

----- TOP -----
I N T E R O F F I C E M E M O R A N D U M Date:
03-Feb-1994 10:24am CTZ From: Kenneth D.
Goebel GOEBEL, KENNETH D @PROFS @SSW*
Dept: Tel No: TO: DENENHOLZ, IRA M. @A1 @ORIONCC:
REINER, ERIC A @A1 @ENVNETCC: STEEL, CYNTHIA L @PROFS @SSWMB @HERMESCC: BRADFIELD,
MARY @PROFS @SSWMB @HERMES Subject: List of questions on several fluorochemical products
cc: UK040121--BRAVMC MARY BRADFIELD BRA US008448--USSP01 CYNTHIA L. STEEL
US047816--ALLINI REINER, ERIC A FROM: Kenneth D. Goebel - -CF&AP Compliance
236-GL-04 (612-733-4899)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*** Forwarding note from UK040121--BRAVMC 03/02/94 10:15 ***To: US019959--USSP01
KENNETH D. GOEBEL From: M.K. Bradfield, 3M UK Toxicology (0)344-858713 Subject: List of
questions on several fluorochemical products Ken, would you be so kind as to find the
following information for me? Decomposition temperatures for: Fluorad Brand Fluorochemical
Surfactant FC-171 Fluorad Brand Fluorochemical Surfactant FC-135 Fluorad Brand Coating
Additive FC-430 Fluorad Brand Fluorochemical Surfactant FC-99 Fluorad Brand Fluorochemical
Surfactant FC-129 Fluorad Brand Fluorochemical Surfactant FC-170 CA Also can we state what
the batch to batch variation on the percentage of methyl iodide is in "FC-135" and
how/what method should be used in monitoring for this material in air? Thanks very much
for your support. cc: US263645--USSP01 K ARMSTRONG 3M ST. BE100008--DIEVMB BOB COX 3M
BELGIUM Best Regards, Mary Bradfield

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I N T E R O F F I C E M E M O R A N D U M Date:
04-Feb-1994 11:08am CTZ From: ERIC A REINER
REINER, ERIC A Dept: 3M EE&PC
Tel No: (612) 778-5079 TO: BRADFIELD, MARY (BRADFIELD, MARY
(GOEBEL, KENNETH D @PROFS)CC:
SORENSEN, STANLEY D. (SORENSON, STANLEY D. @A1 @ORION) Subject:
Monitoring Of Methyl Iodide In Air From FC-135 Ken Goebel asked me to respond to you
question about how to monitor for methyl iodide in air. The question sounds like an
industrial hygiene concern. If so, I think you would get a more relevant answer if you
explained the concerns and re-asked the question of Stan Sorenson. In general, though, we
think one approach to analyze for methyl iodide would be to first adsorb it from air on
some adsorbent material. I don't know which adsorbent would be optimum. Then, one would
desorb it and analyze for it by gas chromatography/ mass spectrophotometry. Eric

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I N T E R O F F I C E M E M O R A N D U M Date:
04-Feb-1994 01:29pm CTZ From: SORENSON,
STANLEY D. SORENSON, STANLEY D. AT A1
AT* Dept: MEDICAL
Tel No: (612) 733-7058 TO: ERIC A REINER (REINER, ERIC A AT A1
AT ENVNET)CC: SORENSON, STANLEY D. (SORENSON, STANLEY D. @A1 @ORION)
CC: GOEBEL, KENNETH D (GOEBEL, KENNETH D @PROFS)CC: BRADFIELD,
MARY (BRADFIELD, MARY @PROFS) Subject: RE: Monitoring Of Methyl
Iodide In Air From FC-135 Our industrial hygiene sampling guide indicated that methyl
iodide can be sampled using either charcoal sampling tubes or the 3M 3500 organic vapor
monitor. Analysis procedure is indicated as gas chromatograph with electron capture
detector. If you have any questions regarding specific analytical details, it is
suggested you contact Ken Hart in our Industrial Hygiene lab in Building 201. I would
think you could also contact the 3M IH people in Harlow. I hope this answers your
questions. Please let me know if there are any further questions or additional
information is desired. Best Regards, Stan

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I N T E R O F F I C E M E M O
R A N D U M Date: 11-Feb-1994 03:53pm CTZ
From: DENENHOLZ, IRA M. DENENHOLZ,
IRA M. AT A1 AT OR* Dept: ICPD
Tel No: (612) 458-1383 TO: Kenneth D. Goebel (GOEBEL, KENNETH D
@PROFS @SSWMB @HE*CC: REINER, ERIC A @A1 @ENVNETCC: STEEL, CYNTHIA L @PROFS @SSWMB
@HERMESCC: BRADFIELD, MARY @PROFS @SSWMB @HERMESCC: DENENHOLZ, IRA M. @A1 @ORION
Subject: RE: List of questions on several fluorochemical products I have not been able to
determine the amount of methyl iodide in FC-135. We analyze for total iodide. Ira

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I N T E R O F F I C E M E M O R A N D U M Date:
15-Apr-1994 03:53pm CTZ From: ERIC A REINER
REINER, ERIC A Dept: 3M EE&PC
Tel No: (612) 778-5079 TO: Scott B. Strand (STRAND, SCOTT B.)



CC: HOWELL, ROBERT D. (HOWELL, ROBERT D. @CC3M)CC: GEHLHOFF, LEO F (GEHLHOFF, LEO F @PROFS)CC: GOEBEL, KENNETH D (GOEBEL, KENNETH D @PROFS)Subject: RE: FC-135Scott,Just a comment on the testing recommendations for FC-135 in your attached letter. I think we might want to further investigate the biodegradability of this fluorochemical quaternary ammonium salt. Its potential eventual biodegradation product is perfluorooctanesulfonic acid. In response to questions raised earlier this year about groundwater contamination from AFFF usage on the Island of Jersey, an outside expert was asked to set an acceptable exposure limit for the potassium salt of perfluorooctanesulfonic acid. Based on monkey bioassay data, that expert suggested a lifetime exposure level of 1.75 ppm. For exposures of a few months, he suggested an exposure limit of 17.5 - 20 ppm. If we were to do a biodegradation test on FC-135 it would probably make most sense to look for degradation in activated sludge, and analyze for perfluorooctanesulfonic acid, total fluorine, fluoride, and the parent material. 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 -----

I N T E R O F F I C E M E M O R A N D U M

13-Apr-1994 08:14am CTZ

Date:

STRAND, SCOTT B.

From: Scott B. Strand
Dept: EE&PC

Tel No: 778-7863 (FAX 778-6176) TO: GOEBEL, KENNETH D

(GOEBEL,

KENNETH D @PROFS)CC: GEHLHOFF, LEO F

(GEHLHOFF, LEO F @PROFS)

CC: ERIC A REINER

(REINER, ERIC A)

CC: DENENHOLZ, IRA M.

(DENENHOLZ, IRA M. @A1 @ORION)Subject: 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 sewerred. 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 8-7863. I normally work from 7:00 - 4:00. Thanks for your help. Best regards, Scott Strand

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3M Internal Correspondence

12:43pm CTZ

Date: 13-Apr-1994

From: Kenneth D. Goebel

GOEBEL, KENNETH D @PROFS @SSW*

Dept:

Tel No: TO: See below Subject: FC-135 cc: US042280--USSP01 CRAIG W OLSON

US047816--ALLIN1 REINER, ERIC A US053833--ALLIN1 DENENHOLZ, IRA M.

US025755--USSP01 GEHLHOFF, LEO F US067738--USSP01 BIERBRAUER, CHESTER FROM: Kenneth

D. Goebel - -CF&AP Compliance 236-GL-04 (612-733-4899) Based on mounting

evidence that our ionic fluorosurfactants may readily be absorbed into the human body and

may persist in the human body for long time periods, I would not recommend sewerred or

disposal into water systems in any amount. However, providing this potential customer with

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 you 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*** Forwarding note from

USPIN009--ALLIN1 04/13/94 08:38 ***Distribution: TO: STRAND, SCOTT B. @A1 @ENVNET CC:

DENENHOLZ, IRA M. @A1 @ORION CC: REINER, ERIC A @A1 @ENVNET CC: BIERBRAUER, CHESTER J

@PROFS @SSWMB @HERMES CC: GEHLHOFF, LEO F @PROFS @SSWMB @HERMES CC: OLSON, CRAIG W @PROFS

@SSWMB @HERMES----- BOTTOM

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R A N D U M

I N T E R O F F I C E M E M O

From: ERIC A REINER

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

Dept: 3M EE&PC

REINER, ERIC A

GEHLHOFF, LEO F

Tel No: (612) 778-5079 TO:

(GEHLHOFF, LEO F @PROFS)CC: BIERBRAUER, CHESTER

J @PROFS @SSWMB @HERMES CC: GOEBEL, KENNETH D @PROFS @SSWMB @HERMES CC: Scott B. Strand

(STRAND, SCOTT B.)CC: HOWELL, ROBERT D. (HOWELL, ROBERT D. @CC3M)

Subject: RE: FC-135 Leo 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 to

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 for each of the two types of organisms you are missing. The predicted safe environmental concentration for this material would then be 3 micrograms per liter or 3 ppb. Knowing a probable 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 algae bioassay 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. Eric

ATTACHMENT -----
E M O R A N D U M
CTZ
GEHLHOFF, LEO F @PROFS @SSWMB*
Tel No: TO: REINER, ERIC A @A1 @ENVNETCC: GOEBEL, KENNETH D @PROFS @SSWMB @HERMESCC: BIERBRAUER, CHESTER J @PROFS @SSWMB @HERMES
BIERBRAUER, CHESTER US019959--USSP01 GOEBEL, KENNETH D. From: FROM: Leo F Gehlhoff -
SCD LAB 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 ANFC 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
BOTTOM -----

I N T E R O F F I C E M

Date: 19-Apr-1994 09:32am

From: FROM: Leo F Gehlh

Dept: