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REPORT OF THE AD HOC COMMITTEE OF THE CHEMICAL CORPS ADVISORY  
COUNCIL MEETING OF 10-12 JANUARY 1954

As requested by the Chief Chemical Officer on 11 December 1953, and Ad Hoc Committee of the Chemical Corps Advisory Council examined the classified plant at Muscle Shoals in order to answer certain questions posed by the Chief Chemical Officer in reference to this installation. The members of the Ad Hoc Committee consisted of:

Dr. Eilan P. Colburn, University of Delaware  
Dr. Howard Adler, Victor Chemical Works  
Mr. Eric R. Braun, Merck & Company, Inc.  
Dr. Harold C. Weber, Massachusetts Institute  
of Technology  
Dr. T. H. Whitehead, University of Georgia  
Dr. C. B. Marquand, Executive Director,  
Chemical Corps Advisory Council

SPECIFIC POINTS ON WHICH RECOMMENDATIONS WERE REQUESTED AND BACKGROUND  
CONSIDERATIONS

1. Whether or not you believe that the plant can be proven to be operable with the present staff without major alterations.

(b)(3):10 USC 130,(b)(5)

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b(5)

b(3) 10 USC 130

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- 2. What you consider a reasonable time to be allowed for this work by the present staff and what particular work would you recommend that they do during this trial run-in period.

We do not believe that the present staff can adequately operate the plant at either the design capacity or at a lower significant capacity. In order to operate successfully, it is believed that noteworthy changes in management must be made at once. These changes are outlined below. We further believe that the plant should not be operated without considerable strengthening of the present staff.

When this staff has been strengthened, we recommend that the plant be run on a sporadic basis to produce small quantities of material in order to obtain additional operating experience and to insure that the final modified plant will be operable. During this period of sporadic operation to obtain design data, the major alterations must be vigorously pursued in order to achieve design capacity at the earliest possible date.

It is estimated that sporadic operation can be obtained in Steps I, II and III in probably three to four months' time, assuming there is no explosive hazard on Step I distillation and that temporary ventilation can be provided in Step III. Installation of the major changes which will be necessary for full-scale operation would permit full operation in a minimum of a year, or probably 18 months. This time should be estimated from the time that the recommended new management group becomes effective.

The following major technical difficulties may require major alterations and/or changes in operation:

Step I

A. (b)(3):10 USC 130

B.

C.

D.

Step II

A. The Committee was informed that no major difficulties were anticipated in obtaining rated capacity in this step.

A. A satisfactory method for establishing the end point of chlorination.

B. Adequate provision for protecting personnel from possible hazards due to leakage in this step. (There is confusion as to whether an actual

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hazard exists. The experience of the Shell Chemical Company at Rocky Mountain Arsenal should be helpful in arriving at a realistic solution to this problem.)

(b)(3):10 USC 130

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10 USC 130

It must be remembered that temporary solutions may have to be tolerated in connection with all of the technical problems in order to attain partial production even though more satisfactory solutions may be needed ultimately. Moreover, it is of the utmost importance that all facets of the above technical difficulties requiring major alterations be vigorously prosecuted as nearly simultaneously as possible.

Although TVA is not completely satisfied with the design and construction unit for the recovery of  $PCl_3$ , they have expressed their willingness to make the necessary alterations and to bring this unit into operation. This should be done as soon as possible. However, work in connection with this operation should not interfere in any way with progress on Steps I, II and III of the basic process.

3. If you decide that the present process does not offer promise of operability, do you recommend that the plant be turned over to a competent chemical company on a research and engineering contract; and if so, please recommend the companies in order of priority that in your judgment are best qualified, from their own operations, to successfully modify this plant and make it operate.

Although the possibility of an outside contractor was carefully considered, it was decided that in view of the fact that TVA must eventually operate the plant and that changing to contractor operation at the present time would result in serious delays in both present and future operation, no such steps should be taken at the present time.

One might question the advisability of having the Chemical Corps proceed with revising and running the plant, arguing that time would be saved by obtaining a competent company engaged in heavy chemical manufacture to take over and contract this work. Several reasons can be advanced against having an outside contractor for this work:

- a. It must be remembered that ultimately TVA will operate this plant. An outside contractor cannot be offered an agreement to extend beyond this break-in period - a period which required a maximum of personnel. There is no inducement which can be offered a competent outsider to come in, expand his personnel, rob himself temporarily of his most skillful employees, both technical and administrative, to the detriment of his own business and then after a few years at most having suffered through all these headaches, to withdraw, constrict his organization and once more try to re-establish his primary business.

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- b. It would seem that an outsider would surely want TVA personnel for operations, since they eventually will take over plant operations. There is considerable question as to how TVA and such a contractor would work together even if any such an arrangement was agreeable to TVA.
- c. Certainly companies inexperienced in heavy chemical production, or interested primarily as consultants, would be of doubtful value from the problem at hand.
- d. As much as three or four months' delay would result from clearance procedures alone unless either Mathieson or Phillips could be induced to take over the contract.
- e. An outside contractor would certainly cost considerably more than the expense involved if the procedure, herein recommended, is followed - just due to overhead, both actual and hidden; which this action would involve. Here again contract arrangements might cause a loss of one to three months before the contractor could start work.
- f. The expense of an outside contractor might well be out of reason without mentioning that probably such items as housing, central laboratory facilities, instrument repair service and all other maintenance, even cafeteria service and warehousing would probably have to be furnished by an outsider. Much of this is now furnished by TVA but we are doubtful if TVA would provide such facilities to an outsider.
- g. The very real obstacles which seem to be in the way of engaging an outsider to take over and control, modify and start the plant, should not entirely deter one from exploring this method of attack simultaneously with the method herein proposed. In this way time will not be lost, and if, after a recommended trial period, it appears that a solution will not be forthcoming without calling in an outside contractor to take over complete responsibility, such action can be initiated without undue delay.
- h. The above consideration is not to be interpreted as meaning that we do not strongly advise the use of outside contracts for "Know-how" and the solution of isolated specific technical problems. This source of aid should be used to the utmost.

In view of the above, this Committee does not wish to recommend specific companies but believes it desirable to leave it to the judgment of the Chemical Corps personnel which companies specifically should be contacted in line with the work which they and their contractors have already accomplished.

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Summarizing the above, the Advisory Council does not believe that the Chemical Corps can quickly obtain an industrial contractor with competence to do the necessary start-up and design work. However, if this proves to be incorrect and an immediate contract can be obtained which is satisfactory to the Chemical Corps and to TVA, this should not be omitted from consideration by the Chemical Corps as an expeditious solution to this problem.

4. What pilot plant work do you recommend to support the future development of this plant?

The pilot plant work now set up at the Army Chemical Center on Steps I, II and III is a capacity of 20# per hour. This Committee does not consider that this pilot plant is of sufficient capacity to furnish the data required for the translating of design changes to the full-scale plant. Even though 1½ million dollars are required for fabrication and operation of a large-scale pilot plant, the Committee believes that this would be a well-justified expense.

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