

Steam is the most common working fluid used in vapor power cycles because of its many desirable characteristics, such as low cost, availability, and high enthalpy of vaporization. Steam power plants are commonly referred to as coal plants, nuclear plants, or natural gas plants, depending on the type of fuel used to supply heat to the steam. However, the steam goes through the same basic cycle in all of them. Therefore, all can be analyzed in the same manner.

You are an engineering consultant hired by the City Planning of Ann Arbor to help design the city's new power plant, which would be providing electricity for the whole Ann Arbor area. At the very early stage of the planning, you are asked to investigate especially the following items:

- The status of the current power plant(s) in Ann Arbor.
- Choose the new steam power plant in terms of the type of fuel and the cycle.
- The preliminary location for building the power plant you choose.
- Make simple calculation to estimate the overall efficiency and the power output of the power plant you designed.
- Any idea to improve the overall efficiency of the steam power plant in addition to the cycle would be a plus.

Please write a report between 400-500 words in length for the committee discussion. **Explain** the decisions you make. **Cite** work or data you obtained from book, journal, or website.

#### Rubric Prompts:

- The report should be understandable to a person with limited thermodynamic knowledge. Which parts were difficult to understand, explained well?
- What points were missing when discussing the status, including the type of the power plant(s), the amount of power generated, and efficiency?
- In the choice of fuel type among coal, nuclear, and natural gas, what points were missing, considering the amount of power needed, emission, and the cost and availability of the fuel?
- In the choice of cycle, what points were missing in comparison among simple ideal Rankine cycle, reheat ideal Rankine cycle and regenerative ideal Rankine cycle?
- Was the location choice and the estimation of efficiency and power requirements reasonable? Does the design meet the requirements to power the whole Ann Arbor area?

#### Peer review guidelines:

- Print and read over your peer's entry to quickly get an overview of the piece.
- Read the report more slowly keeping the rubric in mind.
- Highlight the pieces of texts that let you directly address the rubric prompts in your online responses.
- In your online responses, focus on larger issues (higher order concerns) of content and argument rather than lower order concerns like grammar and spelling.
- Be very specific in your responses, referring to your peer's actual language, mentioning terms and concepts that are either present or missing, and following the directions in the rubric.
- Use respectful language whether you are suggesting improvements to or praising your peer.

**Commented [A1]: MEANING MAKING ACTIVITY**  
The prompt asks students to assume the role of an engineering consultant, hired by the City Planning of their school community, to "help design the city's new power plant."

**Commented [A2]: CLEAR EXPECTATIONS**  
Students are given a list of what they are to include in the written piece.

**Commented [A3]: CLEAR EXPECTATIONS**  
Explicit instructions about what to write, length, and what kind of information to include, include when to provide citations.

**Commented [A4]: CLEAR EXPECTATIONS**  
Students given criterion from the rubric.

**Commented [A5]: OPPORTUNITIES FOR METACOGNITIVE DEVELOPMENT**  
Seeing the rubric prompts allows students to assess their own work to determine to what extent they have included these items.

**Commented [A6]: CLEAR EXPECTATIONS**  
Students given instructions for how to conduct peer review.

**OPPORTUNITIES FOR METACOGNITIVE DEVELOPMENT**  
In reviewing the work of their peers, students gain a better understanding of the assignment and potential responses.

**INTERACTIVE WRITING PROCESS**  
Students engage in drafting and peer review.