Monsanto

FROM (NAME & LOCATION) P. G. Benignus - St. Louis

DATE : September 8, 1970

SUBJECT : Therminol 55 Type Fluid as possible Dielectric

REFERENCE :

TO : DR. R. H. MUNCH
QUEENY

cc: W. R. Richard - WRICH
J. G. Bryant - JBRYA
D. A. Olson - DOLSO
H. S. Bergen - HBERG
R. Davis - RDAVI
M. F. Baber - MBABE

For your convenience and as Bill Richard requested this data, I am pleased to enclose the properties and ASTM test methods for uninhibited transformer mineral oil. In general, this is also used for circuit breakers. However, for circuit breakers a somewhat lower viscosity is sought. The exact value at zero centigrade sought is 300-320 SUS. It has been indicated to me that the viscosity of Therminol 55 is 215 SUS at 37.8°C.

Accordingly the viscosity of Therminol 55 as given is higher than desired by dielectric use. The same thinking pertains relative to the published minus 20°F pour point for Therminol 55 versus minus 40°F or lower sought for dielectrics used in transformers, circuit breakers, and cables.

However, Don Roush and others indicate that various fractions from the Chocolate Bayou stream may be available with lower viscosity and pour point than for Therminol 55.

Your results show that these fluids can be cleaned up to excellent electrical values.

Costs are indicated to be quite low, indicating orderly economics possibly for use as dielectrics.

We are aware of industry interest in dodecyl benzene materials for cables, etc. Doble will evaluate a 100 gallon sample at a stipend of something like $1500. This would encompass the more costly arc testing which is a requirement relative to possible use for circuit breakers and cables. Doble's evaluation including oxidation stability tests as related to transformer applications have carried a much lower stipend.

This area of dodecylbenzene related materials appears as one of the very few new ventures open to us at the moment. I am sure that we are all interested in pursuing it. Possibly Jim Bryant may well be assigned to exploring availability and general physical properties of the various streams of this type material at Chocolate Bayou. You earlier pointed out and we certainly agree with your thoughts that it is highly important for us to learn what materials in this area are available to us. I think that Jim Bryant could develop this for us if he were given it as a project.

P. G. Benignus

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UNINHIBITED TRANSFORMER OIL PURCHASE SPECIFICATION TESTS*

TYPE OF TEST	TEST LIMITS	ASTM METHOD
Acidity, mg KOH/g**	.025 max.	D974 (Modified)
Aniline Point, °C	78 - max.	D611
Color ASTM	0.5 max.	D1500
Corrosive Sulphur	Passes	D1275
Dielectric Strength, kv	26 - min.	D877
Dielectric Strength, kv	20 - min. (.04" gap)	D1816
Flash Point, °C	130 - min.	D92
Interfacial Tension, dynes/cm	40 - min.	D971 (unfiltered)
Pour Point, °C	-40 - max.	D97
Power Factor at 100°C, %	0.3 max.	D924
Power Factor at 25°C, %	0.05 max.	D924
Specific Gravity, 60/60	.865 - .910	D1298
Viscosity at 37.8°C		
Kinematic, cs	11 - max.	D445, D446
or Saybolt	62 - max.	D88, D446
Sludge-Free Life, measured at 8-hour periods	64-hr. min.	D1904-61T (Modified)
PFVO Rating ***	See attached graph	

* These specification tests were developed after several years of study and research sponsored by a representative group of the utilities in the United States

** Acidity to be measured by ASTM proposed modification to D974, using 1/100 normal solution and a micro-burette.

*** Any oil for which the power factor curve lies within the acceptable area and does not cross the graph until 72 hours or later, is considered an acceptable oil. The time (Hours) that the power-factor curve of an oil crosses the limiting graph is indicative of the quality of the oil.

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