AI Usage Documentation

Conversation 2: Report Writing and Revision

ME 401: Engineering Systems and Applications

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This memo documents AI-assisted report drafting, data refresh, and client-tone revision activity.

EXECUTIVE SUMMARY

This document records AI usage for the conversation where a consultant-style Seattle Port Authority report was produced in LaTeX, supported by refreshed optimization and dispatch results. The AI assistant extracted project instructions and draft context, proposed an implementation plan, updated optimization bounds for a nuclear-coupled cycle study, ran the analysis workflows, and drafted a complete technical report. Follow-up revisions were then applied to adjust audience tone (port authority level), remove low-relevance technical detail from executive messaging, add Fukushima-informed tsunami context, and remove citations to internal class/draft documents.

1. PRIMARY PROMPT

1.1 User Prompt (Major Conversation 2)

```
ok I do want you to write the report. I am going to reattach relevant
files for you. In the napkin engineering document I have written a
draft report for a prior assignment. The port i have chosen is seattle
and the report will focus on bulding a nuclear reactor there. You are to
write this as an engineering consultant who is writing to the seattle
port authority, however the reactor will be built in eastern washington
as it is safer over there. Run the new rankine optimization code to fix
the states and get numbers for the report. You can also run
Port_Analysis.py to get the power flow diagram and other diagrams found
in the draft report. make sure to mimic my writing style and tone from
the napkin engineering document, however for the final report it will
need to sound professional. The project instructions document is from
the professors and while it is our guide for this project, it is not
super detailed. make sure that whatever you generate could earn a
perfect grade though as determined by the rubric in that document. The late:
was written in word and converted to a pdf but I want you to write the
final report in tex. Don't worry about making it into a pdf, i can do that.
please modify the optimization bounds as you see fit to get a good
optimization for the nuclear reactor properties.
```

2. DESIRED OUTCOME

2.1 Requested Deliverables

- Final technical report in LaTeX (not PDF) with professional consultant framing.

- Updated model outputs and figures pulled from current code runs.

- Explicit siting rationale for Eastern Washington location.

- Rubric-aware writing and references.

3. MESSAGE HISTORY AND STATUS UPDATES

3.1 Conversation Trace (Excluding This Documentation Thread)

- Assistant status update: scoped files and scripts for report evidence capture.

- Assistant status update: extracted assignment instructions and napkin draft text.

- Assistant status update: identified mismatch between requested realism and current broad optimization bounds.

- Assistant status update: performed feasibility sweeps for defensible nuclear-cycle bound choices.

- Assistant provided full proposed plan block for report production and verification.

- User supplied final coordinate and siting rationale details.

- Assistant status update: implemented selected bound/reproducibility updates in optimization script.

- Assistant status update: ran optimization reproducibility checks and refreshed figures/validation JSON.

- Assistant status update: ran Seattle portfolio analysis to refresh dispatch metrics and plots.

- Assistant status update: drafted full `seattle_port_nuclear_report.tex`.

- Assistant status update: applied client-tone revisions requested by user: removed explicit script naming, reduced executive-summary specificity, added Fukushima tsunami context, removed internal-document citations.

3.2 Plan History (From Proposed Plan)

- Planned advanced nuclear-style optimization bounds and deterministic DE settings.

- Planned full report generation with sections, equations, tables, and figures.

- Planned use of refreshed outputs only (not stale values).

- Planned references from external technical sources only.

- Planned verification set: reproducibility, constraints/validation pass, CLI consistency, and report compilation check.

4. RESULTS AND DISCUSSION

4.1 Artifacts Produced During Conversation 2

- Updated optimization settings in `analysis_scripts/rankine_optimization.py`: advanced cycle bounds and fixed DE RNG for reproducibility.

- Refreshed computational outputs: `optimization_contour_boiler.png`, `optimization_conto` `optimization_sensitivity.png`, `rankine_validation_report.json`.

- Full report draft: `LaTeX/seattle_port_nuclear_report.tex`.

4.2 Requested Revisions Applied

- Removed explicit Python filename mentions from audience-facing text.

- Removed optimization-bounds detail from executive summary.

- Added Fukushima-based tsunami-risk context for coastal siting discussion.

- Removed phrase "project scoping notes".

- Removed citations to internal class instructions and napkin draft.

5. AI-ASSISTED ENGINEERING REFLECTION

5.1 What AI Did Well

- Connected model execution outputs directly into technical writing.

- Kept report claims tied to rerun numerical evidence.

- Supported rapid revision cycles for audience-specific tone.

5.2 What Required Human Direction

- Site-specific rationale details and final coordinate lock.

- Audience preference on technical depth in executive summary.

- Citation policy for excluding internal course/draft references.

6. CONCLUSION

The second major AI conversation delivered a complete LaTeX consultant report with refreshed computational evidence and targeted editorial revisions, while maintaining transparency about assumptions and preserving reproducible analysis behavior.