PRODUCING A UNIFIED PROGRESS REPORT WITH INPUTS FROM SEVERAL CONTRACTORS*

By Oliver A. Nelson

ABSTRACT

The project management organization in which the author works produces an annual technical progress report for the Clinch River Breeder Reactor Plant Project. The report has to be integrated and edited from the inputs of six major Project participants scattered from coast to coast. The integrated report manuscript then has to be submitted for two formal reviews, and the report must be published in a readable and attractive form.

Accomplishing those steps in a reasonable length of time, with a high degree of accuracy, and at minimum expense requires careful planning and close supervision. Planning includes scheduling in such a way as to perform operations in parallel, where possible, instead of in series. Exploiting the capabilities of word processing saves much keyboarding and proofreading time. Art from previous reports is reused when possible. Many of these methods can be applied to other reports that require integration and editing of material from several sources.

THE REQUIREMENT

The Clinch River Breeder Reactor Plant Project must produce an annual technical progress report for the information of its participants, Government agencies, the electric utilities, and others. Production of the report requires information from the six major participant organizations and from the central Project Office. Those participant organizations are diverse, and they are scattered from coast to coast (Figure 1). The readers of the report also are diverse, with different interests and different levels of technical understanding.

*Work performed on U.S. DOE Contract DE-AC15-76CL50003.

The responsibility for producing the report rests with my employer, which is Westinghouse Electric Corporation in its role as Lead Reactor Manufacturer. We get the necessary information from the Project participants and then integrate and edit that information into a coherent report. Then we have the integrated draft reviewed and approved, first by the Project participants and then by the Project Office. Finally, we have camera-ready art made and have the report printed.

Careful planning and close supervision are needed to accomplish those steps in a reasonable length of time, with the required accuracy, and at minimum expense. Many of the methods that work for us probably can be useful to other organizations that must produce documents with information from several sources.

HOW WE DO IT

Planning

First, we plan each year's report for continuity from year to year. One way of achieving continuity is by standardizing the titles of the subsections (Figure 2). That kind of standardizing also facilitates the participants' writing because the titles serve as an outline of each section.

For unity of purpose in each year's report, we pick a major theme appropriate to the status of the Project. This year's theme, for example, is progress in the completion of designs and in the production, testing, and delivery of plant components.

For timely publication, we construct a production schedule. That schedule is based on the necessary steps and on our estimate of the time required to take those steps (Figure 3). It also is designed to keep as many people as possible working in parallel and thereby keep production time as short as possible.

Implementing

About two months before inputs are due, we send a letter to the Project participants telling them when to provide their inputs and what to include. Just as important, we ask each participant to name one person who is to be our contact for all matters pertaining to the report. Having only one person to deal with at each location saves a great deal of time and trouble.

The letter also instructs the participants to identify the parts of their text imputs that are unchanged from the previous year, or have only minor changes. The previous year's text is in magnetic storage at our word processing facility at Waltz Mill, Pennsylvania. We reuse what we can, thereby saving much keyboarding, proofreading, and correcting time. Similarly, we save much illustrating time by reusing illustrations that have no changes or only minor changes from the previous year.

We also take advantage of the fact that a large part of the input for the report comes from the Westinghouse Reactor Manufacturer (RM) organization (Figure 1). That organization is located at Waltz Mill, which is where our word processing facility is located. We instruct Westinghouse RM to have its new input typed by Word Processing, thereby capturing it in magnetic storage. After I have edited the input, Word Processing only needs to correct it instead of having to rekeyboard all of it.

While waiting for the inputs to arrive from the participants, I set up systems for logging the inputs and recording their status as they progress through the various processing steps. Without good records, we would lose much time looking for things and maybe duplicating operations.

When the inputs arrive, I edit the text and illustrations at the same time to make sure that they agree with each other and that they complement each other. I obtain clarifications as needed to make the report intelligible to readers from diverse backgrounds. I will have more to say about editing later in this paper. I also extract information, as I go, for a Foreword to the report. I make the Foreword complete enough to stand alone as a separate document, because we will have it printed separately as a summary progress report. That gives us two reports from one effort.

I order word processing and graphics as I go, instead of waiting until editing is finished. That is part of the overall plan to keep as many people as possible working in parallel (Figure 3).

We have Word Processing print out the text double spaced to facilitate revisions. We proofread it and check the illustrations, but we have only major typing errors and major graphics errors corrected at this time. We save time and money by using the marked proof copies as repro for the first review draft (Figures 4 and 5).

The first review is performed by the major participants other than the Project Office. Our contact in each participant organization supervises the review there.

As the reviewers' corrections come back to me, I evaluate them and consolidate the relevent corrections on the repro pages that I used for printing the first review draft (Figures 6 and 7). I do not have our word processing and graphics people make the corrections; instead, I save time and money again by using the marked repro for printing the second review draft. The second review is performed by the Project Office.

While those reviews are being performed, our graphics people are designing the cover and the interior of the report.

When I receive the review corrections from the Project Office, I consolidate them on the original repro pages (Figure 8). That gives me text and illustration pages containing the corrections resulting from proofreading, from the first review, and from the second review. Then I have all of those corrections made at one time by our word processing and graphics people. The word processing people use a phototypesetter to convert the corrected text to typeset form without rekeyboarding it.

I go to Waltz Mill to check the final type and illustrations and to supervise production of the camera-ready art. Our word processing and graphics people are very competent, but they are not familiar with the technical content of the report and so cannot be expected to catch all errors. By being on the site, I can have errors corrected without the delays imposed by distance.

We make the camera-ready art as complete as we can, and we include information that the printer will need. That facilitates the soliciting of bids by the Department of Energy's Technical Information Center (TIC) and then facilitates the processing of the camera-ready art by the printer.

We deliver the camera-ready art to TIC for bids and printing. I make myself available to answer questions from TIC and then from the printer.

Finally, I check the printer's final proof ("bluelines") myself. I explain the needed corrections to the printer in person instead of just sending the marked bluelines to him.

TYPES OF EDITING PERFORMED

I passed over editing very quickly in the first part of this paper because I was giving a quick and general account of how we accomplish the total project. I would like to return to the topic now, because editing is important. Some of the material comes to us in poor form and needs to be edited to be understandable. None of the inputs are consistent in style, so all of them have to be edited for consistency. There is not time to edit as thoroughly as we would like, but a great deal of improving can be done in the time available.

First, of course, I edit to correct actual errors in spelling, grammar, and terminology. I also improve consistency in punctuation, capitalizing, use of abbreviations, and degree of detail. Consistency helps the reader know what we mean by a given punctuation mark, abbreviation, or term. It also enhances the professional look of the printed report.

I also edit to enhance the clarity of the wording. We get our share of wordy, vague, and illogical sentences, poor punctuation, and poor organization. Our contributors also tend to use specialized terms that are understood in-house but are not likely to be understood by many of the intended readers of the report.

Also, we are afflicted by fads in the use of words and punctuation. A fad these days seems to be promiscuous use of the slash. People use it to mean so many things that the reader can't be sure what it means in many instances (Figure 9). Unless the meaning of a slash seems clear, I replace it with the word that it stands for.

SUGGESTIONS

For Saving Time and Money

Anyone who must produce documents by obtaining and integrating material from several sources probably can benefit from our experience. Most of my suggestions are implicit in the description of our methods that I have just provided, but I will summarize them here and add a few.

First, plan every step in the total effort that can be foreseen. Involve your management in the planning, inform your management of the plan, and keep your management aware of progress and problems. Management does not like unpleasant surprises.

Schedule the steps, but be flexible to adapt your schedule to program changes, problems, and unanticipated opportunities. Schedule as many operations as possible in parallel to keep as many people as possible working instead of waiting.

Tell the participants early exactly what they are to provide and when they are to provide it. Have each participant organization appoint one person to be your sole contact in that organization.

Have your own organization ready to process the inputs when they arrive.

Exploit the capabilities of word processing. One such capability is storage of text so that it can be reused without having to rekeyboard it. Another is the ability to take text out of storage in several forms, such as double-spaced typescript for review drafts and typesetting for camera-ready art.

Minimize the amount of word-processing and graphics time required by making all changes at one time, after the last review. You might have to educate your people to accept review drafts that are not "clean," but you probably can do so if you point out the advantages. Of course, you have to keep the review drafts easy to read.

Look for ways to get more than one document out of one effort.

Talk with people at the printing agency, whether it be TIC, your own reproduction department, or a commercial printer. Those people can tell you things about format and printing requirements that will prevent delays and enhance the quality of the final product.

For Maximizing Quality

Edit as closely as time permits to improve text, tables, and illustrations. However, don't edit just to impose your personal preferences on the authors; edit for clarity.

Have at least one draft of the document reviewed by competent people. Be sure to tell the reviewers the purpose of the document, what kind of review you want, and when the review is to be completed.

Maintain close contact and good relations with your contact people in the participating organizations. Also maintain close contact and good relations with the people in your graphics, word-processing, photographic, and printing groups.

Supervise the production steps yourself. By doing so, you can detect word-processing or illustrating practices that differ from what you want, and you can change them before they become habits and before they show up in much of your text and illustrations. Check the camera-ready art before it gets too far from your graphics department. And finally, be available to assist the printing agency.

The production of a report or other document requires the efforts of many people working as a team. However, teamwork doesn't happen automatically. It requires careful planning, clear communication, and close supervision.

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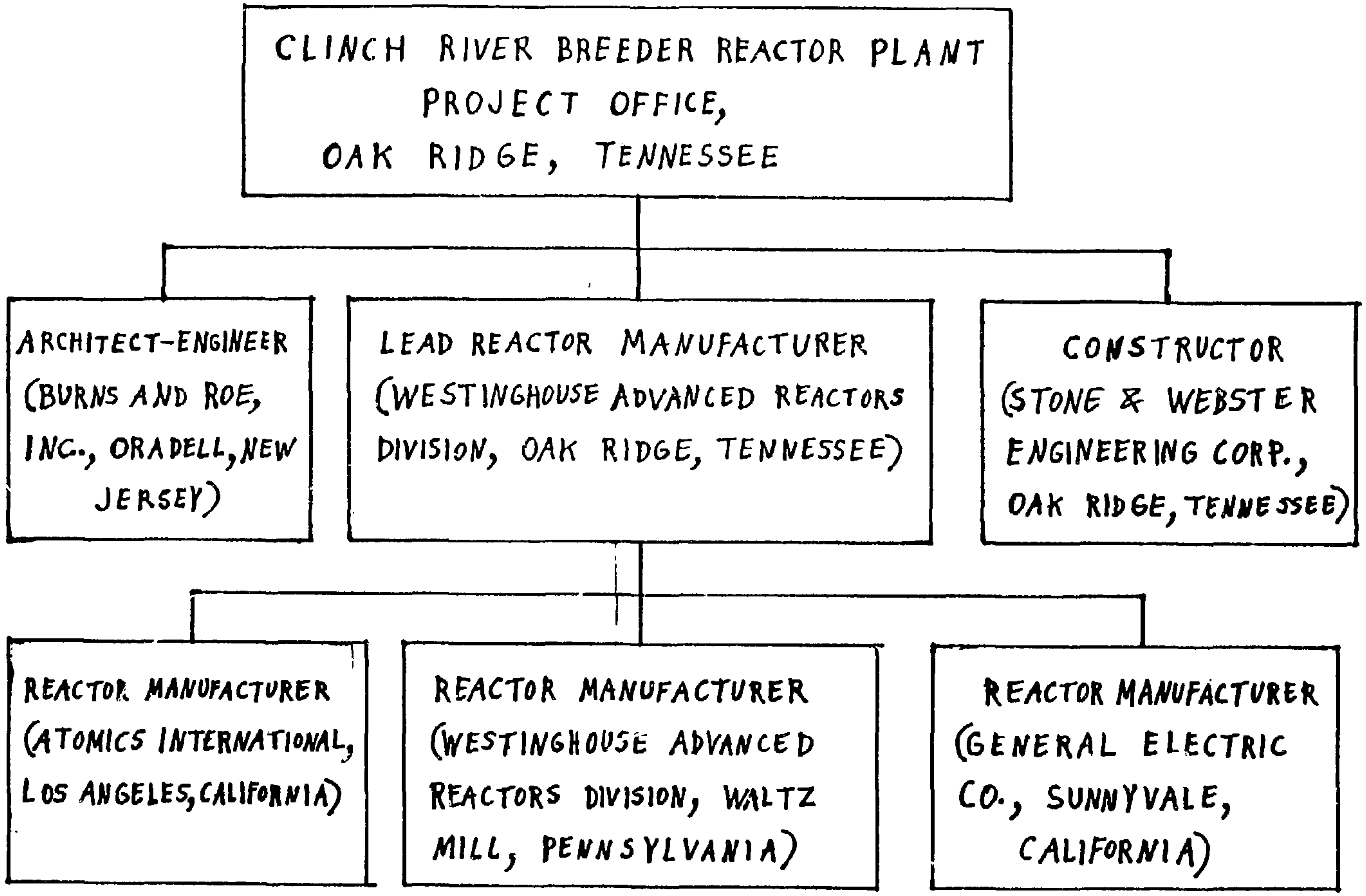


Figure 1. Major participant organizations, and their locations, in the Clinch River Breeder Reactor Plant (CRBRP) Project.

PROBLEMS

No technical problems were encountered other than the need to implement the recommended changes from the Key Systems Design Review into the IGRPS.

SCHEDULE AND MILESTONES

Implementation of the recommended changes from the Key Systems Design review was carried over to the next fiscal year. SDD-82 Sections 3, 4, 5, and 6 were completed and submitted for review in August and September 1980.

4.4.3 Impurity Monitoring and Analysis System (System 85)

DESCRIPTION AND PURPOSE

The Impurity Monitoring and Analysis System (IMAS) will monitor impurity levels in the liquid metal systems and in the argon cover gas systems and will verify that impurity levels are within acceptable limits. IMAS components will also collect on-line samples of liquid metals and cover gases for analysis in an on-site laboratory. The liquid metal samples will be obtained through permanent piping connections to appropriate piping in the Auxiliary Liquid Metal System, and the cover gas samples will be obtained with portable sampling equipment connected to appropriate piping in the Inert Gas Receiving and Processing System.

PRIOR WORK AND STATUS

The primary and secondary interfaces were defined. The cover gas sampling method was redesigned for use of portable sampling equipment. Provisions were made for IHTS loop separation during sodium sampling. The need for ex-vessel sodium sampling equipment was established.

A study of the need for backup primary sodium sampling equipment reconfirmed the adequacy of the present system design.

Drafts of Sections 3, 4, 5, and 6 of SDD-85 were prepared. Interface control drawings for the sodium transfer tunnel were released for Project use. The interface control document defining System 85 trace heating requirements imposed on System 68 was released for Project use.

Testing of ASME Class 2 liquid metal prototype valves was partially completed. A design review was held, and the valve supplier was released to fabricate those valves.

General instrumentation panel ordering data were prepared and transmitted to Westinghouse-RM for procurement action.

ACCOMPLISHMENTS

Drafts of the preoperational test specifications for the system were prepared and released.

Preprocurement plans for the sodium sampling cells radiation shielding windows and master/slave manipulators were prepared.

An ECP identifying the laboratory procedures and laboratory equipment to be used for the analysis of sodium and cover gas in the Plant Service Building combined laboratory was prepared.

Fabrication of the ASME Class 2 1-inch and smaller plant valves was started. All material, including pneumatic operators, was received, and manufacture of parts and subassemblies was more than 50% completed. The certified design report for the ASME Class 2 valves was completed and approved.

PROBLEMS

No technical problems were encountered.

SCHEDULE AND MILESTONES

A control milestone scheduled and completed in this period was the submittal of draft preoperational test specifications. Procurement action on the sodium sampling packages, plugging temperature indicator packages, shielding windows, and master slave manipulators was awaiting resolution of the national policy debate on the Project.

4.4.4 Radioactive Waste System (System 24)

DESCRIPTION AND PURPOSE

The approach adopted for disposal of liquid radioactive waste is removal of radioactive material from the liquid radioactive waste stream by removing insolubles through filtration and then concentrating radioactive solubles through evaporation and demineralization. The spent filter cartridges, spent resins, and by-products of the volume reduction process are sent to the solid radioactive waste system for disposal. When possible, the condensate from the evaporation process is reused within the plant.

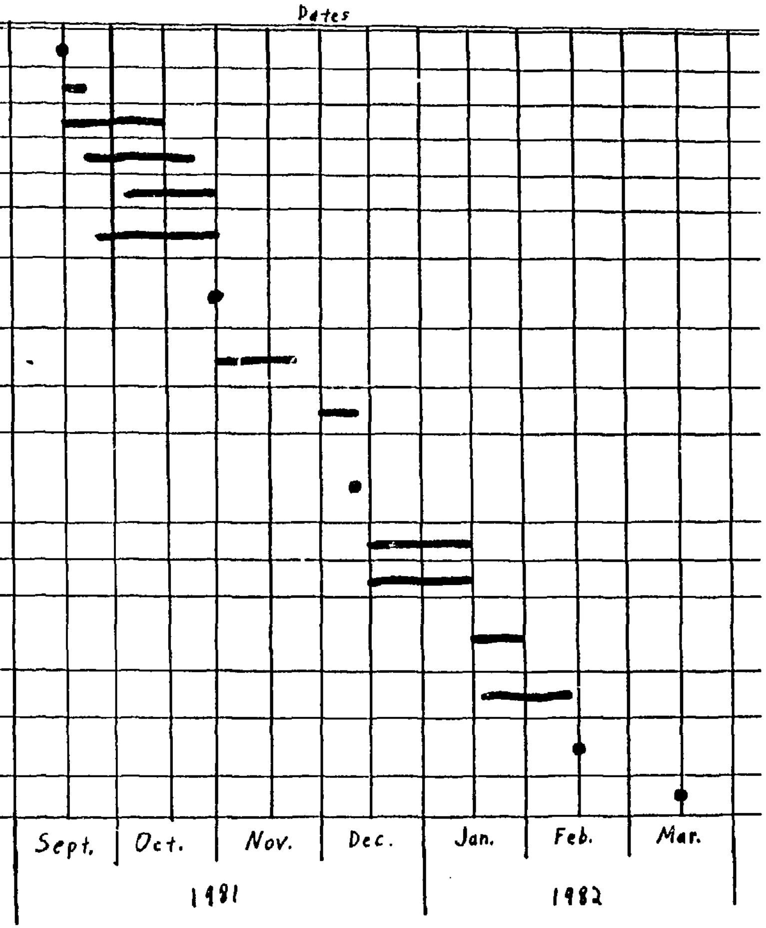
The Radioactive Waste System comprises four subsystems that collect, process, store, monitor, alarm and control, sample, package, manage, and dispose of liquid and solid radioactive wastes.

The low-activity subsystem collects low-activity-level (less than 10^{-4} μCi/cc) liquids from plant drains, filters and concentrates the radioactive solubles by evaporation, and discharges the excess liquid via the cooling tower blowdown stream.

Figure 2. Typical page from the CRBRP Technical Progress Report, illustrating standardized subheadings.

Production Schedule, 1981 CRBRP Technical Progress Report*

Events	Performers
Provide inputs.	Project participants
Check RM inputs.	RM Programs
Edit draft and illustrations.	Nelson
Process text and illustrations.	ARD Communications Services
Read proof and check illustrations.	Nelson
Make corrections and prepare first review draft.	ARD Communications Services
Transmit first review draft to W-LRM, RMs, B&R, and S&W for approval. Request approval by 11/24/81.	Nelson
Review, approve, and update draft to 9/30/81. Transmit comments to Nelson.	W-LRM, RMs, B&R, S&W
Integrate review comments into draft; print second review draft.	Nelson
Transmit second review draft to Project Office for approval. Request approval by 1/15/82. Request patent clearance through Lusky.	Nelson
Project Office review.	Getz
Patent clearance.	Lusky
Integrate Project Office review comments into draft. Send draft to ARD for revision of text and illustrations.	Nelson
Revise text and illustrations. Make camera-ready art for printer.	ARD Communications Services
Deliver camera-ready art to Project Office for bids on printing.	Nelson
Deliver printed copies to Project Office and W-LRM.	Printer



* The report covers the fiscal year October 1, 1980, to September 30, 1981.

Figure 3. Production schedule for the report, showing operations performed in parallel where possible.

schedule, and assembly will be completed by March 1981. Functional testing will be completed by May 1982, and the closure head assembly will then be available for shipment to the CRBRP site.

PLUG RISERS

Description and Purpose -- The three closure head rotating plugs are supported by the plug risers, which are arranged in pairs and bolted or welded to the periphery of each plug and the reactor vessel flange as shown in Figure 3-53. The risers provide the structural support for the plugs, contain the bearings for rotation, and also contain the reactor head seals. Attached to the tops of the risers are the bull gears, which engage the plug drive system and transmit rotating torque to the closure head plugs.

The riser assemblies are made from ring-forged top and bottom flanges with an intermediate web section made of rolled plate. The riser flanges are forged from low-alloy steel. The webs are fabricated from rolled Inconel-600 plate and then machined to final thickness after assembly to the flanges. The Inconel material in conjunction with the riser configuration provides a high thermal impedence that, together with the cool-pool focused-flow head access area cooling system, keeps the elastomer seals and the plug drives at the top of the risers below 25°F compared with the closure head and vessel flange except for the small outer and intermediate outer risers, where the bottom flange is eliminated and the riser web is welded directly to the rotating plug.

Prior Work and Status -- Design and analysis of the riser assemblies progressed through the final design stage, and the final design review was held. Purchase orders for the riser forgings and Inconel plate were placed, and the materials were delivered to the riser fabricators. Purchase orders were placed with Babcock and Wilcox (B&W) for the bolted risers and with Chicago Bridge and Iron for the welded risers. Engineering design effort on the risers was completed. The fabrication effort on the bolted risers was 82 percent complete, having progressed through preliminary machining and into final machining. Construction of the shipping containers was initiated. Welded riser fabrication progressed to the point where the risers were ready for fit-up and welding to the closure head plugs.

Figure 4. Typical text review page with a correction marked.

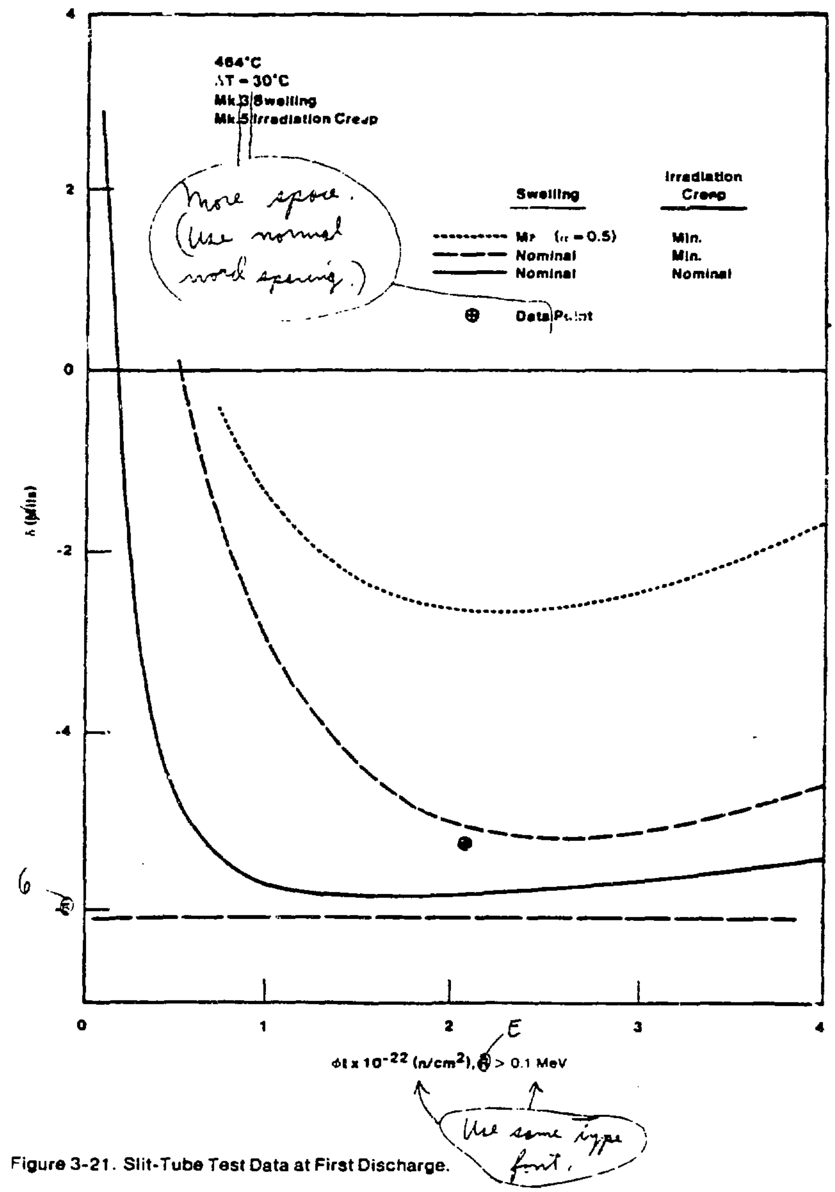


Figure 3-21. Slit-Tube Test Data at First Discharge.

Figure 5. Typical illustration review page with corrections marked.

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The riser assemblies are made from ring-forged top and bottom flanges with an intermediate web section made of rolled plate. The riser flanges are forged from low-alloy steel. The webs are fabricated from rolled Inconel-600 plate and then machined to final thickness after assembly to the flanges. The Inconel material in conjunction with the riser configuration provides a high thermal impedence that, together with the cool-pool focused-flow head access area cooling system, keeps the elastomer seals and the plug drives at the top of the risers below 125°F compared with the closure head and vessel flange except for the small outer and intermediate outer risers, where the bottom flange is eliminated and the riser web is welded directly to the rotating plug.

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Figure 6. Typical text review page (same as Figure 4) with an additional change resulting from the first review.

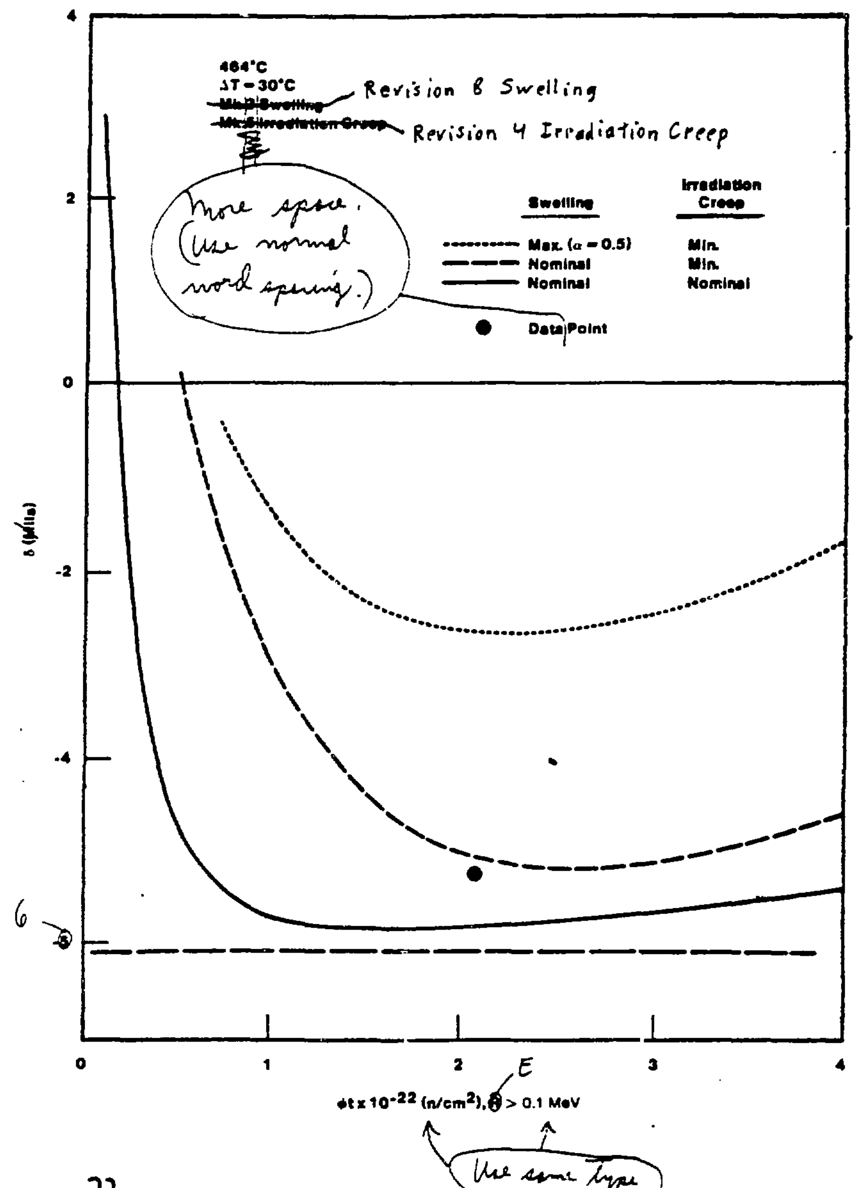

Figure 3-~~21~~ 22. Slit-Tube Test Data at First Discharge.

Figure 7. Typical illustration review page (same as Figure 5) with additional changes resulting from the first review.

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PLUG RISERS

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Figure 8. Typical text review page (same as Figures 4 and 6) with an additional change resulting from the second review.

SLASHED TO DEATH
OR
AMBIGUITY MADE EASY

THEY ARE

- ~~AI IS~~ TO INVESTIGATE SIGNAL CONDITIONING VARIATION/MODIFICATIONS.

THEY ARE

- ~~AI IS~~ TO OPTIMIZE THE SHIELD/MODERATOR BLOCK DESIGN.
- THE MODIFICATIONS WILL INCREASE SENSITIVITY/STATISTICAL ACCURACY.
- THE WAIVER/DEVIATION MODULE IS TO BE OPERATIONAL IN OCTOBER.
- THE SHROUD/SPACER PLATE ASSEMBLY IS A PROBLEM AREA.

/ = AND ? OR ? AND/OR ? VERSUS ?

FIGURE 9. EXAMPLES OF AMBIGUOUS USES OF THE SLASH.