FROM, (NAME & LOCATION): E. S. Tucker - South Second Street - St. Louis

DATE: February 29, 1972

SUBJECT: BIODEGRADATION OF THERMINOL 55 AND THERMINOL 66

REFERENCE: Memo, J. J. Roder to W. B. Papageorge 1-26-72 and "Biodegradation and Acute Fish Toxicity Data for Dowtherm A and G Fluids", Dow Chemical Company Bulletin

TO: W. B. Papageorge
B2NK

cc: W. H. Hunt - A2SA
J. T. Garrett - A2SA
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BIODEGRADABILITY INFORMATION

As you know, prior to J. J. Roder's 1-26-72 memo, we have never been requested to evaluate the biodegradability of either Therminol 55 or Therminol 66. However, we have evaluated the biodegradability of HB-40 (Therminol 66) when it was proposed as a potential replacement for Aroclor 1242 as a solvent for carbonless reproduction paper.

At that time HB-40 (Therminol 66) was evaluated using two standard test procedures: the semi-continuous activated sludge (SCAS) test - simulating a secondary sewage treatment plant; and a river die-away (RDA) test - simulating the natural microbial action of river water.

The SCAS test we employed is patterned after the standard test method used to evaluate the biodegradability of surfactants [JAOS 42, 986 (1965)]. A description of the test procedure as applied in this study is given in our publication, Analytical Chemistry Method 71-32.

Based upon the data obtained from this study, it would not be unreasonable to state that this fluid undergoes primary biodegradation and that it would not be a persistent aquatic polluent. This statement obviously should not be interpreted to mean that we would recommend the wholesale release of this material to any aquatic environment.

Definite biodegradation of this fluid was also observed in the RDA tests. The detailed results of our tests with this fluid are published in Analytical Chemistry Special Study 71-4.

We have not evaluated the biodegradability of Therminol 55 and as such we have no experimental data upon which any statement could be made. I checked with Dr. R. W. Swisher and the above statement reflects his opinion on the subject as they have also never attempted to evaluate the degradability of this fluid.

Chemical Oxygen Demand (COD)

We do not actually carry out COD determinations in our laboratory since they are done on a routine basis by the J. F. Queeny analytical laboratory and they provide this service for us.

The elapsed time required to obtain this data is ∿3 - 4 days and the cost is minimal (∿$11/sample).

Biochemical Oxygen Demand (BOD)

We have not measured BODs for either of these fluids nor have we ever set up to make this type of measurement.

Generally speaking, evaluating the biodegradability of any material solely upon the results obtained from the standard BOD test can be inaccurate and misleading. If a high BOD is observed (rapid oxygen consumption) then one can generally state that the material in question is readily oxidized by bacteria. If, on the other hand, little or no oxygen was consumed, it would not be correct to positively state that the material cannot be oxidized by bacteria since there are a number of other factors which must be considered Additionally, this test is limited by the fact that accurate results can only be obtained with materials that have water solubilities on the order of 10 ppm or greater. It is, therefore, imperative that the water solubility of any material to be tested be known or determined.

As I indicated I would, I have checked with John Giesing of Industrial Bio-Test Laboratories and found that they routinely do standard BOD measurements. The total cost of having a 5, 10, and 20 day BOD test run is $25.00 per sample.

Another alternate would be to have our Enviro-Chem people at Dayton provide us with this service.

"Biodegradation and Acute Fish Toxicity Data for DOWTHERM A and G Fluids", Dow Chemical Company Bulletin

With respect to the information being distributed by Dow on their fluids, I have asked Dr. Dave Miller to provide us with current samples of all of our Therminol fluids so that we can determine their water solubilities and make arrangements to have the COD and BOD tests performed - if all concerned parties are in agreement that we will need this data.

E. S. Tucker

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