DOE’s Atlas Railcar Design Project

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The Need for New Railcars

• The Blue Ribbon Commission recommended development of a large-scale transportation system for commercial SNF and HLW (January 2012).

The Need for New Railcars

• Development of railcars is “destination-independent”

• Necessary regardless of where the material is eventually transported.
AAR Standard S-2043

- S-2043 reduces the likelihood of derailment and thereby reduces risk.
- DOE has made agreements with the Union Pacific and BNSF railroad companies, which state, “All cars supplied by the Government Shipper ... will comply with AAR Construction Standards...”

- S-2043 is the most comprehensive railcar standard published by AAR.
  - Thorough analysis during the design phase
  - Extensive testing phase
  - Analytical results from design phase must match testing results
- S-2043 requires use of state-of-the-art components.
  - Electronically Controlled Pneumatic Brakes
  - System Safety Monitoring
    - Location, speed, truck hunting, rocking, wheel flats, bearing condition, ride quality, braking performance, and vertical, lateral and longitudinal acceleration
- S-2043 requires maintenance and inspections during operations.
# Atlas Railcar Design Project Schedule

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**Notes:**
- Phases 1 and 2 Overlap
- Contract Signed August 2015
Conceptual Design: Atlas Railcar

- The Atlas railcar conceptual design has 12 axles.
- The railcar has the same axles and trucks as the Navy’s M-290 design.
- The Phase 1 Final Report and all drawings are available at: 
  https://curie.ornl.gov. Click on the “Search” tab and then enter “atlas railcar” in the search box.

Conceptual Design: Buffer Car

- The buffer car must also comply with AAR Standard S-2043.
Conceptual Design: Cradle Attachment Points

![Isometric View of Cradle](image)

Conceptual Design: Cradle Family 1-A

**Family 1-A**
Two axial end stops with two saddles (removable saddles on a single frame)
Casks included in Family 1-A: TN-32B, TN-40, TN-40HT, HI-STAR 180, HI-STAR 190
Conceptual Design: Cradle Family 1-B

**Family 1-B**
Two axial end stops with a full length saddle
Casks included in Family 1-B:
HI-STAR 60, HI-STAR 100, HI-STAR 100HB

Conceptual Design: Cradle Family 2

**Family 2**
Captured rear trunnion with top forging shear key or simple front saddle
Casks included in Family 2: NAC-STC, NAC-UMS, MAGNATRAN, TN-68
Conceptual Design: Cradle Family 3

Family 3
Two saddles with a shear key in the bottom center of the neutron shield (similar saddles on a single frame)
Casks included in Family 3: MP198, MP197HB, TS125

Conceptual Design: Cradle Family 4

Family 4
Unique design including many SAR features
Cask included in Family 4: MP187
Path Forward

• More procurements will be necessary to finish the Atlas Railcar Design Project
  • Follow-on contract to perform the testing and obtain AAR approval
  • DOE is planning to use the Navy’s design for the escort railcar
• Longer term, DOE will have several options to manage a large-scale transportation system:
  • Buy railcars and store/maintain at DOE site
  • Buy railcars and contract for storage/maintenance
  • Lease railcars
  • Contract with company(ies) for shipment campaign(s)

Summary

• Atlas railcars compliant with AAR Standard S-2043 are needed, and they are destination-independent.
• DOE is making steady progress on development of cask and buffer railcars.
  • Finished Conceptual Design Phase.
  • More than half-way through the Preliminary Design Phase.
  • Scheduled to start prototype fabrication this summer.
• Future work includes:
  • Extensive testing
  • Obtain an escort car from the U.S. Navy
  • AAR approval for the cask and buffer railcar designs.