Web-Based Training to Support NRC Reviews

The U.S. Nuclear Regulatory Commission (NRC) requires a uniform and consistent review of plans for decommissioning nuclear facilities. To facilitate the reviews a training program was developed that targets specific plan aspects related to dose-based compliance demonstrations or modeling. The training material was adapted to a Web-based program, to provide more consistency in material presented and to more readily accommodate staff and trainer schedules.

PROBLEM/OPPORTUNITY

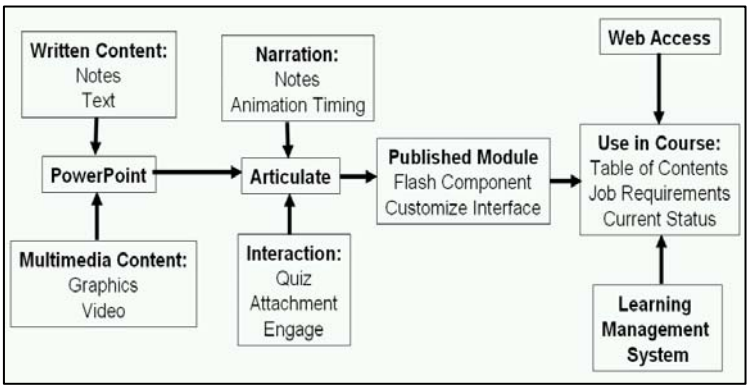
Technical staff that perform regulatory reviews or other similar tasks are frequently required to receive training to maintain required skills to effectively perform these tasks. An example is the need for NRC staff to have adequate background and training to provide technical review of the License Termination Plans (LTPs) or Decommissioning Plans (DPs) submitted to NRC by nuclear facility licensees. The plans include procedures for safely removing the plant or facility from service and ensuring that the remaining (residual) radioactivity has been reduced so that the property can be released. To ensure a uniform and consistent review of these plans, the NRC developed training for its staff.

The difficulties of scheduling classroom training that is compatible with trainer and trainee availability and the need to offer periodic refresher courses create the demand for alternative approaches to the traditional lecture room setting. However, to the extent possible, alternate approaches should also allow for interaction by the trainee to focus on critical or hard-to-understand portions of the training. A live classroom course was first developed, which targeted reviewing of specific aspects of the LTP and DP related to dose-based compliance demonstrations or modeling.

APPROACH

The Environmental Science Division (EVS) developed a Web-based training (WBT) course to replace the classroom-based course for NRC LPT and DP technical reviews. To enhance the WBT experience, audio, animations, linked documents, quizzes, and scripts were integrated with a commercial web-based training package that supports simple navigation.

EVS worked with the NRC to integrate the course into both existing and state-of-the-art learning management systems. A testing group is being utilized to identify and help resolve training issues prior to deployment of the course. When completed, the course can be accessed for credited training with required modules dependent on the job category of the training participant. The modules will also be accessible to NRC staff for review or refresher following initial course completion.



Development work flow using commercial off-the-shelf products

The development process (see figure) includes construction of the content such as graphics, text, and notes into a PowerPoint® file. Additional multimedia and interactive components can be added through Articulate®, which is an add-in to PowerPoint. Articulate also supports additional quiz and interactive components. After the review and editing of the content, the notes are recorded for narration along with timings for animated slides. Articulate can then take the slide presentation with the multimedia objects and create an integrated Flash object for Web, local network, or CD distribution.

RESULTS

The NRC training course consists of core and advanced modules tailored to specific NRC job functions. Topics for individual modules include identifying the characteristics of simple and complex sites, identifying when outside expertise or consultation is needed, demonstrating how to conduct acceptance and technical reviews of dose modeling, and providing details regarding the level of justification needed for realistic scenarios for

both dose modeling and derivation of derived concentration guideline limits (DCGLs). (DCGLs are media- and nuclide-specific concentration limits that will meet dose-based, license termination rule criteria found in 10 CFR Part 20, Subpart E).

Various methods of applying probabilistic uncertainty analysis to demonstrate compliance with dose-based requirements are presented. These approaches include 1) modeling the pathways of radiological exposure and estimating doses to receptors from a combination of contaminated media and radionuclides, and 2) using probabilistic analysis to determine an appropriate set of input parameters to develop DCGLs. Calculation of operational (field) DCGLs from media- and nuclide-specific DCGLs and use of operational DCGLs in conducting final status surveys are addressed in the WBT.

Realistic case examples are presented and analyzed including the abstraction of a realistic site into a conceptual model and computer model. A case history is also used to demonstrate development of NRC review documents such as requests for additional information. WBT promotes consistency in reviews and has the advantage of being able to be used as a resource to staff at any time. The WBT will provide reviewers with knowledge needed to perform risk-informed analyses (e.g., information related to development of realistic scenarios and use of probabilistic analysis). WBT on review of LTP or DP dose modeling will promote staff development, efficiency, and effectiveness in performing risk-informed, performance-based reviews of decommissioning activities at NRC-licensed facilities.

FUTURE

WBT promotes consistency in reviews and has the advantage of being able to be used as a resource to staff at any time. The WBT will provide reviewers with knowledge needed to perform risk-informed analyses (e.g., information related to development of realistic scenarios and use of probabilistic analysis). EVS expects that WBT in other applications will promote staff development, efficiency, and effectiveness in performing risk-informed, performance-based review and analysis.

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