

## Memo 11

**DIVERSIFIED CHEMICAL PRODUCTS****Specialty Products Division****Cambridge MA**

**TO:** U. R. Engineer  
**FROM:** Wright Wellnow, PR Services  
**DATE:** 2006 Oct 11  
**SUBJECT:** Writing Standards for Final Report

The Final Report for 10.490 should resemble many other technical reports you have encountered. Of course, it differs in detail from a laboratory report -- no experimental data section -- but like the lab report,

- it tells a story to a technically qualified reader
- it makes claims and supports them with evidence
- it is written for several levels of reader scrutiny
- its narrative is to be clear, pertinent, and readable

Please use these sections:

### 1 Executive Summary ( $\leq 2$ pages)

This section is intended for managers who may read no other part of your report, and yet must make decisions based on your results. Tell them the motivation for doing the work, an outline of the most salient features of your optimized process, the important results, and any other points you consider significant for their decision-making. Although the managers do not do technical work, you may assume that they have technical training.

### 2 Table of Contents

### 3 Introduction ( $\leq 2$ pages)

Assume that your readers have not seen your Summary, so that the story begins anew. This section is like a funnel to focus their attention from general concerns down to the narrow topic of your report. Do this in two paragraphs at most, leading to a statement of your project objectives. Then outline how you went about your work - what were you given, where were you constrained, what steps did you take? The reader should leave the section with a clear idea of what the next three sections are for.

### 4 Base Case Process Simulation ( $\leq 4$ pages)

Present the task network of the base case process. For each task in sequence, outline the operating events, describe how you calculated its performance, justify significant assumptions, and document the calculated performance with respect to important constraints. The results of each task are documented in a material balance table.

The key challenge you face is satisfying the demands of a technical reader in as concise a manner as possible. You need not instruct your reader in distillation, but you must point out what distinguishes your particular operation - number of trays, reflux ratio, stopping criterion. Read your work as a critical reader would, and ask the questions that a critic would ask. Remember that you can cite the course Memos for support, rather than reproducing their content.

**Memo 11**5 Base Case Economic Analysis ( $\leq 3$  pages)

State the basis of your cost estimate. Please include both NIS and UIS cases. Cite Memos as needed. Then present concise tables that detail each component of the cost. Conclude with the calculation of campaign time and cost of product. Comment on any points that the reader should be told. Ensure that the reader could reproduce your results from your explanation and the results in Section 4.

6 Optimized Process ( $\leq 8$  pages)

Present the task network for your process. Describe its most salient features; highlight how it differs from the base case, particularly where great improvements have been made. Discuss each task, where your description must identify the equipment in use, in addition to the simulation. Present a Gantt chart that verifies equipment scheduling. Then present the economics.

Sections 4 and 5 can, where appropriate, serve as models for Section 6; you can refer to those sections rather than reproduce text or other content. Your task is again to convince the technically trained reader of the soundness of your case, presenting what is needed without superfluous detail.

7 Safety and Environmental Analysis ( $\leq 3$  pages)

- environmental analysis. What are the waste streams generated by your process (magnitude, composition, medium)? What chemical species in these streams are regulated and in what way? What treatment or abatement technologies might be appropriate for each waste stream? What is the eventual fate of the waste material and its impact on the environment? Are there opportunities to improve material recovery and recycling by altering your design (pollution prevention)? What are the costs associated with pollution prevention?

- safety analysis. What are the potential safety hazards associated with operating your design? What events or failures can lead to a release of material from your process? What are the health impacts of these releases for plant workers and the general public (toxicity, flammability, explosion)? What events pose the most significant risks (note that risk is a combination of impact and likelihood)? What measures could be taken to mitigate the most significant risks?

8 Appendices

Appendices are for the reader who wants to examine your work in detail. Here you can supply detail that would get in the way of the story if put into the report. However, do not force the general reader to turn to the Appendix! Tell a complete story in the report body, so that the reader can fully understand the claims you make and the nature of your supporting calculations. It is in the Appendix that details and intermediate steps can be found.

**Detail**

You should write clear prose in sufficient detail so that a technically trained reader can do the calculations to check your work. However, do not use excessive detail. You are not writing a textbook -- we have those already. You should not need many equations, nor to reproduce standard calculation procedures in your text -- if you have explained sufficiently, your reader will know what equations to use.

**Use of Citations**

When you cite an available document (such as a course memo) do so for supporting a claim, or to point to further detailed information. That is, cite such a reference as you would an Appendix, so that the reader understands what will be found there, but can appreciate your story without actually turning to it.

**Conventions of the Language**

Break narrative up into sensible paragraphs. Use short and clear sentences. Pay attention to the nuisance matters of subject-verb agreement, complete sentences, appropriate use of commas and semicolons.

**Formatting**

Single-space the lines, like this document. Edit the document for consistent appearance, citation styles, section headings, and so forth. Make it look nice. Whether justified or not, poor language and appearance detract from the credibility of the work.