of Superfund assessments is usually risk, this special edition of this course will focus on the dose assessment calculators which are used by EPA for determining compliance with dose based Applicable or Relevant and Appropriate Requirements (ARARs).

Learning Objectives:

1. Learners will be able to identify methods for conducting site specific dose assessments.
2. Learners will be able to compute a data assessment using the radiation dose calculator.

3. Learners will be able to apply practical recommendations for improving radiation dose assessment.
4. Learners will be able to perform a step-by-step dose assessment on a realistic hypothetical dose characterization problem.
5. Learners will be able to analyze dose characterization results from the hypothetical dose characterization problem.

Audience:

This course is designed for site managers, risk assessors, and individuals seeking a practical understanding of Superfund radiation dose and risk assessments.

Prerequisites:

There are no prerequisites required relative to the learning topic prior to attendance

Instructors:

Stuart Walker, Fred Dolislager

Workshop 4: Aging Management of Dry Cask and Packaging for Extended Storage

Time: Sunday 0800 – 1700 - breaks and lunch provided

Description: Researchers at Argonne National Laboratory have developed guidance documents on aging management for spent fuel during extended dry storage and subsequent transportation for the U.S. Department of Energy (DOE) and the International Atomic Energy Agency (IAEA). [1-5]. Argonne researchers also pioneered studies of spent fuel canister gas leakage detection [6-9], as well as other environmental aging degradation mechanisms of critical components such as hydride reorientation and embrittlement of high-burnup (HBU) fuel cladding alloys, elastomeric O-ring seals and concrete shields and overpacks. Moreover, Argonne researchers have developed methodology to address extension of intervals for periodic leakage rate testing of Type B radioactive and fissile materials transportation packaging [10-13].

In this workshop we will present and discuss key elements of aging management for spent fuel during extended storage and subsequent transportation, including major aging management activities on scoping evaluation of structures, systems and components (SSCs) that are important to safety (ITS), time-limited ageing analyses (TLAAs), ageing management programs (AMPs), including inspection, monitoring, mitigation, repair, and operating experience and lessons learned. We will also illustrate the methodology for extending internals of periodic leakage rate testing for Type B radioactive and fissile material transportation packagings. Emphases in the workshop are on the principles and practices of aging management, drawing examples from applications and industry practices, based on the latest guidance from the regulatory authorities in the U.S. and IAEA.

The workshop will be led by subject matter experts who have developed and taught the DOE Packaging University Program training courses on (1) ASME Boiler and Pressure Vessel Code for nuclear transport and storage, and (2) QA for transport packaging and storage cask since 2015.

Learning Objectives:

1. Recognize the technical basis for aging management of spent nuclear fuel for extended storage and subsequent transportation
2. Describe TLAAs and AMPs and their main attributes
3. Describe scoping evaluation of SSCs that are ITS; and
4. Identify technologies that can be used for inspection, monitoring, repair and mitigation.

Audience:

The target audience includes US and international professionals attending WM26, who are interested in aging management of spent fuel for existing and future advanced reactors. The methodology of extending periodic leakage rate testing intervals for transportation packaging is also of interest to the targeted audience.

Prerequisites:

There are no prerequisites required relative to the learning topic prior to attendance

Instructors:

Dr. Yung Liu, Dr. Zenghu Han, Dr. Christopher Gastl, and Brian Gutherman