INTEROFFICE MEMORANDUM

Date: 03-Feb-1994 10:24am CTZ

From: Kenneth D. Goebel

TO: DENENHOLZ, IRA M. @A1 @ORION

Re: List of questions on several fluorochemical products

CC: UK040121--BRAVMC 03/02/94 10:15 ***To: US019959--USSP01 K ARMSTRONG 3M ST. BE100008--DIEVMB BOB COX 3M BELGIUM

Ira, could you please provide a response directly to Mary Bradfield on the decomposition temperatures? And also wt% of CH3I in FC-135? Eric, can you help out Mary on a suitable method to monitor CH3I level in air? Thanks.

Kenneth D. Goebel
Subject: RE: FC-135

Hi Ken,

Leo Gehlhoff has a customer who is looking at using FC-135 surfactant in a process where it will end up being sewered. He has requested that we provide him with what we would consider a safe concentration for this application. Unfortunately, to make this determination, we are going to need more data than what we have. From what I have found, we only have a small amount of data on the fluorochemical solids (BOD, COD, TTC and fish) and published data on the isopropyl alcohol. To better characterize the impact of the product, I think it would be advisable to run daphnia, minnows, algae (optional), sludge respiration inhibition, and Microtox on the formulated product. BOD/COD won't be necessary since we are quite confident that the fluorochemical portion won't degrade and we know IPA will.

BY COPY OF THIS NOTE: Leo, How soon do you need a response? The quickest these tests can get done is probably 2 weeks considering time to get the sample, do the testing, and analyze the results. If what I am asking for here is unclear, feel free to call me at 778-7863. I normally work from 7:00 - 4:00. Thanks for your help.

Best regards,

Scott Strand

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CC: HOWELL, ROBERT D. (HOWELL, ROBERT D. @CC3M)
CC: GEHLHOFF, LEO F (GEHLHOFF, LEO F @PROFS)
CGOEBEL, KENNETH D @PROFS

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DENENHOLZ, IRA M. (DENENHOLZ, IRA M. @A1)

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Subject: FC-135

In your memo, attached, you asked for a safe discharge recommendation for FC-135 knowing the environmental fate has to be a business unit decision. The Performance Chemicals group of SCD will have to decide whether or not to send your sample for additional testing. I leave it up to Ira Denenholz/Leo Gehlhoff to provide you with a sample. My recommendation is no water disposal. Kenneth D. Goebel

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Date: 22-Apr-1994 09:17am CTZ

From: ERIC A REINER

Dept: 3M EE&PC

Tel No: (612) 778-5079

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Subject: RE: FC-135

In your memo, attached, you asked for a safe discharge concentration for FC-135. Here are the considerations one needs to make to determine this from an environmental risk perspective. Obviously the discharger also has to be sure that he is in compliance with all regulations. First, with a persistent material like a fluorochemical surfactant, you want to minimize release to the environment because the persistent material may accumulate in places in the environment where it could build up over time. Starting this test would have to wait for the go ahead from Jim Johnson. Jim thinks the lab is close to being able to schedule the analytical work for such a study. Eric --- ATTACHMENT --

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INTEROFFICE MEMORANDUM

Date: 13-Apr-1994 08:14am CTZ

From: Scott B. Strand

Dept: EE&PC

Tel No: 778-7863 (FAX 778-6176)

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Subject: RE: FC-135

Hi Ken,

Leo Gehlhoff has a customer who is looking at using FC-135 surfactant in a process where it will end up being sewered. He has requested that we provide him with what we would consider a safe concentration for this application. Unfortunately, to make this determination, we are going to need more data than what we have. From what I have found, we only have a small amount of data on the fluorochemical solids (BOD, COD, TTC and fish) and published data on the isopropyl alcohol. To better characterize the impact of the product, I think it would be advisable to run daphnia, minnows, algae (optional), sludge respiration inhibition, and Microtox on the formulated product. BOD/COD won't be necessary since we are quite confident that the fluorochemical portion won't degrade and we know IPA will.

BY COPY OF THIS NOTE: Leo, How soon do you need a response? The quickest these tests can get done is probably 2 weeks considering time to get the sample, do the testing, and analyze the results. If what I am asking for here is unclear, feel free to call me at 778-7863. I normally work from 7:00 - 4:00. Thanks for your help.

Best regards,

Scott Strand
concentrations that would cause effects. For this reason, all processes using fluorochemical surfactants should be designed to minimize environmental release. Eliminating environmental release, however, is not always feasible. If it is not feasible, the goal is to be as certain as possible that the concentrations resulting in the environment will not have adverse effects on people, plants, and animals. You can never be completely certain that any concentration is totally safe because you can't test the compound on all types of organisms. If you test the chemical on species from at least 3 different groups (like fish, algae, and crustaceans) find the lowest concentration causing no effects, and give yourself a safety margin of 10-fold below this concentration, however, you can be fairly sure that your material won't cause adverse environmental effects at that environmental concentration. If you don't know the no effect concentration levels, you may want to give yourself a 100-fold safety margin below the lowest LC-50 level. In the case of FC-135, we have only data on one type of organism. You really don’t have enough information to determine a probably safe concentration. One could, however, add a 10-fold factor of safety to each of the two types of organisms you are missing. The predicted safe environmental concentrations for this material would then be 3 micrograms per liter or 3 ppb. Knowing a probably safe aquatic concentration, if you also know how much a user's discharge will be diluted when it enters the environment, you can determine how much that user can fairly safely discharge. The question is this: Will the discharge rate cause the concentration to rise above the “safe” level? It is the concentration that will result in the environment that is important, and this is determined from the amount or rate rather than the concentration of the discharge. If the 3M Environmental Lab is able to run the Daphnia and algaebioassay in house, the recharge to the division would be about $500. If because of work load, the work is sent to an outside lab, the recharge would be about $4000. These tests, as you understand, would enable us to make a better prediction of an ‘environmentally safe’ aquatic concentration. If you decide to have these tests done, please make sure Ken Goebel is given a complete description of the samples you send. If this doesn't clear up your questions, please call so we can discuss it.

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**INTRAOFFICE MEMORANDUM**

Date: 19-Apr-1994 09:32am

CTZ

From: Leo F Gehlhoff - SCDA 236-2A-01 (733-9727)

To: REINER, ERIC A @ENETCC; GOEBEL, KENNETH D @PROFS @SSWMB @HERMES;

BIEBERBAUER, CHESTER J @PROFS @SSWMB @HERMES

Subject: FC-135

USD 067738--USSP01; GOEBEL, KENNETH D.

FROM: Leo F Gehlhoff - SCDA 236-2A-01 (733-9727)

I HAVE TO ADMIT ERIC, THIS PAPER TRAIL IS GETTING ME LOST. KEN'S RECOMMENDATION THAT NO LEVEL OF FC-135 BE SEWERED BECAUSE OF WHAT WE KNOW ABOUT SKIN PENETRATION SEEMS EXTREME TO ME. IF THAT WERE THE CASE, COULD A PERSON WALK BAREFOOT ON A FLOOR TO WHICH A POLISH CONTAINING AN FC SURFACTANT HAD BEEN APPLIED? PLEASE LET ME KNOW WHAT IS NEEDED TO ARRIVE AT A RECOMMENDATION FOR A SEWERABLE CONCENTRATION OF FC-135. I CAN PROVIDE SAMPLES NECESSARY FOR TESTING. IF YOU HAVE ANY QUESTIONS, PLEASE SHOUT. THANKS, LEO

Leo F Gehlhoff

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CONFIDENTIAL - SUBJECT TO A PROTECTIVE ORDER ENTERED IN HENNEPIN COUNTY DISTRICT COURT, NO. 27-CV-10-28862