EE 492 Bi-WEEKLY REPORT 03

2/10/24 – 2/24/24

Group number: *sdmay24-30*

Project title: *New Nuclear*

Client &/Advisor: *Dr. McCalley*

Team Members/Role: *Dana Boor (Team Lead), Damien Henry (Team Organizer), Zachary Hainline (Research and Design), Jeremy Yost (Research and Design), Mason Richards (Research and Design), Muhammad Syukri Bin Ahmad Zainal Akmar (Research and Design).*

- **Bi-Weekly summary:**

This week, our team focused on making progress towards the key components of our project we will need to complete our end-of-semester deliverables. One such component is our team's benefit to cost calculator, which we finalized in MATLAB and will utilize extensively when we move on to the Co-optimized Expansion Planning (CEP) software. Another task our team completed was compiling our reactor design information into a summary table. This was a recommendation from our advisor which we all agreed would be of great use. This table will help better explain our decision process behind our final recommended design and be a quick guide into what each individual reactor's selling points are.

- **Past weeks accomplishments:**

-Compiled a table of our six reactor designs that each of us has been focusing on. This table lists the key features that make these potential designs appealing and advantageous.

-Created our Benefit to Cost calculator for all of our six reactor designs. This was created in MATLAB and will be used along with the CEP software when we need to input certain data.

-Delivered a reactor research summary presentation to our advisor and received feedback on how to best present this information in our end-of-semester deliverables.

- **Pending issues**

-Verifying with our advisor/client our Benefit to Cost calculator that we created. Ensuring that we didn't miss any crucial details before implanting into the CEP software.

- **Individual contributions**

Name	Individual Contributions	Hours this week	Hours Cumulative
Dana Boor	-compiled research for the Natrium reactor and completed applicable portion of presentation/summary table. -assisted in researching scalar quantities to be used in our team's benefit to cost calculator.	6	22
Jeremy Yost	Compiled relevant research for the BWRX-300 nuclear reactor for use in advisor presentation and summary table. Aided Mason with completing our benefit to cost calculator. We decided together that MATLAB would be the best choice for the calculator.	6	20
Mason Richards	Compiled research for the Holtec SMR-160 reactor to be included in a presentation to our client/advisor and to be used in the summary table. Wrote the calculator for our cost to benefit analysis with the help of Jeremy. We first attempted to do so in Excel but decided that MATLAB was a little better suited for what we were trying to accomplish.	6	20
Syukri Zainal	Created the template of the reactor design summary table. Compiled the research information of the PRISM reactor on the design summary table.	6	20

Zach Hainline	Compiled information and research for the Arc-100 reactor and presented upon the advantageous features. Aided in writing out the Bi-Weekly report. Worked with everyone in revising and finalizing.	6	20
Damien Henry	Compiled research for the NuScale VOYGR reactors and completed the applicable portion of the presentation/summary table	6	18

- **Plans for the upcoming week**

-(Everyone) Deliver our Benefit to Cost calculator to Dr. McCalley. Depending on the feedback provided update our MATLAB program accordingly.

-(Everyone) Begin researching and utilizing the CEP software. Rewatch the demonstration provided to us by Ali and ask further questions if needed.

- **Summary of weekly advisor meeting**

In our meeting this past week, each team member presented the reactor design that they had been researching. Dr. McCalley suggested we make a table of all the primary features that we presented on. We also talked about our Benefit to Cost equation further and highlighted some final key details that were needed. In addition, we discussed getting a plan together for tackling the CEP software. Dr. McCalley fears this may take longer than we expect due to the unfamiliarity and learning curve associated with the software. To address this, our team has agreed to allot more time to this portion of the project.

- **Broader Context**

1) Updates to the broader context effects:

After looking over our section 4.4 from Senior Design 491 and discussing it as a team, we have concluded that there is no need to add any additional effects. Our original document highlights all involved negative and positive effects extremely well.

2) Plans to demonstrate evidence of positive effects:

The major significant positive effect that we listed was the ability for new nuclear technology to be paired with wind and solar. We plan on demonstrating this ability through the use of Co-optimized Expansion Planning (CEP) software. This software provides us with data concerning investment recommendations into nuclear and renewables. This software will also provide us with the opportunity to identify constraints that the various nuclear technologies would need to meet to be competitive energy producers with wind and solar.

3) Ways to address or justify negative effects:

The most prominent negative effect our group is contending with is environmental safety. The way we are addressing this negative effect is through careful consideration of design aspects related to security and protection. When evaluating our reactor designs, our group's primary focus is on the safety features of each design. Keeping these safety features in mind will help eliminate any potential unnecessary risk to environmental safety.