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August 13, 2018

DMS #

SNL Document # SAND2018-NNNN R  
Work Breakdown Structure: 1.08.01.03.07 – DR International Disposal Coordination - SNL  
Work Package # SF-18SN01030702  
Quality Rigor Level QRL4  
Milestone # M4SF-18SN010307022  
Milestone Title *Report on the Status of the SFWST Campaign International Activities in Disposal Research at SNL*

The following summaries are provided as fulfillment of milestone M4SF-18SN010305022 and represent international coordination activities in disposal research funded by the US DOE Spent Fuel and Waste Storage and Technologies (SFWST) Campaign during Fiscal Year 2018.

### **SFWST funded bi-lateral interactions with Taiwan**

TECRO-AIT Joint Standing Committee Meeting on Civil Nuclear Cooperation, Garden Villa Hotel, Kaohsiung, Taiwan, December 12-13, 2017.

SNL researcher attended these meetings on behalf of DOE, SFWST. The SNL researcher participated in information exchanges within working group 2, “*Waste Management and Environmental Restoration*”, all having to do with the back end of the commercial nuclear fuel cycle. Specific areas of information exchange included:

- Public participation in siting of nuclear facilities,
- Geological repository sciences,
- Technology transfer for radioactive waste disposal,
- Nuclear fuel extended storage and transportation projects and
- The SFWST campaign progress in general.

SNL researcher provided DOE SFWST Milestone reports on the following topics:



2017 report entitled “*FY17 Public Views on Nuclear Facility Siting and Radioactive Waste Management in the United States SAND2018-4180*” addresses the request to supply an example of public participation.

2017 report entitled “*FY17 Status Report Research on Stress Corrosion Cracking of SNF Interim Storage Canisters SAND2017-10338R*” addresses the request to provide reports on stress corrosion cracking (SCC) research.

In addition to the reports identified above, there were six additional reports on topics of potential interest to colleagues from Taiwan. These reports were:

1. *FY17 Evaluation of Spent Fuel Disposition in Crystalline Rocks SAND2017\_10749 R*
2. *FY17 Evaluation of Used Fuel Disposition in Clay-Bearing Rocks\_SAND2017-10533R*
3. *FY17 International Collaboration Activities in Different Geologic Disposal Environments\_LBNL-2001063*
4. *FY17 Inventory and Waste Characterization Status Report SAND2017-10260*
5. *FY17 Proceedings of the 7th US German Workshop on Salt Repository Research, Design, and Operation SAND2017-1057R*
6. *FY17 Rail-Cask Tests Normal-Conditions of-Transport Tests of Surrogate PWR Fuel Assemblies SAND2017-0468R*

Additionally, Sandia National Laboratories conducted PFLOTRAN training at Taipower during the week of April 16, 2018 for about 26 attendees. The main objectives of the course were to:

- Understand the underlying theory behind PFLOTRAN
- Install PFLOTRAN
- Understand the basics of setting up PFLOTRAN input files
- Execute PFLOTRAN simulations
- Visualize results PFLOTRAN with:
  - Python: matplotlib
  - ParaView
- Understand PFLOTRAN terminology well enough to submit well-informed questions to the PFLOTRAN-users mailing list

The PFLOTRAN instructors said of the course offered that it was successful. The US DOE Office of Nuclear Energy funded the activity on behalf of Taipower and in support of the AIT-TECRO JSCCNC bilateral relationship through the Spent Fuel and Waste and Science Technologies campaign.

The next annual meeting of AIT-TECRO JSCCNC is scheduled for October 2018 and will be held at Savannah River National Laboratory.

#### **OECD-NEA Repository Metadata (RepMet) project**

OECD Nuclear Energy Agency (NEA) launched the Radioactive Waste Repository Metadata Management initiative (RepMet) in 2014 under the auspices of the Integration Group for the Safety Case (IGSC) technical body. RepMet’s goal is to recommend sets of metadata that can be used by national radioactive waste repository programs to manage their data, information, and records thereof, in a way that is both harmonized internationally and suitable for long-term management

and utilisation, e.g., in safety cases. Furthermore, the initiative that involves over ten different countries' programs is working on the formulation of a consistent set of guiding principles for capturing and generating metadata, recommending a shortlist of selected relevant standards and guidelines on international good practices.

National radioactive waste repository programs require a large amount of data across multiple disciplines (e.g. geoscience, radioactive waste management, engineering) that increase as these programs proceed in number, type and quality for multiple reasons and goals (e.g.: site characterization, licensing, safety case elaboration, etc.). Considering these boundary constraints, the core idea of long-term data management is that "data are being collected and managed for others to use". Next generations of data-users have to be able to understand and access the information that the preserved data represent. Individual scientists and research teams, as well as managers and communications specialists, need to be aware of this and document their work accordingly.

RepMet is facilitating their task by bringing about a better understanding of a key aspect of the modern data management within the field of radioactive waste disposal, namely the identification and management of metadata. The initiative has analyzed the metadata implementation both from the high-level point of view (i.e. methodologies, approaches, organisation policies) and from a more technical one (i.e. recommendation and application of selected metadata standards, data modelling techniques and implementation of controlled dictionaries).

RepMet is developing libraries across three disciplines relevant to radioactive waste management. The libraries are shown in the table below, together with the corresponding disciplines and topics.

Disciplines	RepMet Libraries	Topics
<b>Geoscience</b>	<i>Site Characterisation Library</i>	Geological and geophysical characterization of the repository site.
<b>Radioactive Waste Management</b>	<i>Waste Package Library</i>	Packaged waste and spent nuclear fuel ready for final disposal at the repository.
<b>Engineering</b>	<i>Repository Library</i>	Repository requirements and structure at closure.

The SNL researcher has been participating in RepMet since its inception when he was elected Vice Chair of the project (the chair is from the Nuclear Decontamination Authority in the UK). The most recent RepMet working group meeting was held October 2017 in Paris at the NEA Headquarters. During the working group meetings, the final deliverables from RepMet are reviewed and edited by the team. The last working group of RepMet is scheduled to occur in September 2018 when the program committee (PC) will prepare agenda items for a planned *International OECD NEA Workshop on Information, Data and Knowledge Management*, January 2019 in Paris.