J. H. Davidson - G. O.

June 6, 1972

MARKET REQUIREMENTS -
NC ESTER PYDRAUL PRODUCTS

J. R. Savage
B2SL

N. T. Johnson
T. L. Gossage - B2SL
C. Paton
R. E. Hatton
W. R. Richard - T3A
J. F. Herber - T3G
L. R. Stark - W4A
R. M. Kountz - F4WA
D. H. Bolliger - F4WC

During recent meetings on NCP and N_2CP ester production, a question has arisen on the market requirements for emulsion characteristics and phenolics content of the finished product Pydraul fluids. As has been outlined, it is desirable and in a few cases, absolutely necessary, that we pass the ASTM Emulsion Test (D-1401) and have a low total phenolics content.

In light of the production and cost problems we have had with silicic acid treatment, which apparently gives us the best emulsion characteristics, it is obvious we must define for you what we need, what we can tolerate and any time requirements.

Emulsion Characteristics

To serve the military and turbine markets we must have product, Turbinol 1223, which will pass the ASTM Emulsion Test. The short term (1972) requirements for both these markets is extremely small as we do not have the product approvals to supply either market. However, we expect to have approvals by late this year and hope to move some product in 1973. The biggest potential in 1973 is the military market (800M lbs.) but we can't count on this business since it is strictly on a bid basis. The turbine business will start small and build with 1973 goal at 100M lbs. For these two applications then, we have essentially no requirements in 1972 and a wide range prediction of 100M lbs.-900M lbs. required in 1973.

In the industrial hydraulic fluid business, good emulsion characteristics are desirable for all Pydraul products since water quite often gets into hydraulic fluid reservoirs through condensation and small heat exchanger leaks. If good separation between fluid and water does not occur, the water travels through the pump and cavitation, corrosion and higher wear rates can occur depending on the

TOWOLDMON0056138

amount of water in the system. This condition of water in the fluid is not normally an everyday occurrence and I do not consider passing of the ASTM Emulsion Test a requirement which must be met if our product costs are substantially increased.

In the industrial hydraulics area, there are a few major accounts who are now reclaiming Pydraul from plan effluent or are planning to do so in the future. For these accounts, good emulsion characteristics (good fluid-water separation) are necessary in order to obtain reasonable fluid recovery ratios. Two accounts are now reclaiming Pydraul in this manner.

	Sales Volume	Product
G.M. - Central Foundry (Bedford, Indiana)	500M lbs.	Pydraul 50E
G.M. - Chevrolet (Massena, N. Y.)	500M lbs.	Pydraul 50E

Due to a rather involved fluid changeover procedure from Pydraul 312A to Pydraul 50E, Central Foundry will not require any new 50E until late 1972. Therefore the short term need for fluid which must pass the emulsion test boils down to one account.

For 1973 and beyond, more accounts will begin to reclaim not only to save on total fluid cost but to reduce downstream effluent treatment costs. The following accounts have active plans underway to reclaim substantial portions of Pydraul used in their operations. Also included are accounts on competitive products where our fluid must be recoverable to obtain the business.

	Sales Volume	Product
Johnson Motors (Waukegan, Ill.)	500M-800M lbs.	Pydraul 50E
G.M. - Buick (Flint, Mich.)	150M-200M lbs.	Pydraul 50E
Inland Steel (East Chicago, Ind.)	100M lbs.	Pydraul 30E,230C
Armco Steel (Butler, Pa.)	50M lbs.	Pydraul 50E
Armco Steel (Middletown, O.)	100-150M lbs.	Pydraul 50E
G.M. - Chevrolet (Bay City, Mich.)	400-500M lbs.	Houghtosafe 112C
U. S. Steel - South Works (Chicago, Ill.)	200-300M lbs.	Fyrquel 220

TOWOLDMON0056139

In summary, good emulsion characteristics are a short term "want" and a long term "need". How much we are willing to pay for good emulsion characteristics must be decided in light of other factors affecting costs on the NC project, but it is certain that a $.04-$.08/lb. premium cannot be justified either short or long term.

Phenolics

The subject of phenolics is a very emotional one with some of our customers now and will certainly become more, rather than less, of an issue as pollution standards are tightened. Our exact position on phenolics with the NC-containing Pydrauls is somewhat up in the air at this point since there are five or six different analytical methods (with varying accuracy) being used as well as many different sample preparations and water dilution ratios. However, all analyses performed by Research thus far indicate that we are at best equal to the Houghtosafe esters and 2-5 times worse than Fyrquel (Stauffer). In some tests we are much worse than either of our competitors.

Regarding criticality of phenolics content, there is certainly a short term threat at some major accounts if we cannot reduce present levels. General Motors corporate pollution people are doing considerable work in this area and have asked us to do some work for them. GM plants are all aware of potential phenolics problems with phosphate esters and we lost a small amount of Pydraul business at one GM account based mainly on the lower phenolics content of Fyrquel. On the other hand, I do not see a short term (1972) threat to a major cross-section of our business solely based on our somewhat higher phenolics content. We are fighting the concept of measuring phenolics in new fluid (used fluid is what counts) and are telling customers all phosphate esters have phenolics and minor differences in phenolics generation are not going to affect effluent treatment costs. This line of reasoning is getting through to those customers who are more realistic on pollution and to those who tend to believe us rather than competitors-particularly Stauffer.

The long term threat to our business based on phenolics certainly exists if we are worse than competition. Stauffer claims less than 100 ppm phenolics and this should be our goal. If we can meet this goal, we will be on equal footing with Stauffer and can promote an advantage over Houghton, who are the most willing to cut prices and who have the least control over their product (buying from FMC).

TOWOLDMON0056140

Again on phenolics, as on emulsion characteristics, we have a short term (1972) want and a long term (1973 and beyond) need. The immediate threat during introduction of our new fluids is probably stronger on phenolics than emulsification. We should make every effort to lower phenolics and get good emulsion characteristics in the June-July run but we cannot justify a premium based on a short term market need. The 2.5M lbs. of NCP and N_2CP produced will make about one-third of total Pydraul finished product requirements for the year. If we do not operate profitably during this run, we will lose money on Pydraul sales for the year and raise serious questions about the advisability of adding any new capital, however small, if this should be needed to help us achieve better emulsion characteristics and lower phenolics content on the NC products.

J. H. Davidson

/pep

0065726

TOWOLDMON0056141