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Task 2 Desired Stakeholder Outcomes

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IRP Status Meeting

May 24-25, 2016

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Task 2 (Sodium Loop Benchmarking)

Stakeholder outcomes from Kick-off Meeting

Observations from current meeting

- **Historic Sodium Loops**
  - Identify a few tests and configurations of interest → A series of HEDL (FFTF) based TREAT tests surveyed and prioritized
  - Recover geometric information and build models → HOP 1-6A identified, data reports with test train drawings delivered
    - *INL's support needed to dig out old documents, etc.* → *INL standing by to help dig out more data as gaps emerge*
  - Compare to test data
    - *Pre-test loop checkout*
    - *Transient test*
  - Use tools/methods useful for state-of-art modelling of sodium loops
    - *Leverage for modern MK-IV design effort*

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Task 2 (Water Loop Benchmarking)

Stakeholder outcomes from Kick-off Meeting

Observations from current meeting

- **Future Water Loops**
  - No historic examples, must construct an "affordable" prototype of the TWERL
    - *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)*

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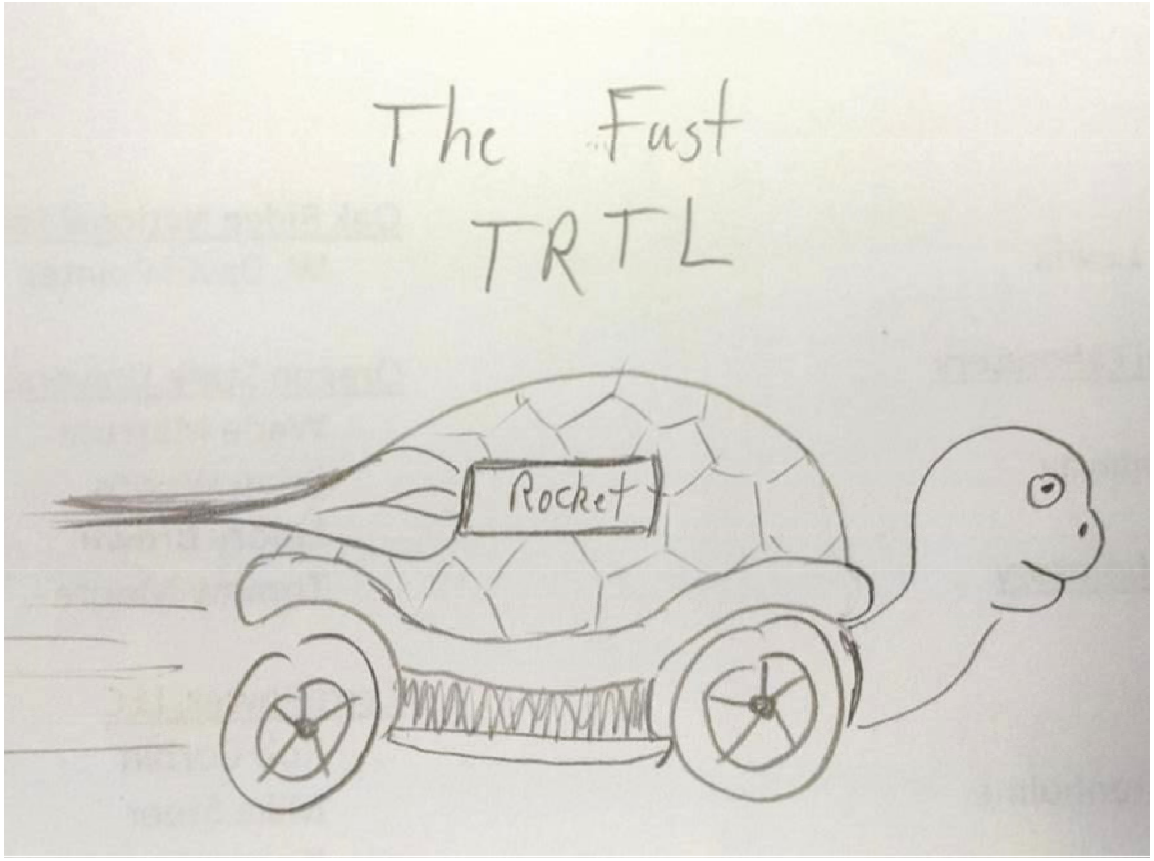
- TRTL design is proceeding nicely and appears very mature, surprisingly few compromises were made
  - *TRTL even uses Inconel in the test section pipe*
  - *Pump availability crisis was averted*
- TRTL design is remarkably similar to the TWERL
  - *Overall, very pleased with the state of the design, in fact, it moved me to produce some art (next slide)*

The TRTL



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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*

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Observations from current meeting

- Aggressively pursuing this prospect
  - *Heating rates have been targeted at very fast ramps up to CHF, homemade novel heaters needed, one off-the-shelf heater as a backup paln*
  - *TRTL is modular and capable of more, but the tests run for this IRP will be one short rodlet*
  - *TRTL has several instruments common to TWERL*

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Task 2 (Water Loop Benchmarking)

Stakeholder outcomes from Kick-off Meeting

- **IRP team should have two plans**
  - *One assuming that INL does not receive near-term project funding for TWERL detailed design*
  - *Another [hopefully more likely] scenario where INL is well funded to continue design and can stay in-sync with OSU during the IRP and TWERL design processes*

Observations from current meeting

- *Unfortunately, this is plan we are on, TWERL detailed design in FY17 looks hopeful, but its not a sure bet*
- *We will keep a list of little lessons learned during TRTL design and construction so that they can be incorporated into TWERL later*

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Task 2 Conclusions

Only a few concerns

- **Task 2 water loop is a challenging project to design, fabricate, install, shakedown, operate, model, and document in these few short years**
  - Additionally, some considerable goals have been targeted which, if realized, will be quite impressive indeed (for example: ATF-cladding transient CHF measurements)
  - Some backup plans exist (risk mitigations), but it is recommended to continually track emergent opportunities and differentiate them as either wants or needs
  - Make the tough prioritization decisions early in the project (write them down)
- **One of this IRP's greatest strengths is how far-stretching and broadly collaborative it is**
  - Despite this strength, we must continue to ensure that the core team is in tight communication
  - Equally challenging, we must resist the urge to get too distracted with programmatic opportunities (again need to differentiate wants from needs)

But overall, very impressed

- **Looks very promising that the outcomes of this IRP will be very relevant**
- **Remarkable progress has been made in just six months**

One Last Random Thing

Argonne National Laboratory

IDAHO FACILITIES
IDAHO FALLS, IDAHO

per LJH
5/17/76

P. O. BOX 2528
IDAHO FALLS JA 2-4400, EXT. 2281

(LONG DISTANCE CALLS)
[illegible] 8, EXT. 2281

June 8, 1959

To: J. F. Boland — Idaho Division

From: G. A. Freund — RED

Subject: TREAT Fuel Assemblies

Attached to this memo is a list of the various types of TREAT fuel assemblies, the numbers made of each type and their planned disposition as of this date. In addition about 100 graphite-urania blocks are being stored by Special Materials at Lemont.