

Geologic Disposal of High Level Waste course 2007

Held : 25th – 28th June, Flamingo Hilton Hotel (to be confirmed), Las Vegas, USA

Course outline

This course covers international experience in key aspects of deep geologic disposal of spent fuel and high level radioactive waste that are needed to form the components of a national program, with a special emphasis on the current US HLW program.

The course program (attached) is designed so that the participants can reconfirm and update their present knowledge - from evaluating the wastes to be disposed of, right through all the technical stages of identifying and implementing geological disposal, to the societal interactions required of repository development projects.

The course is considered ideal for professionals working in the implementation, regulation or technical support areas at every stage in their national programs. It will be particularly valuable for those who may just be starting their management-level career on geological disposal projects who need to see geological disposal in its widest context.

The programme consists of 4 to 6 lectures per day in an informal classroom atmosphere with sufficient time allocated for participants to raise questions and answers. Participants will be encouraged to introduce the relevant issues from their own national program and discuss the issues with the tutors and the other participants from around the world.

The course will spend the first day at the Yucca Mountain (planned repository) Site to learn directly about the site investigations to demonstrate the feasibility and safety of geological disposal.

Course organisers

The course is organized by the ITC School of Underground Waste Storage and Disposal with the support of the United States Department of Energy (USDOE, one of the Member organisations of ITC).

Course Programme

Monday June 25th

0730 - 1600

Field Visit to Yucca Mountain

A guided visit to the proposed repository site, including underground experimental work, led by DOE staff

Tuesday June 26th

0830 – 0900

Introduction to the training course

Objectives; how the week will work (structure of course)

Participants introduce themselves.

Neil Chapman

ITC

0900 – 0930

Welcome and overview of current status of US program

Intended principally as orientation for non-US participants

Russ Dyer

Chief Scientist

DOE/OCRWM

0930 – 1030

The nuclear fuel cycle and radioactive waste

The nuclear fuel cycle; the origins of spent fuel and high-level waste; reprocessing and the wastes its produces;

amounts of SF/HLW existing worldwide; how they are conditioned for disposal; advanced fuel cycles and their implications for repository design; other wastes (LL-ILW, DU, Pu, DRSS) requiring geologic disposal; what other countries are doing with their HLW/SF

Charles McCombie

McCombie Consulting

1030 – 1045

Break

1045 – 1145

Chemical, thermal and hazard characteristics of HLW/SF

Radionuclides that they contain; chemical form; radiological and toxic hazard potential with time; waste form characteristics with respect to disposal (half-lives, thermal impacts, radiation impacts); stability of fuel cladding; impacts of pre-disposal storage.

Mick Apted

Monitor Scientific

1145 – 1300

Lunch

1300 – 1430

PANEL DISCUSSION

Current international fuel cycle developments, international fuel cycle security and the implications of advanced fuel cycles and GNEP for waste disposal in the USA and other countries

Tom Isaacs

Charles McCombie

Russ Dyer

1430 – 1445

Break

1445 – 1600

The concept of geologic disposal & geological environments being evaluated worldwide

What geologic disposal means (generic concepts), its technical and non-technical objectives and why it has been selected.

Range of geologic environments being considered worldwide, the hydrogeologic, structural and geochemical properties that make them suitable and which need to be understood; the tectonic and natural evolution issues associated with the formations and the types of environment in which they can occur.

Neil Chapman

ITC

1600 – 1630

Round-up discussion of Day 1

Tutors

1630

Adjourn

Wednesday June 27th

0830 – 0930

Design concepts for repositories and underground stores

Basic safety concept of the multibarrier EBS - NBS system; different ways that this can be implemented for HLW and SF; how a safety concept integrates different geologic environment with different repository designs; why designs and safety concepts vary from country to country (different ways of achieving safety); examples of designs, why they were selected and how they have changed with development; how storage can be fitted into design concepts.

Mick Apted

Monitor Scientific

0930 – 1030

Safety standards and regulations

Basic international ethical and radiological principles underlying regulatory standards (IAEA, ICRP, etc); concepts of dose and risk; other components of regulations - e.g. non-human impacts, requirements for contents of safety assessment, treatment of timescales, uncertainty, etc; how standards and principles are applied in different countries; the manner in which regulators and implementers interact; future developments internationally

Charles McCombie McCombie Consulting

1030 – 1045

Break

1045 – 1145

Showing it is safe: presenting the evidence

The use of safety assessment results and multiple lines of evidence to present a set of reasoned arguments on long-term safety for the regulator and other audiences (geological stability, natural geochemical fluxes and concentrations, natural analogs, natural radiation background, etc)

Neil Chapman

ITC

1145 – 1300

Lunch

1300 – 1345

The Yucca Mountain project: a historical perspective

Discussion of the history of the YMP and the US approach to nuclear waste disposal; drivers for waste policy and the current legal and regulatory situation; technical insights from performance assessment; regulatory and policy issues. Comparisons with the licensing of the WIPP repository.

Lake Barrett

Consultant

1345 – 1445

PANEL DISCUSSION

Lessons learned from licensing WIPP and from Yucca Mt History: the licensing process in the USA and in other national repository programs: the future at Yucca Mountain

Lake Barrett

Charles McCombie

Mick Apted

1445 – 1500

Break

1500 – 1600

Selecting a repository site

International guidelines on site suitability; national experience in selecting sites; political and technical constraints; stepwise narrowing down to an acceptable site; current status of national siting programs worldwide; contentious issues in siting

Neil Chapman

ITC

1600

Adjourn

Thursday June 28th

0830 – 0915

Repository site characterization in different geologic environments

Stages in characterising a site during the selection process; deployment of various field techniques - appropriate strategies for regional and site scale characterisation; advanced geosciences techniques; managing data & QA; data synthesis and interpretation of site properties; evolution into descriptive models; approaches for different geologic environments and different repository concepts.

Neil Chapman

ITC

0915 – 1015

Repository total system performance assessment

Development and application of probabilistic modeling in assessing the performance of a geologic repository over thousands of years. Discussion will focus on scenario development, treatment of uncertainties and model abstraction. Results of other national program safety assessments.(putting YMP analyses in context). Some key issues internationally in developing and presenting TSPAs

Abe Van Luik, OCRWM/ORD

1015 – 1030

Break

1030 – 1200

Interactive Case Study

Risk assessment for radioactively contaminated sites: Los Alamos Case Study

How safety and risk assessment techniques are applied to make decisions on managing operating nuclear sites today: the RACER project at LANL

Helen Grogan

Risk Assessment Corporation

1200 – 1330

Lunch

1330 – 1430

International case studies on societal issues

The Forum on Stakeholder Confidence (FSC) facilitates sharing of experience in addressing the societal dimension of radioactive waste management, explores means of ensuring an effective dialogue with the public with a view to strengthen confidence in decision-making processes among players at national, regional and especially at local levels. A broader, more realistic view of decision making is taking shape.

Paula Alford

NWTRB

1430 – 1445

Break

1445 – 1600

PANEL DISCUSSION

The future of geologic disposal: key areas of future development and change internationally – obstacles and challenges

Charles McCombie

Neil Chapman

1600

Close of Course