

## Final Report Suggested Format

Your final report on your design project must be archival. That is, someone with your report should be able to reproduce your results exactly using only information in your report.

Remember these important rules for writing reports:

1. You need to be more organized than you think you need to be.
2. Work the reader from what they know to what they don't know.
3. You know a lot more than your reader on this subject so you need to use a lot more clarity than you think you need.

The format listed below is shown only as a guideline. Specific sections and requirements will change based on your specific project. Each section should include a discussion/ analysis.

1. Memo of Transmittal - address to D. A. Crowl. Include in memo most significant result.
2. Introduction - including purpose of effort, constraints, expected benefits.
3. Business Objectives: The business objectives are usually given to you by company management. This might include: plant capacity, purity and quality of product, plant location, service factor, expansion capability, turn-down ratio, etc.
4. Technical Feasibility - What are all the ways to make this product? What were the criteria you used to select a single method and why?
5. Detailed Chemistry - include chemical reactions, heats of reactions, kinetics (if known), etc.
6. Safety / Environment issues - Describe the safety and environmental issues (including waste disposal) and how they are addressed.
7. Market Survey - include historical prices for raw materials and product. Identify and discuss sudden changes and project into future.
8. Base Case Selection - select the specific case that requires the least capital investment.
9. Mass and Energy Balances - should close exactly for a paper study. Include tables in main body of report. Discuss.
10. Flow Sheet - both overall and detailed. Discuss in detail.
11. Equipment Sizing - Summarize and discuss, details in appendix.
12. Technical Specifications on all Equipment - put detailed spec sheets in appendix, summarize in main body of report.

13. Equipment Costing - summarize and discuss, details in appendix.
14. Expenses - summarize and discuss, details in appendix. Include table of all utility values in main body of report.
15. Cash flow for base case - include detailed tables and discussion.
16. Incremental options - describe, determine capital and expenses, apply true incremental cash flow, summarize and select viable options. Define new optimized base case. Should consider no more than 3 incremental options.
17. Sensitivity - include Strauss plots for raw material, product, and potentially other important prices.
18. Risk - Monte Carlo, other methods.
19. Summary - assemble all results from previous sections. No new stuff here!
20. Conclusions - Major results summarized. No new stuff here!
21. Recommendations
22. References.
23. Appendices - should only include supplemental, but not critical stuff here. The report should be able to survive without the appendices.

Your report must include the following (with discussion in the report):

1. An equipment specification sheet for each major piece of equipment.
2. A summary table of all equipment, including major sizing and cost information, and detailed reference for cost.
3. A detailed operating expense checklist.
4. A detailed table of Lang factors, and justification for any changes in the values.
5. A table detailing the mass balances.
6. A table detailing the energy balances.
7. A detailed flow sheet.
8. Any supporting calculations for your equipment sizing.
9. A detailed table of feed and flow values. (T, P, mass flow rate, density, etc.)
10. Detailed cash flow tables.
11. Straus plots (recommend NPV vs. raw material cost, product price, and others).