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DPW-56-257

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DESIGN DATA SUMMARY - MARK VIA FUEL ELEMENTS

A letter, Croach to Babcock and Woodhouse, dated May 8, 1956 transmitted copies of DPSTM-700-VIA "Design Data Summary - Mark VIA Fuel Elements", for review and release by the Wilmington Technical Division personnel. This report was reviewed by D. F. Babcock, E. E. Hayes, and J. C. Woodhouse, and was discussed today by M. S. Bloomsburg, D. W. Bartholomew, C. McBride, E. E. Hayes and Woodhouse. The report provides a workable summary of the technical information developed to date for the Mark VIA fuel element. Certain correcting information, which will not in general change the report, will be provided within the next two weeks; supplemental information on details probably will be forthcoming for the next several months. It is agreed, however, that the report as it stands provides a satisfactory compilation of information for use at the present stage as a basis for designing facilities for a production process. It is being released on this basis.

In the Wilmington reading of the report a number of comments have been made with respect to further information that will be required or corrections that should be provided. Copies of comments by E. E. Hayes and D. F. Babcock are attached to the original of this letter and to copies being forwarded to the Savannah River Laboratory.

We are releasing all Wilmington copies of the report and will supply additional copies at your request.

ATOMIC ENERGY DIVISION
Technical Division

Dale F. Babcock
Dale F. Babcock

MASTER

John C. Woodhouse
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JCW/jss

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Reviewing *C. J. Babcock* 1/28/59
Official *C. J. Babcock* AED Class Officer
Date

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TECHNICAL DATA SUMMARY
DPSTM-700-VIA - MARK VIA FUEL ELEMENTS

I. Comments by E. E. Hayes (5/22/56)

- Page VIII-1, Para. A-3 - The radial dimensional tolerances of the co-extrusion billet components have been doubled over that of the Mark VI element. If the increased tolerances are satisfactory for VIA, then they should be satisfactory for VI.
- Page VIII-2, Para. A-5(a) - The chemical cleaning step for the fuel core, prior to billet assembly, has been eliminated. Again, if the change is satisfactory for VIA, it should be satisfactory for VI.
- Page VIII-3, Para. A-6 - The Mark VIA extrusion practice also differs from Mark VI practice in that integral ribs are extruded on the tube.
- Page VIII-5, Para. B-2(b) - The calculated amount of target alloy content is about 5% less than specified for the same tube on Page III-29.
- Page VIII-11, Para. C-II(1)(a) - Typographical error "change" should be "charge".
- Page VIII-12, Para. C-II(6) - "the fuel cores" should be deleted. This paragraph pertains to target cores only.
- Page VIII-13, Para. D-1 - Equipment. Although the equipment for cleaning extruded VIA tubes is the same as for VI tubes, it should be stated that the time cycle is longer by about a factor of two and that an additional nitric acid tank is required.
- Page VIII-13, Para. D-2 - Equipment for Target Tubes. The entire wording of this section is confusing to me and may be to others. For example, one can infer that the same equipment will be used for processing both fuel and target. Actually, work on each will be in separate buildings. It is stated that "new equipment" for vacuum melting target cores is required in addition to the equipment needed for processing fuel alloy. Actually, no new vacuum melting equipment is required for Mark VIA target cores as compared with Mark VI targets.

II. Comments by D. F. Babcock (5/29/56)

- A. The numbers given for the diameter of the rib circle in Table III-1 do not agree with the numbers given in Figures III-11-12 and 20. Also the cross-sectional areas of the fuel tubes are somewhat in error. These figures also do not agree with the uranium-235 ratio given in Table VIII-4, nor do they agree with the relative heat generation figures given on Page IV-3.
- B. On Page IV-1 I believe the term "hydraulic tubes" needs a definition. Another way of handling this would be to omit the term "hydraulic tubes" and use "percentage of total flow".
- C. Figure IV-7 uses a suppressed scale in a way that is somewhat confusing. I believe that it is intended that the pile power should be 1500 MW when the ordinate is 1.65. As this figure actually reads, the pile power is zero for this ordinate.
- D. On Page IV-8 the next to the last and the last paragraphs are somewhat difficult to understand. I would be quite satisfied to leave them out. Perhaps my chief concern is the sentence which reads: "In addition, the steam temperature is imposed on the thermocouples to give the maximum temperature signal developed." I do not know what this means.
- E. On Page VIII-6 and 7 the flow sheet indicates to me that recycle chips, etc. go to a core machining operation. Perhaps the metallurgist intended it this way or perhaps there is an error. Would you please look into it.