Review by
Joe Louchiano
for VHT ; RJB ; RNT

Washington Works C-8 Program

Incinerator Investigation

- As a result of the recent industrial hygiene investigation conducted at the incinerator, personal exposures to C-8 were found to be well below the provisional AEL of 0.56 mpb (see attached letter).

- All air samples collected in May at the incinerator were analyzed by the C-8 specific method and showed essentially zero C-8 air levels.

C-8 Toxicity Studies at Haskell Lab.

- Teratology - Female rats were exposed to approximately 10 mg/m³ of C-8 (1000 times the provisional AEL) by inhalation during days 6 to 15 of gestation. Each rat received ten 6-hour exposures. R.E. Staples, Teratologist, mentioned that fetuses and weaned offspring are now being examined. Although it's early in the examination phase, some optimistic signs have been observed. The eyes are being checked by an ophthanologist and so far nothing compound related has been observed. Also, so far, no adverse

Very confidential at this point

effects on the fetuses have been observed. Firm conclusions should be reached by end of 3rd quarter. If no adverse effects are observed at this high dose level, testing at lower levels will not be necessary.

- Teratology - In two weeks, Haskell will begin a study which will duplicate the 3M study. In this study, pregnant female rats will be exposed to C-8 by gavage (C-8 fed directly into the stomach through a tube).

- Blood Analyses of Female Rats - Approximately 200 blood samples were collected from female rats exposed orally or by inhalation. Purpose of this study is to determine how oral and inhaled C-8 doses relate to blood C-8 levels. Samples are being analyzed for C-8 at the Experimental Station. Preliminary results should be available by the end of July.

- Distribution - Excretion Studies - Radio-labelled (Carbon - 14) C-8 is being administered orally to male and female rats, mice, hamsters, rabbits, dogs, and monkeys. Elimination of C-8 in the urine and feces will be measured. Test will determine if C-8 accumulates in tissues. Preliminary results should be available by mid - July.

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- Protein Binding - The binding of radio-labelled C-8 to blood proteins will be studied. This study should help explain the persistence of C-8 in the blood. Testing should begin in mid-July.

Blood Sampling Program

- On an annual basis, blood C-8 levels will be checked on all permanent Teflon® employees including supervisors, operators, mechanics, engineers, and secretaries.

- 56 women were tested by the middle of May. Mean C-8 concentration found was 0.9 ppm. They will be retested in November.

- Any new Teflon® employees will be tested after 3 and 6 months of Teflon® employment.

- A few former Washington Works employees (retirees) will be tested to help determine rate of C-8 elimination.

- Chuck Campbell wrote an employee communication which is intended to inform employees about the C-8 blood sampling program as well as the Haskell Laboratory testing. The blood sampling program will begin when

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the communication is cleared and circulated to the employees.

Air Sampling Program

- FEP – C-8 in air levels have been significantly reduced since 1980. Samples collected since completion of the May shutdown indicate significant improvement over the samples collected immediately prior to the shutdown. For example, during March, 1981, The clean room C-8 levels averaged 4.11 mpb. However, air samples collected in the clean room over the past month average around 1.5 mpb.

- FEP – Personal samples collected on the wet finishing operator continue to show a downward trend in C-8 exposure. Samples collected from January to May, 1981 averaged around 0.51 mpb. (Samples collected on the wet finishing operator averaged 0.95 mpb in 4/80 and 0.91 mpb in 9/80). However, since the shutdown, samples are averaging around 0.23 mpb.

- FEP – Thirty-one of thirty-two air samples collected during the shutdown were below 0.1 mpb. This indicates that the cause of

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airborne C-8 is not the old residual dust in the area but is due to hot process sources of C-8. Al Behnke is therefore concentrating his efforts on eliminating these C-8 sources.

- FEP – Housekeeping is still important since old residual dust it can pose a skin contact and potential ingestion problem. Efforts to improve housekeeping are therefore being continued. Two Winans employees have been hired for 13 weeks to continually clean up residual dust throughout Building 163.

- TFE – Relatively few air samples have been collected in Building 162 since September, 1980. Therefore, an ambitious air sampling program is being planned in order to establish a good data base. The results of these air samples will determine the continued effectiveness of engineering controls and will indicate if any further corrective measures are necessary.

- I have designed a new industrial hygiene air sampling data form which will aid me in interpreting air sampling results (see attached). The back of the sheet will be filled out by Production and will contain information regarding operating conditions when the sample was being collected.

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Air Samples Collected Outdoors

Date	Location	Winds	M.P.B. C-8	Analytical Method
3/27/81	Outside Trailer Offices - West of Bldg. 168	Noon - NNE @ 12mph	0.64	Methylene Blue
3/21/81	"	Noon - SSW @ 5 to 6 mph	<0.1*	"
3/31/81	"	"	<0.1	"
3/27/81	Outside Trailer Offices - Approx. 100' west of Bldg. 164	Noon - NNE @ 12mph	<0.1	"
4/8/81	Outside Carr Bldg. At West Door	Noon - SW @ 15mph	0.15	"
4/15/81	"	Noon - N @ 7 mph	<0.1	"
5/8/81	900' West Of Teflon® F.P. Dryer Exhaust Stacks (Both Dryers Running)	8:00 A.M. - SE @ 4 to 5 mph Noon - SE @ 6 mph 2:00 P.M. - SE @ 6 to 7 mph	0.03	C-8 Specific
5/8/81	1200' West ...	"	<0.03**	"
5/8/81	1500' West ...	"	<0.03	"
5/8/81	450' East ...	"	<0.03	"

* The limit of detection for the methylene blue method is 0.1 mpb.

** The limit of detection for the C-8 specific method is 0.03 mpb.

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6/8/81	On North Side of West Supernate Pond	9:00 A.M. - S@2mph Noon - SW@6mph	0.28	Methylene Blue
6/8/81	On North Side of Middle Supernate Pond	"	0.28	"
6/8/81	On North Side of East Supernate Pond	"	0.39	"

Status of Scrubbing Project

- Process Engineer assigned (C.E. Steiner)
- P and E has been issued by Charleston Regional Design
- Current expected timing:

Scope – 8/81
Estimate – 11/81
Authorization – 1/82
Construction – 1/83
Turnover

C-8 To River

- At present, approximately 11,000 lb. of C-8 goes to the river each year.

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1000 lb. – Fine Powder/Dispersion
350 lb. – Granular
9650 lb. – FEP
11,000 lb.

- A scrubber with 90% efficiency on the fine powder dryer exhaust stacks, will increase the yearly amount of C-8 going to the river by about 8100 lb. – a 74% increase.

- Another alternative would be to send spent scrubber solution to supernate ponds. Assuming no C-8 reclamation or recycling of water, the costs for both dryers would be extremely high. Cost of disposing supernate is about $0.28/gallon. Approximately 19,250 gallons of spent scrubber solution would be sent to the ponds each day. The daily disposal cost would therefore be $5400 or almost $2 million a year.

- If an ion-exchange resin can be used to reclaim C-8 and thus make recycling water possible, a great deal of money could be saved. Feasibility of this alternative is being investigated.

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Supernate Disposal

- A letter was sent from A.C. Huston to Chemical Waste Management (C.W.M.) which is the parent company of Ohio Liquid Disposal (O.L.D.). The letter advised C.W.M. of the recent 3M findings and recommended handling procedures. A similar letter was sent to Chambers Works.

to the Production Manager in charge of waste disposal since Chambers Works will be handling 50% of our supernate. The other 50% will be handled by O.L.D. The letter was sent to C.W.M. was approved by DuPont Legal and Energy and Environmental Affairs. The letter was received by C.W.M., initialled, and returned to Washington Works. A waste audit of O.L.D.'s facilities was performed in 1/81 by C.A. Palmer of E.S.D. Another audit is proposed for the last quarter of this year.

Atmospheric Dispersion of C-8

- R. Wevodau, E.S.D., used Parkersburg weather data from 1973 to 1977 along with FEP and TFE C-8 emission data to compute expected ground-level C-8 concentrations at 15 Washington Works locations. For each of the 15 locations, maximum 1-hour, maximum 8-hour, and annual mean C-8 concentrations were calculated (see attached Tables). Since C-8 seems to accumulate in the blood, the annual mean concentrations are probably the most meaningful. The highest annual mean of the 15 locations is 0.34 $\mu g/m^3$ or 3.4% of the AEL and was found 2000' north of the Imie Powder Dryer stacks before the height was increased.

- According to R. Wevodau's calculations, increasing the dryer stack heights 15' reduced the annual mean concentration for the 15 locations by an average 32.6% per location.

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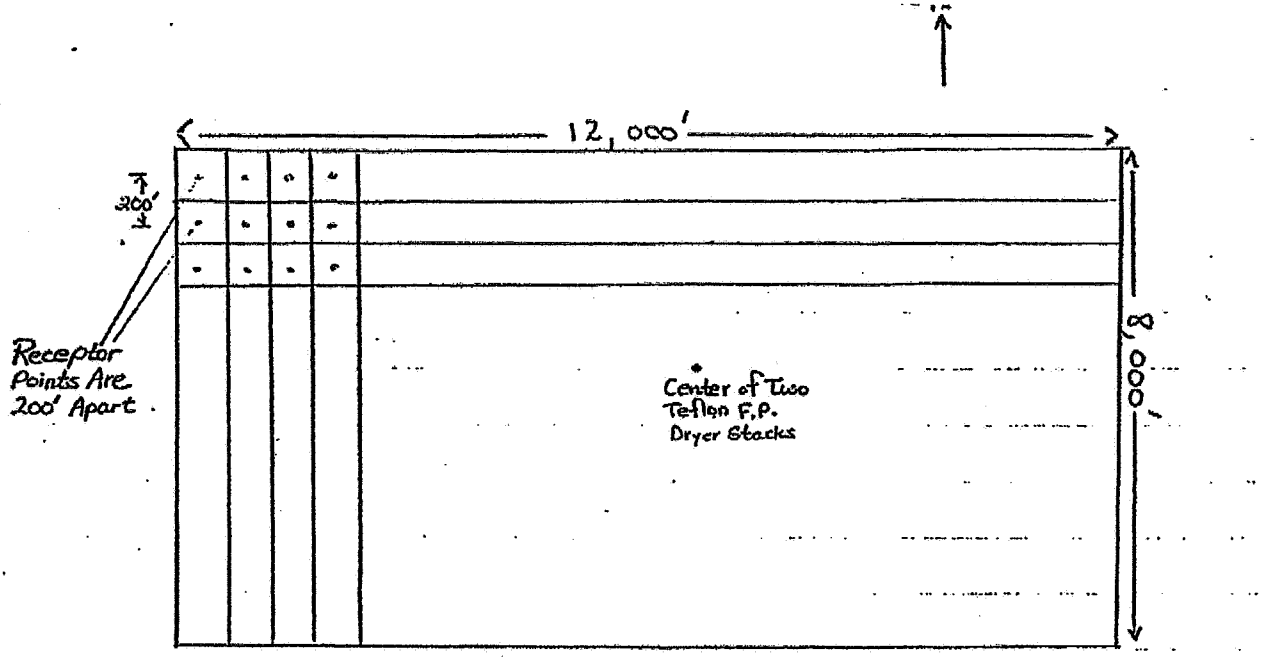

ANMEAN PROGRAM GRID

With the new ANMEAN program, 1-hour, 8-hour, and annual mean C-8 concentrations can be calculated for 2400 receptor points which are 200' apart. The old ISC program is only capable of calculating C-8 concentrations for 180 receptor points. In the ANMEAN program, concentration contours can also be plotted.

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