Used Fuel Disposition Campaign

Interim Storage Mock-Up Discussion

David Enos and Charles Bryan
Sandia National Laboratories

UFD Working Group Meeting
June 5th, 2014
SAND2014-15020 PE
Considerable work has been done on 304SS to demonstrate that it is susceptible to chloride induced stress corrosion cracking

Work of particular relevance to interim storage relies on bend bars to provide the stress state
  – Is this representative?
  – What can these tell us and what are their limitations?

Recall – SCC requires three things
  – Environment (EPRI work, etc.)
  – Susceptible material – Mockup (sensitization)
  – Stress – Mockup (weld residual stress)
Goals for a Mock Container

- Want to replicate fielded structures in order to assess the susceptibility stress corrosion cracking initiation and propagation
- Welding parameters, joint designs, etc. are all held proprietary by the vendors
- NEUP program (R. Ballinger) approached three vendors last year and received quotes from each of them.
- We attempted to do the same with varying degrees of success
  - NAC – still waiting…
  - Holtec – no response.
  - Areva-TN - Ranor
Used Fuel Disposition

General Info on the Mock-up

- **Wall material:** 304 SS
- **Wall thickness, overall diameter, weld joint geometry:** standard geometry for NUHOMS 24P
- **Welds:**
  - Specific design not specified by manufacturer.
  - Welds to be full penetration and inspected per ASME B&PVC Section III, Division 1, Subsection NB (full radiographic inspection)
  - Double-V joint design
  - Weld procedure: Submerged Arc
Mock-Up Design

Circumferential weld

Two longitudinal welds, 180 degrees apart

Used Fuel Disposition

67.25 in.
48 in.
48 in.
Mock-Up Design

Two Circumferential welds

Three longitudinal welds, 180 degrees apart

67.25 in.

48 in.  48 in.  48 in.
What do we want to do with the mockup?

- **Comments on the design – anything we should add/remove?**
  - Baseplate?
  - Simulated repairs?
  - Stress mitigation?
  - Others?

- **What do we want to measure?**
  - Weld residual stress state
  - Extent of sensitization

- **What samples do we want to make?**
  - Subdividing the mock-up will impact the stress state – need to determine how much
  - Sample geometry that we need?