



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Task 2 Desired Stakeholder Outcomes

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IRP Status Meeting

May 23-24, 2016



Task 2.1 (Sodium Loop Benchmarking)

Initial Stakeholder Outcomes

■ Historic Sodium Loops

- Identify a few tests and configurations of interest
- Recover geometric information and build models
 - *INL's support needed to dig out old documents, etc.*
- Compare to test data
 - *Pre-test loop checkout*
 - *Transient test*
- Use tools/methods useful for state-of-art modeling of sodium loops
 - *Leverage for modern MK-IV design effort*

Observations from current meeting

- **Efforts to build CFD models of HOP 1-6A test in a historic Mk-II loop well underway**
- **Problem description report complete**
- **Recent “meshing meeting” appears to have been a success**
- **Mentor-student collaborations seem fruitful**
- **Previous “behind schedule” state (due to data availability issues) has now been mostly recovered**



Task 2.2 (Water Loop Benchmarking)

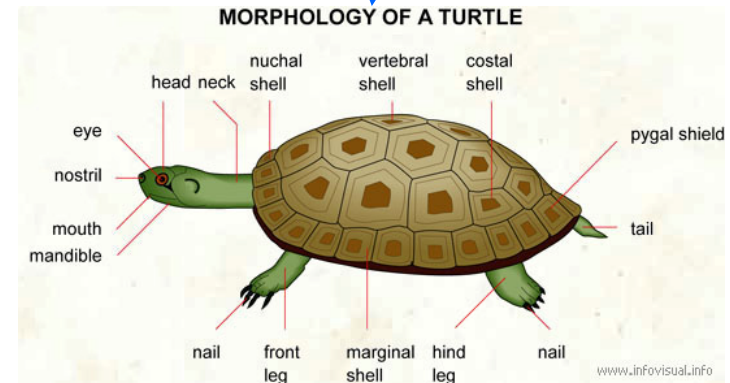
Initial Stakeholder Outcomes

■ Future Water Loops

- No historic examples, must construct an “affordable” prototype of the in-pile loop TWERL (TREAT Water Environment Recirculating Loop)
 - *INL will eventually build a true-to-design TWERL prototype with superalloy piping, custom pump, etc. to verify design and operation*
- Prototype should be “true to the essence” of the TWERL
 - *Compact, upright, small internal volume, no pressurizer, pump/system curves*
 - *Something akin to the secondary enclosure is desirable*
 - *Modularity (ability to install other types of test train)*

Observations from current meeting

- **Slight schedule delay on long lead procurements, but appears recoverable**
- **Most of the TRTL parts are now at OSU, shakedown tests forthcoming**



- **Would like to recommend that the sheet metal enclosure around the loop be officially renamed the “TRTL shell” and painted accordingly**



Task 2 (Water Loop Benchmarking)

Stakeholder outcomes from Kick-off Meeting

- Heated rod simulant should be pursued if feasible
 - *Heating rates need not simulate that possible in TREAT*
 - *Single rod test train recommended*
 - *Only the most basic test train features and instruments need to be included*
 - *Other test train concepts can be installed later if scope remains*
- Run the loop through its paces, gather data, benchmark against models
 - *INL has primarily used RELAP5-3D to model TWERL thus far, other tools could be used and compared*

Observations from current meeting

- **Very excited to see how well the new-design electrically heated simulant rod works**
 - If successful, might become a mainstay invention to be used in out-of-pile prototypes of TREAT experiments
- **Benchmark models and modelers standing by waiting for data**
- **INL will provide further info on a few pulses for simulation in the TRTL for input to matrix testing plan**