School of Nuclear Science and Engineering

COLLEGE OF ENGINEERING

Task 2.1 Progress Overview

Brian Woods

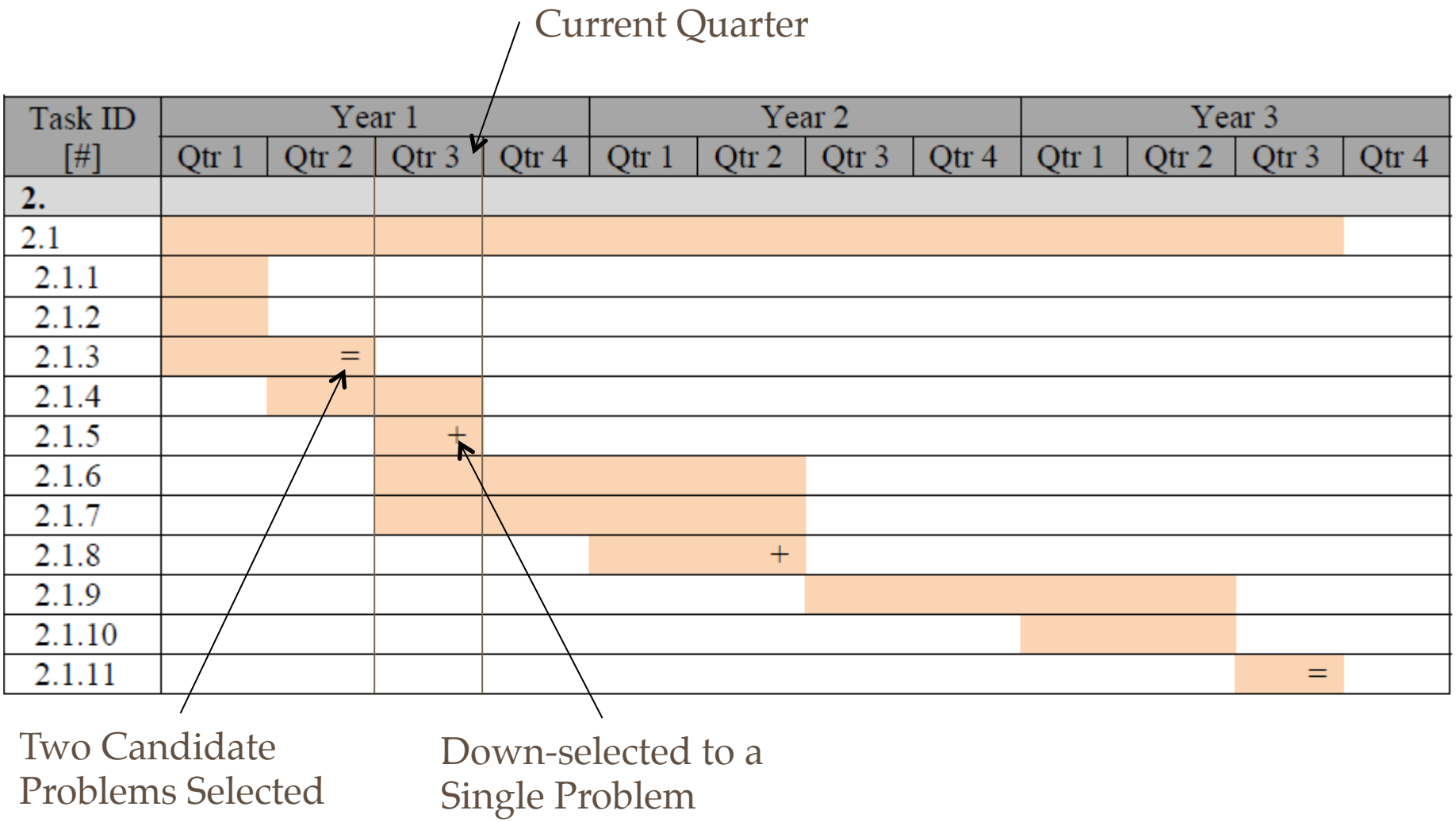
Task 2.1 Overview

- **Loop Thermal-Hydraulics**
  - A complete thermal hydraulic study will be conducted that focuses on the experimental loops placed within the TREAT Facility. These include a comprehensive evaluation of historical data collected from previous sodium experiments as well as expansion of existing data through design, development, and utilization of a new experimental loop that is representative of a proposed TREAT water flow loop.
  - **Sodium Loop**
    - Data from historically collected sodium loop calibration experiments will be used in a benchmark study against Nek5000 (DoE NEAMS code) and Star CCM+ (Industry code).

Task 2.1 Description

Task #	Description	Owner
2.1	Sodium Loop	
2.1.1	Survey literature of existing sodium test data	B. Woods
2.1.2	Select two candidate problems	B. Woods
2.1.3	Organize and document data for two candidate problems	B. Woods
2.1.4	Identify and review industry needs for sodium loop data	B. Woods
2.1.5	Down-select to one problem for benchmark evaluation	B. Woods
2.1.6	Preliminary modeling with industry tool Star CCM+	K. Weaver
2.1.7	Preliminary modeling with NEAMS code Nek5000	D. Pointer
2.1.8	Comparison of experimental data & model results for problem	B. Woods
2.1.9	Benchmark level evaluation of problem	B. Woods
2.1.10	Evaluation of uncertainties in selected problem	B. Woods
2.1.11	Submission of benchmark for peer review	B. Woods

Task 2.1 Schedule



Oregon State University

Task 2.1 Progress

- Survey literature of existing sodium test data
  - Access issues related to Applied Technology.
  - Completed search of open literature and OSTI.
  - AX-1 Test (Mark IICB loop) data looked promising.
    - Requested data as information published in the open literature not rigorous enough for benchmark.
    - Some data was provided for AX-1, but an overall Final Report was never prepared. Much of the useful data is contained in various drawings, notes, data files, and letters which were not easily accessible.

Task 2.1 Progress

- Survey literature of existing sodium test data
  - HEDL (Hanford Engineering Development Laboratory) Reference Fuel TREAT Tests.
    - Examined HEDL Tests and ranked tests for applicability to the benchmark.
    - HEDL Tests Ranked
      - HUT 1-8A
      - HUT 1-6A
      - **HOP 1-6A**
      - HUC-PTO-2-2A
      - HOP-PTO-3-2E
      - HOP-PTO-1-2A
  - Requested to get data from two of these tests.

Task 2.1 Progress

- Select two candidate problems
  - Availability of test data
- Organize and document data for two candidate problems
  - Examined previous OECD benchmarks.
  - Completed draft problem specification.
- Identify and review industry needs for sodium loop data
- Down-select to one problem for benchmark evaluation