

JUL 15 1963

From : St. Louis - General Offices

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DATE : July 12, 1963

SUBJECT : NEW FUNCTIONAL FLUIDS

REFERENCE :

TO : RESEARCH, 2nd STREET
W. R. RICHARD

Bill,

This is to confirm results of our meeting last Tuesday and to add some further information.

PYDRAUL "A-300"

This program appears right on the track. I understand you will check fire-resistance of the formulation containing 7.4% petroleum oil, then decide whether to go further with this product or stay with the one using 7.4% TCP.

Besides the work you have lined up, we requested:

- a) The formulation be dyed blue before the various tests are completed
- b) Compatibility with PYDRAUL A-200 and Houghtosafe 1130 be checked. (solubility and lubricity). Later we may need to know compatibility with other synthetic fluids.

I understand you will have 500 hour pump test data about August 1 and that we will meet again at that time to discuss field tests at Alcoa and GMC (Bedford, Indiana). The pump test, if good at this point, will be continued, to 1,000 hours.

Low Cost Fire Resistant Hydraulic Fluid

The market for PYDRAUL A-200 may erode a little sooner than expected now that Texaco is selling water glycols at \$1.50 per gallon. In addition, the market is still looking for a price/performance combination to switch approximately 7,000,000 gallons per year of oil to a fire resistant product.

Emulsions can sell for 75 cents per gallon but performance is low - principally emulsion stability problems.

DSW 586178

Water glycols can sell for \$1.35 per gallon but are a little high in price for the performance limitations of a water containing product.

A non-aqueous, non-emulsion product, of good fire-resistance and good lubricity, could protect the segment of our PYDRAUL A-200 business vulnerable to Texaco's water glycol. In addition, it would give us a product for the 7,000,000 gallon per year industrial market.

Separate from this is the 10,000,000 gallon per year market for the coal mines. Here a lower maximum toxicity level requirement is imposed.

I talked to Elmer Wheeler since our meeting and learned Aroclor may be permitted in coal mines but a high chlorinated, low volatility product is necessary - perhaps Aroclor 5460. However, new, costly toxicity data would have to be generated.

On this point, with all the new uses being considered for chlorinated biphenyls, we need to get new, costly data. It can be justified, I'm sure, by combining the profit potential of several new applications. May I request that you and Mac McEwen approach Elmer on this fairly soon to determine what is needed and what the costs and justifications look like. This will prevent expenditure on programs that can't be marketed.

I understand you are examining:

- a) Aroclor, Oil, TCB
- b) Aroclor, Oil
- c) Phosphate ester, Oil

- - - and that Dr. Blake is examining

- d) Water, Aroclor emulsions
- e) Water solutions

Specifications, costs and profit potentials for this project are given in detail in Roger Hatton's Pre-Research Appraisal O.D. 1331, "Low-Cost Fire-Resistant Hydraulic Fluids" dated December 17, 1962.

Low Temperature Fluidity Heat Transfer Liquid

Several heat-transfer and miscellaneous applications have been calling for almost identical fluid properties. The applications are:

Heating Tank cars, Tank trucks and barges
Space Heating via heat
Snow Melting
Industrial process cooling
Gyroscope fluids

The properties of a single fluid to meet all these needs can be summarized as follows:

Fire-resistant
Pumpable at -30°F to -40°F
Low room temperature viscosity
(of the order of 25 cps max)
Thermal stability 550°F min.
Boiling point (initial) 350° - 400°F minimum though
600°F is much preferred
Non-corrosive to steel
Cost of product \$1.00 to \$1.50 per gallon max.

All applications can command a price of about \$3.00 per gallon. This yields a gross profit over sales of 50% to 67% which is at or above the bracket of most non-enterprise functional fluids. Volume potential is not definite but appears adequate for statistical analysis, blending and a little application test work.

Here is our best estimate of the volume we believe we can sell to these applications from 1964 through 1967, in addition to sales of existing THERMINOL products

Heating tank cars	20,000 gals.
Heating tank trucks	20,000 gals.
Heating barges	10,000 gals.
Space heating and snow melting	30,000 gals.
Industrial process cooling	25,000 gals.
Gyroscope fluid	<u>1,000 gals.</u>
Total	106,000 gals.

This is 106,000 gallons or \$318,000 at 50 to 67% gross profit.

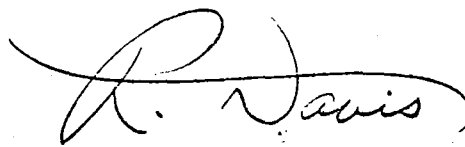
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We are encouraged by Lou Stark's work on MCS-196 which indicates viscosities as low as 120 cs at -40°F are possible with chlorinated biphenyl/chlorinated benzene blends. Pyranol and Inerteen blend experience is also encouraging.

I understand you will examine statistically (on paper) blends of Aroclor with chlorinated benzenes and other candidate diluents.

SST Hydraulic Fluid

The target specifications were outlined in preparation for the meeting next week. An interesting point was that chlorinated biphenyl or blends as described above appeared to be good candidate base stocks for this fluid. Formulation to a patentable fluid of improved performance was mentioned.



R. Davis

/mh

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