Review + Comment
to Kennedy

DRAFT

Proposal to Conduct a
General Human Health and Environmental Effects
Risk Analysis on C-8

Purpose: The purpose of this project is to evaluate the risks to human health and the environment from exposure to C-8 during manufacture, transport, product use, and disposal of C-8. The analysis will be conducted in a fashion that will provide semi-quantitative estimates of risks so that exposures yielding the highest risks can be identified and recommendations on reducing these risks can be developed. Risks from manufacture, transport and product use will developed in a way that will facilitate future comparisons of risks estimated for potential C-8 alternatives. The project will be conducted in three parts. The first two will be conducted in parallel, in which human health and ecological risks will be characterized. The final part will develop conclusions on exposures that contribute the highest risks so that recommendations for risk management strategies and alternatives can be developed. The project is estimated to take 12 months to complete from the time of initiation. The Exposure analyses listed below will require collaboration with appropriate plant personnel. *(The dates presented assume a Feb. 1, 1997 SBU approval date.)*

Scope:

I. Human Health Risk

A. Hazard Identification — Time Line: 4/18/97 — Est. Cost($): 8000

Hazards to human health will be reviewed and summarized in this section. The critical toxicity endpoints of relevance to human health risk will be identified and potential dosimeters to be used for interspecies extrapolation of risk will be discussed. The Haskell toxicity summary will be updated as part of this task.

B. Dose-Response Analysis — 9/30/97 — 43,200

The dose-response characteristics of C-8 will be evaluated. This may include conducting benchmark dose analyses to identify no-observed adverse effect levels where necessary. Appropriate dosimeters for interspecies extrapolation will also be developed based on the likely mode of action. The pharmacokinetics of C-8 will also be reviewed. If possible, rudimentary physiologically-based pharmacokinetics approaches will be developed to facilitate interspecies extrapolation of risk. Risks vs. dose relationships will be developed in this phase

C. Exposure Analysis — 9/30/97 — 16,000

Reasonable exposure scenarios for C-8 will be developed. This are likely to include airborne, drinking water, dermal, and other oral ingestion pathways. Intake rates and durations of exposure will be developed. Haskell will work with an assigned person(s) from the plant site to help characterize these exposure pathways for manufacturing, transport, product use, and waste disposal operations. The business will provide Haskell with data on concentrations of C-8 in the affected media (air, water, soil). These data will be tabulated. Monte Carlo techniques may be used to calculate expected upper confidence limits for these exposures, depending the availability of data. The cost associated with this task includes only Haskell personnel time.

D. Risk Characterization — 12/15/97 — 16,000

Risks will be summarized according to the major routes of exposure (air, water, dermal, other oral) for each C-8 application (manufacture, transport, product use, disposal). The risks will be characterized by comparing the likely exposure concentrations to the dose-response relationship. This method is generally referred to as a Margin of Exposure. The characterization will provide the risk manager with

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information that will help identify the operations and exposure pathways that present the highest risk. The characterizations will also enable future comparisons to be made of potential risks posed by C-8 alternatives.

II Ecological Effects

	Time Line	Est. Cost($)
A. Hazard Identification		

Hazards to key environmental health indicator species will be reviewed and summarized in this section. The critical toxicity endpoints will be identified. Based on the current literature search, chronic studies in aquatic species will need to be undertaken. Avian reproduction and avian food-chain accumulation will need assessment; however this may be extrapolated using mammalian toxicology and PB-PK data and E Fate information. The Haskell toxicity summary will be updated as part of this task.

1.) Hazard Assessment	9/15/97	$10,000
2.) Testing (Fish ELS and Daphnid Chronic) (This is with static renewal and analytical)	8/15/97	$80,000
3.) Avian (if needed)	8/15/97	$80,000

B. Exposure Analysis

Reasonable exposure scenarios for C-8 will be developed for the higher environmental exposure areas at the three manufacturing sites, including their respective disposal sites and a customer site. Intake rates and durations of exposure will be developed. Haskell will work with an assigned person(s) from the plant site to help characterize these exposure pathways for manufacturing, transport, product use, and waste disposal operations. The business will provide Haskell with data on concentrations of C-8 in the affected media (air, water, soil). These data will be tabulated. Monte Carlo techniques may be used to calculate expected upper confidence limits for these exposures, depending on the availability of data. The cost associated with this task includes only Haskell personnel time.

1.) Exposure Assessment - Washington Works	6/15/97	8,000
2.) Exposure Assessment - Dordrecht	8/15/97	6,000
3.) Exposure Assessment - Shimizu	9/15/97	2,000
4.) Exposure Assessment - Customer	10/15/97	2,000

D. Risk Characterization

Risks will be summarized according to the major media of environmental exposure (water, soil, air) for each C-8 application (manufacture, transport, product use, disposal). The risks will be characterized by comparing the likely Predicted Environmental Concentrations (PEC) to the Predicted No Effect Concentrations (PNEC). This method is generally referred to as Hazard Quotient. The characterization will provide the risk manager with information that will help identify the operations and exposure pathways that present the highest risk. The characterizations will also enable future comparisons to be made of potential risks posed by C-8 alternatives.

12/15/97 16,000

III. Recommendations on Risk Management Strategies and Alternatives

12/15/97 4800

This section will evaluate collectively the risks identified to human health and ecological receptors. Based on these analyses, recommendations will be made as to which operations could be targeted to ensure risks are appropriately managed in the most cost effective manner. This will be a very subjective exercise (narrative) and will require some intereaction with the appropriate people from the business.

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- meeting Notes
- 3 wks ago meeting held to discuss C-8 + RCRA corrective actions -
  - discussed remediation
- Drawing Risk Analysis as part of RFI will reveal EPA awareness on C-8.
- Documents over 3 yrs to be destroyed

CEG - 6 ug/day
AEL - 0.01 mg/m³

- EPA Screening Level
  Look at basic toxicity data + then look at individual media exposure.
  - ✓ EPA gets their guidance from DuPont
    Submission is 6/99 - will read promptly.
- Consider on site communications for C-8 + others in drinking water -

★ - Playtis, Tyler, Kennedy to draft a question for Haskell for to give us some type of guidance on C-8 levels in water similar to AEL levels in air
note
↳ Pass through Bernie J. Reilly. 774-5445

- if between 3 + X
  - ✓ Not a panic go to point
  - ✓ take No. to CE with tailored questions
    PM, Env Res, OCC H resource.

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Phone Conference - Playtis, Kennedy, Zipf

- Initial action point - 10% of AEL due to additive source to airborne exposure that already

10% ⇒ 5 PPB in air } Management action initiated 25 PPB
50% ⇒ ~~management action~~ requiring Formal investigation + follow-up

- Shut off water ⇒ 50 PPB @ 100% AEL.

Ritchey - Carl B. Reilley

- 3PPB is absolute safe for all people.

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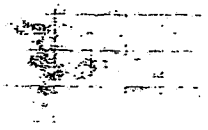
C-8 Issues

SAFETY

- Employee Protection
  - Air monitoring
  - BPE
  - Liquid C-8
- Customer Protection
  - MSDS SHEETS —
- Environmental Protection
  - Analytical
  - Air — authorization approved for 94
  - WATER —

    Groundwater
- LANDFILLS



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ENGINEERING DUPONT COMPUTATION SHEET

D.G. w.leg -

AEL = 0.01 mg/m³

Assume 10 m³/day breath in 8hr day

100% of C-8 is absorbed

at AEL level 100 µg of C-8 day

Assume - 2L/day @ 1 PPB of C-8 by wt.

100% absorbtion - 2 µg of C-8 day

(Arnold shows >80% absorption from water)

People at AEL or less showing 0-6 ppm F⁻

1/25 of 6 ppm is .24 ppm -

Lubeck wants us to buy their land. so they can relocate

Continued water @ 2PPB in Lubeck water System at 2L day

$(2\times10^{-9})\times 2\times10^{3} = 4\times10^{-6}$ g/day consumption

Air - AEL 1×10^{-5} g/m³ $\times 10^{3}$ m³/day $= 1\times10^{-4}$ g/day

20% AEL 10^{-5} g/m³ $\times 10$ m³/day $\times .2 = 2\times10^{-5}$ g/day

Δ is 5/1 air/water

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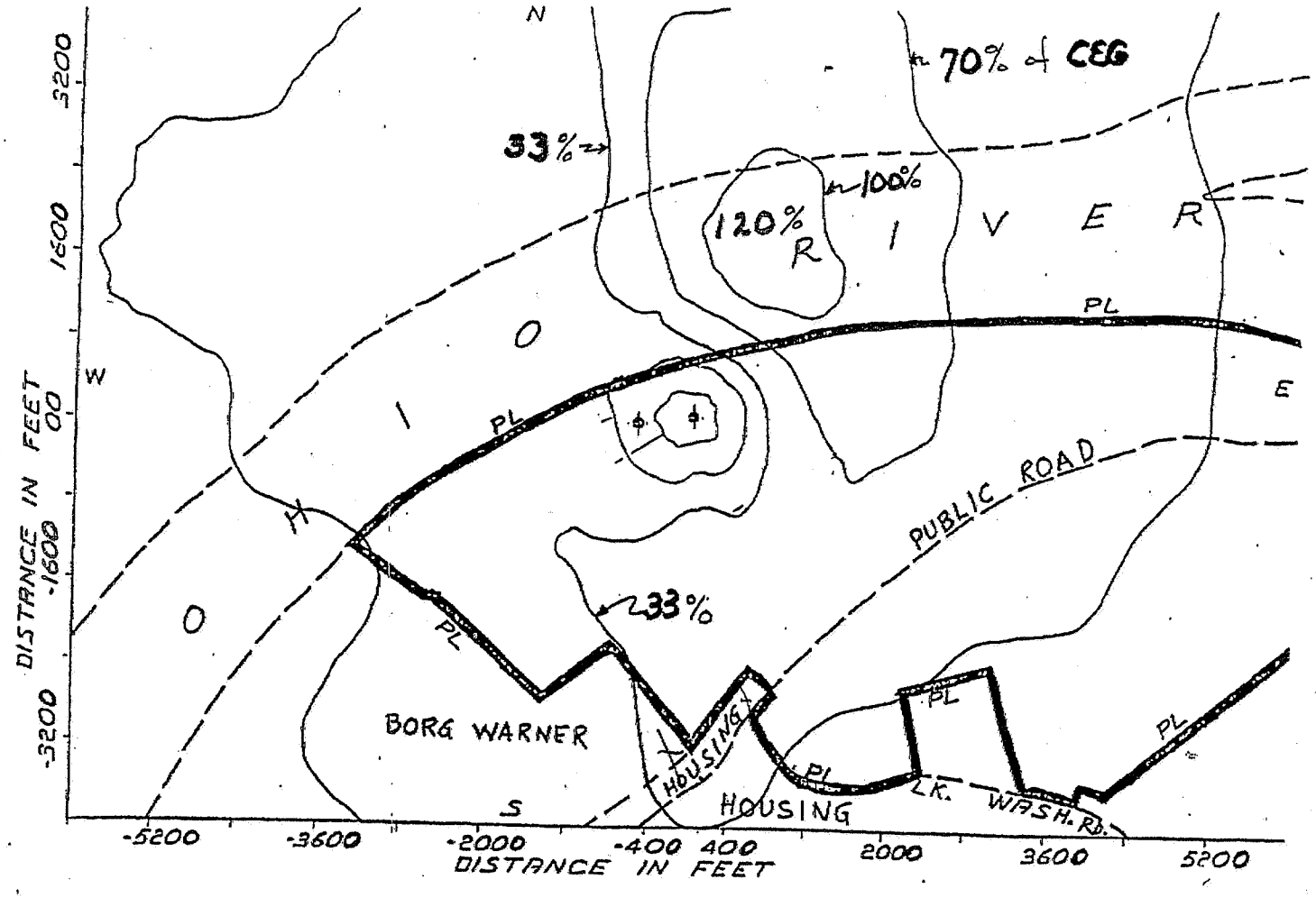
WASHINGTON WORKS C-8 ANNUAL MEAN CONCENTRATION
CASE 1



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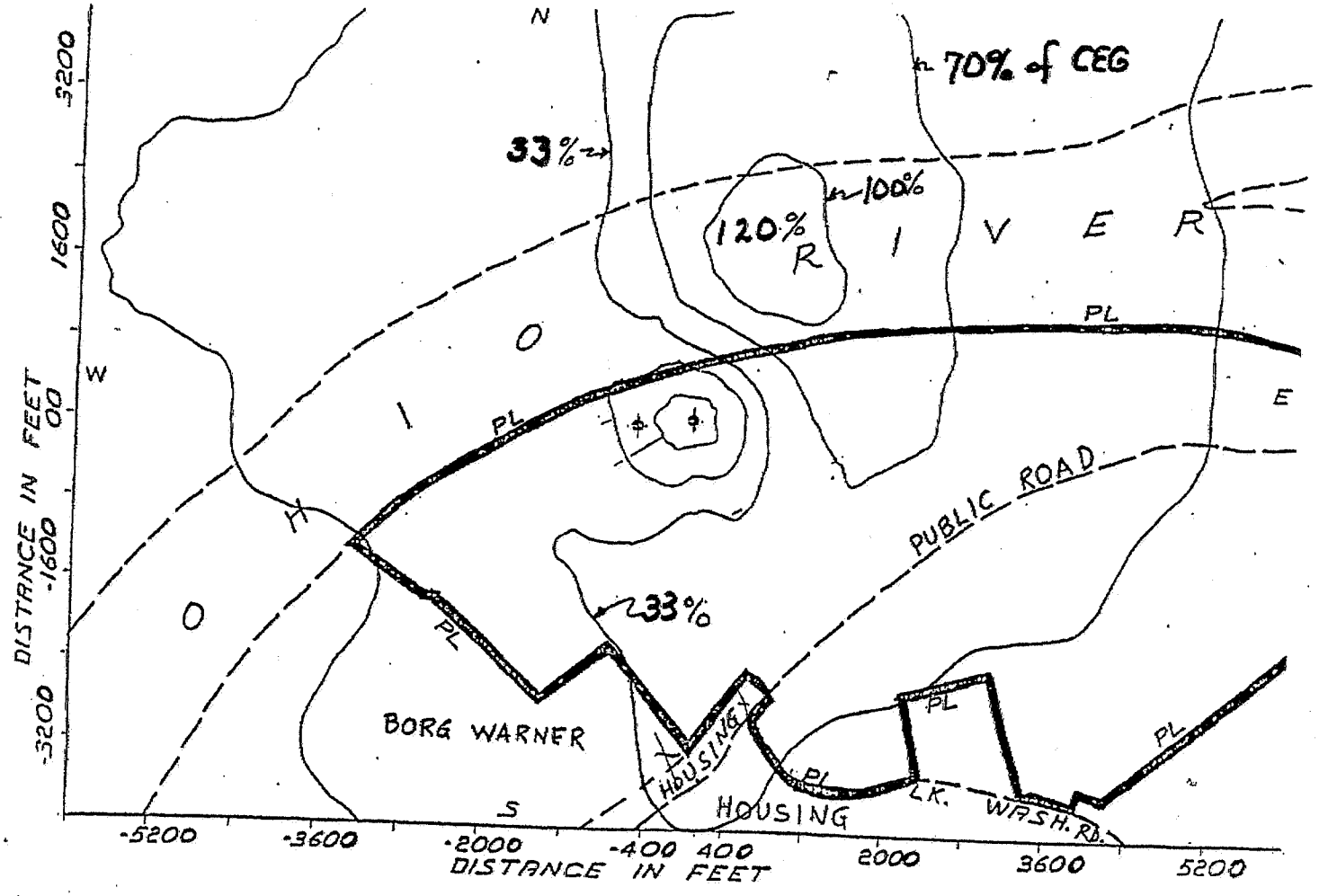
WASHINGTON WORKS C-8 ANNUAL MEAN CONCENTRATION
CASE 1



"48" 6000-3 ft/min
-Nozzle 3.4

stable

Permit
815B

424-6117

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Fisher F6#24 6118

* update ord'r. to show PP change

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CPP-6000 — Wilwood — Chris Sharp 863-3471
Alt. 428-1047

.002

Reg 7 2500 — .2 lbs/hr .0024
5000 .8 lbs/hr

930
- Current P.O. rate 961 lbs/hr — 1000 lbs/hr

Belt Speed - 3.8 → 950 lbs/hr.
bottom is 3.1 → 775 lbs/hr.

Reg 7 Permit
2500 - 3 lbs/hr —
5000 - 5 lbs/hr

Reg 7 - exemption under Sect. 10 - various 10 type operations due to unavailable materials.
↳ Clarification of the exact communication —

★ Communication with Cheryl 1st thing in AM.

1) Get Air Sampling going tomorrow.
access for longer than one hour requires breaching protection
get TA to cover this operation.

774-457

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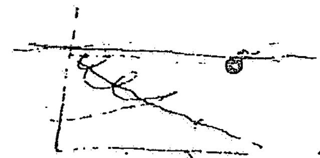
Re: [illegible]

Personal Air Sampling



✓ DCHM will replace PERS → in UTX

✓ [illegible] jobs [illegible]

c) [illegible]

1) time

2) handling with PPE

3) Barricade

Air monitoring

- 70% through Logan
- C-8 high spots
  - ✓ Ingredients Addition

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	A	B	C	D	E	F	G	H	I
39									
40	K-7762 Calculations, Continued								
41	AEL for C8 material is 0.01mg/cubic meter								
42	1 ft3 = 0.028 m3								
43	1 lb = 453,000 milligrams								
44	0.06 lbs = 27,180 mg								
45	30M cfm = 30,000 X 60 X 24 = 43,200,000 ft3 = 1,209,600 m3								
46	2.2470238e-2	mg/m3	or 0.0225 mg/m3						

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	A	B	C	D	E	F	G	H	I
1	K-7762 Calculations								
2	To Calculate the amount of TEFLON and Ammonium Perfluorooctanoate which could be in Cape Fear Waste Treatment Pond								
3									
4	Assume 6 Draw Machines								
5		3 DHM's							
6		3 HR's							
7	Process uses 1 g/min of 2.55% finish emulsion.								
8	4.8 lbs/hr of finish oil remain on fiber.								
9									
10	1g/min x 8.3 lbs/gal x 60 min/hr s .0255 finish concentration = lbs oil applied/hr								
11									
12	12.699	lbs/hr finish oil applied to fiber							
13	4.8	lbs/hr finish oil remaining on fiber							
14	7.899	lbs/hr /DM finish oil going to pond							
15	1137.456	lbs/day waste oil to pond for 6 DM's							
16	Finish contains 10% TEFLON which is max 0.5% Ammonium perfluorooctanoate								
17	0.568728	lbs Ammonium Perfluorooctanoate/day to waste pond							
18	**2.74085e-8**	**parts Ammonium Perfluorooatanoate/part of waste water in pond**							
19									
21	Pond holds 2.6 million gallons.								
22	Each day, 1.5 million gallons water enter and leave the pond								
23	5.2708804e-5								
24									
25	To Calculate the amount of TEFLON and Ammonium Perfluorooctanoate which could be on fiber.								
26	Assume 0.1% FOT and 0.07% K-7762.								
27	.0007 x .1 % Teflon x 0.005 ammonium perfluorooctanoate = amt ammonium perfluorooctanoate on fiber								
28	0.00000003 parts ammonium perfluorooctanoate per part fibe	or 350 parts per billion							
29									
30	3.50e-7	or 350 ppb on fiber							
31									
32	1 cubic foot of air at 70 degress F at 29.92 lbs atmospheric pressure = 0.075 lbs								
33	30,000 CFM X 60 min/hr X 24 hrs/day X 70% DM efficiency X 0.075 lbs/cubic foot of air =						2,268,000	lbs of air /day	
34	0.06 lbs C8 per day/2,268,000 lbs air/day =	2.6455026e-8	or 26.5 ppb C8 in relaxer exhaust assuming						
35					fans shut down when fiber is not running.				
36	BUT, fans runn 100% of time, fiber runs 70% of time. Therefore,								
37	3,240,000	air/DM/24hrs							
38	1.8518518e-8	or 18.5 ppb C8 in relaxer exhaust assuming fans run all the time.							

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