

Desktop Division Design Requirements

Follow the Design Requirements for your task that are appropriate for a desktop study.

The guidelines below will help you adapt your task statement from a bench-scale to a desktop study.

- Follow the design statement listed as the first bullet under “Design Requirements.”
- The key feature of a desktop analysis is a detailed Process Flow Diagram (PFD) that outlines your team’s solution to your task. The PFD should include all selected treatment processes and must include mass and energy balances (input and output rates, reactants, and reaction rates, etc., if applicable). See the 2022 Team manual for an example of an acceptable PFD.
- Your analysis may include a computer simulation, but it must be based on the PFD.
- Your scale-up should include a Techno-economic Analysis (TEA). For the analysis, include:
- Minimize and report on the footprint required for the full-scale treatment operation.
- Present a Techno-Economic Analysis (a.k.a. Techno-Economic Assessment) for constructing a full-scale commercial-size on-site process that meets the requirements of your task. For the analysis, include:
 - An estimate of capital expenses (CAPEX) according to the specifications in your task. These typically include, but are not limited to, equipment, pipes, pumps, etc. Do not include costs of buildings and appurtenances to the treatment process.
 - Operating expenses (OPEX) should be calculated on an annual basis calculated according to specifications listed in your task, including, but not limited to, any consumables (chemicals, sacrificial components, etc.) byproduct disposal costs, energy requirements assuming industrial electricity rates, and labor.

In addition to other operating costs that your team identifies, include these operating costs: staff labor rate of \$70/hour; solids disposal costs (\$50/ton); energy requirements using an electricity rate of \$0.09/kWh.
 - Materials list (note that this list is requested explicitly for all desktop designs):
 - List all equipment, materials, and chemicals needed, and indicate all efforts to reduce costs.
 - List all vendor sources, and report and reference all performance data for each piece of equipment or materials.
 - Visualization tools: Sensitivity analyses, etc. (Recommended: NMSU TEA Short Course).
- Address all wastes, including the fate of all waste products, generated by your process(es).
- Discuss any intangible benefits of the selected process(es).
- Discuss your plan’s adherence to appropriate federal (USA), state and local laws and regulations. Attend WERC’s EH&S Short Course for helpful tips for addressing regulatory issues. (Email for webinar link.)
- Include a Public Involvement Plan, as applicable (See Team Manual).
- Address safety aspects of handling the raw produced water and any final products. Be sure to attend WERC’s webinar for helpful tips for addressing health and safety issues. (TBA–Email for webinar info.)
- Include all other Design Requirements listed in your task that are not bench-scale specific. If you have questions, please contact us: werc@nmsu.edu

WERC 2022 Desktop Division Design Requirements

Technical Report Requirements □

The report should demonstrate your team's insight into the full scope of the issue and include all aspects of the problem and your proposed solution. The report will be evaluated for writing quality, organization, clarity, reasoning, and coherence. Standards for publication in technical journals apply.

The report must address in detail the items highlighted in the Problem Statement, Task Requirements, Evaluation Criteria, and the 2022 Team Desktop Division Manual, except as noted in this document.

Technical Report Length

The desktop-study technical report should total no more than 20 pages including report cover page, table of contents, executive summary, report body, figures, tables, and references. The audits are not included in the page count.

Note that this is shorter than the full-contest entry, because desktop contest entries do not include discussion of bench-scale results.

Technical Report Checklist

- Title Page
- Executive Summary
- Body
 - Background Research
 - Detailed Process Flow Diagram quantifying all mass/energy balances (as applicable)
 - TEA
 - CAPEX
 - OPEX
 - Materials List
 - Sensitivity Analysis
 - Public Involvement Plan (as needed)
 - Regulatory Discussion
 - Health and Safety issues associated with full-scale treatment
- References
- Audits (not included in page count)