

**Used Fuel Disposition Campaign
*Storage and Transportation
Research and Development
Sandia National Laboratories
Year-End Summary 2012***

Fuel Cycle Research & Development

***Prepared for
U.S. Department of Energy
Used Fuel Disposition
Campaign
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FCT Quality Assurance Program Document

Appendix E FCT Document Cover Sheet

Name/Title of Deliverable/Milestone
Work Package Title and Number
Work Package WBS Number
Responsible Work Package Manager

Storage and Transportation Research and Development
Sandia National Laboratories Year-End Summary 2012
M4FT-12SN0803055
ST R&D Investigations – SNL, FT-12SN080305
1.02.08.03
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(Name/Signature)

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Quality Rigor Level for Deliverable/Milestone

☐ QRL-3 ☐ QRL-2 ☐ QRL-1 ☒ N/A*
☐ Nuclear Data

This deliverable was prepared in accordance with

Sandia National Laboratories
(Participant/National Laboratory Name)

QA program which meets the requirements of

☐ DOE Order 414.1 ☐ NQA-1-2000 ☐ Other

This Deliverable was subjected to:

☐ Technical Review

Technical Review (TR)

Review Documentation Provided

☐ Signed TR Report or,
☐ Signed TR Concurrence Sheet or,
☐ Signature of TR Reviewer(s) below

Name and Signature of Reviewers

☐ Peer Review

Peer Review (PR)

Review Documentation Provided

☐ Signed PR Report or,
☐ Signed PR Concurrence Sheet or,
☐ Signature of PR Reviewer(s) below

***NOTE** In some cases there may be a milestone where an item is being fabricated, maintenance is being performed on a facility, or a document is being issued through a formal document control process where it specifically calls out a formal review of the document. In these cases, documentation (e.g., inspection report, maintenance request, work planning package documentation or the documented review of the issued document through the document control process) of the completion of the activity along with the Document Cover Sheet is sufficient to demonstrate achieving the milestone. QRL for such milestones may also be marked N/A in the work package provided the work package clearly specifies the requirement to use the Document Cover Sheet and provide supporting documentation.

USED FUEL DISPOSITION CAMPAIGN STORAGE AND TRANSPORTATION RESEARCH AND DEVELOPMENT SANDIA NATIONAL LABORATORIES YEAR-END SUMMARY 2012

1. INTRODUCTION

This report fulfills the level four milestone M4FT-12SN0803055 “ST R&D SNL Year-End Summary 2012”.

In fiscal year 2012, Sandia National Laboratories (SNL) provided overall management of the Storage and Transportation Research and Development work, key support for three major Used Fuel Disposition Campaign (UFDC) deliverables, participation in the U.S. Electric Power Research Institute (EPRI) Extended Storage Collaboration Program (ESCP), and leadership on the ESCP International Subcommittee and its report “International Perspectives on Technical Data Gaps Associated with Extended Storage and Transportation of Used Nuclear Fuel”.

1.1 Support for Deliverables

Milestone M11UF041401, “Storage R&D Opportunities Report” under Work Package Number FTPN11UF0414. SNL provided three out of six authors for this level one PNL milestone completed 1/31/2012. This report was titled “Gap Analysis to Support Extended Storage of Used Nuclear Fuel Rev. 0”, herein called the gap report. This report was the final version of the draft report of the same name completed in June of 2011, and included responses to industry comments. This report reviewed the literature and identified 52 gaps in the technical basis for safe extended storage of used nuclear fuel. Based on seven criteria, the research to fill each gap was given a high, medium or low priority.

Milestone M2FT-12PN0808041, “High and Medium Technical Gap Priorities Report” under Work Package Number FT-12PN080304. SNL provided one out of three authors for this level two PNL milestone completed 4/30/2012. This report was titled “Used Nuclear Fuel Storage and Transportation Data Gap Prioritization”, called the gap prioritization report herein. For this report, additional prioritization criteria were developed, and the research to fill the high and medium priority gaps identified in the gap report were further prioritized. In this report the scope was broadened to include transportation in addition to extended dry storage of used nuclear fuel. In addition, high-level plans to close the gaps using separate effects tests, small-scale tests, modeling and simulation, in-service inspections, and the engineering-scale demonstration were presented. This report was issued as draft, so that industry comments could be obtained and addressed before it is finalized.

Milestone M2FT12PN0803042, “Review of Technical Data Gaps Relative to Similar External Studies,” under Work Package Number FT-12PN080304. SNL took the lead in producing this level two PNL milestone, completed 7/31/2012. This report was titled “Review of Used Nuclear Fuel Storage and Transportation Technical Gap Analyses”. This report compares the UFDC’s priorities assigned to research to close the gaps as documented in the gap and gap prioritization reports with the priorities assigned in gap reports from the U.S. Nuclear Waste Technical Review Board (NWTRB), the U.S. Nuclear Regulatory Commission (NRC), the EPRI, the ESCP international subcommittee, and the

International Atomic Energy Agency (IAEA). The priorities of research to close the gaps identified in these reports were compiled into a table of 94 gaps, and 11 organizations and countries. Of these gaps, 61 were rated a high or medium priority by at least one organization or country and were analyzed further, with descriptions of the gaps, discussions on the consistency in prioritization, and recommended actions. For most gaps, it is recommended that there be no change in the prioritization. However, for four gaps where the evaluation by the UFDC is significantly different from that in other gap analyses, it is recommended that the issues of contention be addressed under existing UFDC gaps or that the priority of the gap be reevaluated after more data is collected.

1.2 Extended Storage Collaboration Program

The ESCP was established by EPRI in 2009 to share information and data related to extended storage and subsequent transportation of used nuclear fuel among the industry, the U.S. Department of Energy (DOE), the national laboratories, and the NRC. In 2010 the program was extended internationally. SNL has been a key participant in the ESCP since its inception, and has continued its support through fiscal year 2012. SNL participated in the non-destructive examination and marine corrosion subcommittees and co-chaired the international subcommittee. In fiscal year 2012, the international subcommittee completed its report: "International Perspectives on Technical Data Gaps Associated with Extended Storage and Transportation of Used Nuclear Fuel". SNL provided the lead author for this report which includes identification of the technical data gaps and their priorities by the ESCP international subcommittee members from Germany, Hungary, Japan, South Korea, Spain, the United Kingdom, and the United States. In addition, this report included the regulatory status, operation status and fuel inventory from each of these countries. While not the official positions of the respective countries, this report provides informed viewpoints of the data needs and research priorities of the subcommittee member's countries, and collects this information into a single report.