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EM NEWS FLASH

Independent Peer Review Releases Findings on Frenchman Flat Groundwater Model

Scientific experts released a favorable evaluation of the computer modeling approach for Frenchman Flat groundwater, calling the U.S. Department of Energy, National Nuclear Security Administration Nevada Site Office (NSO) model projections "conservative" and "carefully tested." These findings, announced on August 19, 2010, to NSO staff, State of Nevada Division of Environmental Protection representatives, and Community Advisory Board volunteers, were in response to NSO's request for an independent review of its model results for addressing groundwater contaminated by historic nuclear testing.

In April 2010, NSO asked the panel of scientific experts to explore three specific questions relating to the computer modeling approach and results scientists are using to better understand the movement of radioactive contaminants in groundwater in and around the Frenchman Flat basin, located in the southeastern part of the Nevada National Security Site (formerly known as the Nevada Test Site). Specifically, the panel was asked to explore whether computer modeling is a useful tool for regulatory decisions, if modeling efforts adequately account for uncertainty, and whether the data is sufficient enough to move forward to the model evaluation and monitoring stage in NSO's Underground Test Area strategy? The panel responded positively to all three questions in the peer review report (available to the public in September 2010), concluding that "the potential processes that could affect the migration of radionuclides in groundwater have been thoroughly evaluated."

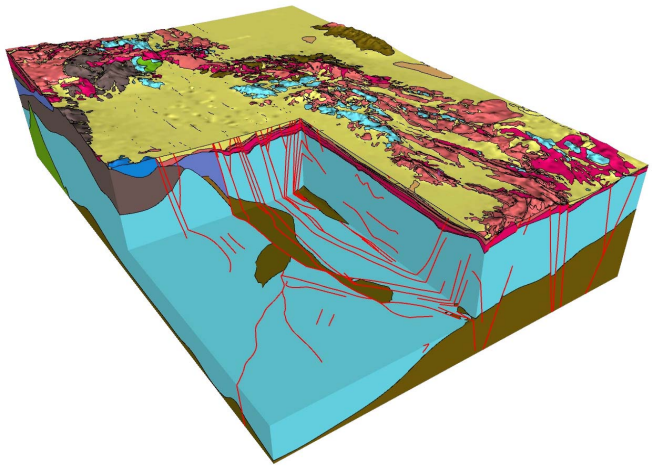
Peer review chairman, Dr. Charles Andrews, briefs the audience on peer review findings. Panelists were nominated based on their experience with model evaluation and then narrowed down to a group representing relevant disciplines. The resulting panel consists of four hydrologists, one geochemist, and one geologist.

The panel was reviewing the modeling results in light of enhancements that had been made since a 1999 Frenchman Flat peer review panel called for the NSO to take a closer look at model uncertainty. NSO responded by increasing the amount of data that goes into the model as well as performing more variations on the model to better understand uncertainty. "We've reworked our model to be conservative

so that it takes into account the highest level of uncertainty," said Federal Sub-Project Director, Bill Wilborn. "But a model is just a tool," explained Wilborn, "and the peer review assessed how well this tool can perform in narrowing uncertainty. "Our ultimate goal," he added, "is to get a clearer picture of contaminant migration so NSO can better protect the public from contaminated groundwater."

While the peer reviewers agreed that the Frenchman Flat model is a useful tool, the panelists recognized there are certain weaknesses inherent in any data-reliant study using computer methods to forecast the future. And while models do help NSO scientists understand the complex geologic and hydrostratigraphic subsurface at the Nevada National Security Site, the assertion that they can accurately measure water flow direction continues to spur debate. But despite these points, the panelists were unified in their praise of the model's elegance and thoroughness. According to panelist, James Rumbaugh (hydrogeologist), the Frenchman Flat model is "a lot more sophisticated than any other model the panel has seen."

Now that the peer review panelists have expressed confidence in the modeling approach, their "overwhelming and unanimous conclusion is that it's time to move on," remarked panelist, Dr. Douglas Walker (hydrologist). Taking these words to heart, NSO will soon begin a *modeling evaluation* stage for Frenchman Flat, during which time groundwater experts will drill and sample new holes to test them against the model results. "The ultimate objective is closure through long-term monitoring to ensure the protection of the public," stated Wilborn.



Computer models are three-dimensional, mathematical representations that give scientists detailed glimpses into areas that are otherwise inaccessible. Computer models are especially useful at the Nevada National Security Site, as its vast scale and complex geology make it incredibly difficult to map the area's intricate subsurface. Information gathered from drilling, sampling, research, and geophysical analysis all become data points in computer models that help scientists evaluate where and how quickly radioactive contaminants move in groundwater.

In this model example, each unit (rock layers grouped by hydraulic properties) is represented by a different color. The red lines represent faults.