Monsanto

FROM (NAME & LOCATION): W. C. Hammann - T3A

DATE: March 24, 1976

cc: R. H. Munch - T1B

SUBJECT: G.E. Monsanto Technical Agreements/ An Evaluation

REFERENCE:

TO: R. G. Potter - B2SB

The evaluation of a capacitor fluid passes through the following phases:

I. Measurement of fluid properties
II. Small Scale use testing (8 units/set) in small ballast capacitors. Our test capacity is 192 2μF, 585 v (0.27 KVAR) capacitors
III. Large scale use testing (up to 100 units/set) in a variety of types and sizes of
   A. Ballast capacitors
   B. Industrial capacitors up to 40μF, 440 v (3.0 KVAR)
IV. Tests in line power factor correction capacitors of 100 to 400 KVAR.

At the time this dielectric project was initiated, we decided to install capability for phase II testing since application data was deemed essential for convincing customers to evaluate our new fluids. This installation cost over $30,000 for equipment and over 1-man year of technical effort.

We decided not to install capability for phase III and IV testing because of the high cost (over $150,000 in equipment alone for each phase), the need for broad technology in capacitor design and construction, and the desirability of corroborating our Phase II data with independent data preferably from capacitor manufacturers.

To meet the latter need we choose to work closely with three companies, G.E., Electrical Utilities and Electric Components, which we believed represented the highest level of technical competence in the industry. Of these three, only G.E. had the capability to generate the kind of Phase III and IV data that would be useful in guiding a fluid development effort.

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For this reason we entered into a technical agreement with G.E. under which they would perform phase III and IV tests on Monsanto fluids and give us the data for our internal use.

Under this agreement we have received:

		Est. Value
A.	Technical Information	
	1. Counsel on capacitor testing and statistical analysis of results	$5,000
	2. Procedure for impregnating capacitors	10,000
	3. Procedure for corona inception voltage measurement	30,000
B.	Special G.E. all-film capacitors for our test program	Not attainable otherwise
C.	Technical Data	>$300 M
	1. Evaluation of 10 experimental fluids. Includes 30 sets of data covering:	
	a. Paper, film and paper film capacitors	
	b. A range of sizes	
	c. Times up to 15,000 hours	
	2. Corona inception and extinction voltages	
	a. Full size power factor correction capacitors	
	b. Small size capacitors	
D.	Technical appraisal of our fluids	
	1. Corroboration of our small scale test results	
	2. Informed judgement that the sulfone approach had real merit.	

The estimate of value is a judgement of what it would have cost us to get the same data (assuming in the case of C that we had the equipment already in place) either through a consultant or through our own efforts. With respect to C, our costs for generating 6 sets of Phase II data using smaller and fewer capacitors per set are ~$75M.

The information we obtained under the G.E. contract was essential in developing our test program, in guiding the selection of candidates, and in final selection of the sulfone additive approach. We are sure the data cost G.E. more to generate than we paid. While they would have developed similar data in evaluating possible candidates from Monsanto, they would

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have been much more selective in number of fluids evaluated and probably would not have given us the actual data - as opposed to a qualitative evaluation. We also are convinced that the data was worth to Monsanto at least the amount paid in minimizing unproductive research directions and in giving us confidence that our own test results would extrapolate to commercial use.

From Electrical Utilities and Electric Components, we obtained data establishing that our fluids could be used to produce capacitors meeting commercial standards. These data were not useful for quantitative comparison of performance of different fluids in capacitors, but did serve as an independent check on G.E.'s (and our own) evaluation.

The future value of the agreement depends on what direction we take in the dielectric market. If we expect to stand pat on 1238, the agreement has little value. We can probably get the information we need from normal customer contacts. If we expect to maintain technological leadership in a technologically evolving capacitor market, the agreement can be very important. I would estimate value at $60,000 as the contract stands but would recommend a re-negotiation of the terms including cost to Monsanto in light of current situation in capacitor fluids.

W. C. Hammann

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