Mr. S. W. Barry - [illegible]
Mr. W. A. Wilson - [illegible]
Mr. D. Dennedy - New York
Mr. J. B. Trotter - St. Louis

St. Louis

March 12, 1953

Mr. T. H. Wheelock

Your Memo, February 26, 1953

New York

C. H. McKechnie
Boston, Massachusetts

Thank you very much for the referenced memorandum and the attached drawing of the heating unit given to you by Messrs. McKechnie when they called on your recently. The 500,000 up to 3,500,000 BTU per hour units described appear very similar to our own design. You indicated that these people have our Bulletin P-130 on design and while the drawing does not show all detail desired, no doubt, these engineers have worked out a satisfactory design. We would gather this to be the case from the information at hand.

Also, since the units currently are using Socony Vacuum's heat transfer oil, this would indicate that a direct change-over to Aroclor could be made without any major changes.

About the screening (described as relatively coarse mesh strainer) filter in the system we would suggest leaving this as is. In addition, however, it would be desirable for the people using the equipment to filter the heat transfer medium periodically using a convenient external, portable, or if desired, permanently set filter employing Fuller's earth or Attapulgus clay. This filter, of course, should not be an integral part of the heat exchanger system as it would restrict flow. I am mentioning this because in your memorandum you indicated to Mr. McKechnie the desirability of having a filter in the system rather than a coarse mesh strainer. I don't know exactly what you meant by this that the earthen filter should be in the system.

To answer the two specific questions raised, we comment as follows:

1. You asked for the specific heat expressed in terms of BTU's per pound, per degree F. of Aroclor 1248 at 100°F, 300°F, and 500°F.

Attached is a copy of Bulletin P-130 and we wish to refer to Table I, and also a copy of Bulletin P-115 and we wish to refer to Figure 3, Page 10. Here the specific heat of the Aroclors is given in terms of calories (15°C) per gram per degree C over the temperature range of 0° to 300°C in the case of Figure 3, and in the case of Table I, Bulletin P-130, over the temperature range of 50°C (122°F) to 300°C (572°F).

DSW 550951

VI 7

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Reading these values directly in the fahrenheit scale will give the desired data since the conversion factor of calories per gram per degree centrigrade to BTU's per pound per degree fahrenheit is 1.

This relation holds, of course, by definition since one calory is required to heat one gram of water one degree centrigrade and one BTU is required to heat one pound of water one degree fahrenheit. Accordingly, specific heat is defined as a ratio of comparison of the given substance with water. If the specific heat is, say--2, it requires two calories to heat one gram of the material 1°C or two BTU's to heat one pound 1°F.

For Mr. McKechnie to get the values at 100°F, 300°F, and 500°F all he has to do is to plot the data given in Table I, Bulletin P-130. In fact, it can be estimated very closely without even going to the trouble to plot it.

It will be in order if you will mention that these specific heat values are certainly on the conservative side. You will recall our having run into systematic errors in different methods of determining this data and that we are still using the lowest values. You may also want to point out that when comparing the specific values of the Aroclor with similar values, say--for Socony Vacuum's heat transfer oil, that much higher density or specific gravity of the Aroclor vs. the petroleum oil should not be overlooked.

2. In answering the second question about probable Aroclor loss, the best thing to say is that the system will have to be tight. In other words, it is simply impractical to operate these systems unless they are relatively free of leakage. Accordingly, your own estimation of 10% make-up may appear somewhat on the high side for a properly operating unit but I would guess it is about as good a figure as we can give on this point.

In your memorandum you indicated that you will pass along to Mr. McKechnie this information via the Everett office. This struck me as a rather round-about way of getting the information to Mr. McKechnie and, therefore, I am passing along my comments both to you and to the Everett office as a convenience to you so that you will not have to transcribe at least my comments. You may have certain things that you will want to add, however. You asked that Mr. McKechnie's drawing be returned and, therefore, I am attaching it.

DSW 550952

VI 8

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P. G. Benignus

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