

Microfiche No.		
07585475A		
[Hatched Bar]		
New Doc I.D.	Old Doc I.D.	
88-92800666	8E92-8892-8848	
[Hatched Bar]		
Date Produced	Date Received	TSCA section
2/24/74	8/25/72	8ECP
[Hatched Bar]		
Submitting Organization		
UNION CARBIDE CORP		
[Hatched Bar]		
Contractor		
WELDON INST. INDUST. RES.		
[Hatched Bar]		
Document Title		
INITIAL SUBMISSION; RESULTS OF FOURTH MOUSE SKIN-PAINTING STUDY WITH SEVERAL COMPOSITIONS WITH COVER SHEET AND LETTER DATED 8/19/72		
[Hatched Bar]		
Chemical Category		
TOLUENE		

8040

8(e)

CAP

(COMPLIANCE AUDIT PROGRAM)

TSCA CONFIDENTIAL BUSINESS INFORMATION

- ORIGINAL - DCO (Jeff/Eric)
- COPY # 1 - CBIC
- COPY # 2 - Scott Sherlock

COMPANY SANITIZED

- ORIGINAL - PINS
- COPY # 1 - PINS
- COPY # 2 - ECAD

CONTAINS NO CBI

- ORIGINAL - PINS
- COPY # 1 - PINS
- COPY # 2 - ECAD (Dave Williams)



UNION CARBIDE CORPORATION

39 OLD RIDGEBURY ROAD, DANBURY, CT 06817-0001

"Contains NO GBK"

8EHQ-0892-8040

August 19, 1992

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**



8EHQ-92-8040
INIT 08/25/92

Document Processing Center (TS-790)
Room L-100
Office of Toxic Substances
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460



88920006686

Attn: Section 8(e) Coordinator (CAP Agreement)

Re: CAP Agreement Identification No. 8ECAP-0110

Dear Sir or Madam:

Union Carbide Corporation ("Union Carbide") herewith submits the following report pursuant to the terms of the TSCA §8(e) Compliance Audit Program and Union Carbide's CAP Agreement dated August 14, 1991 (8ECAP-0110). This report describes mouse skin-painting toxicity studies with several compositions (no CASRN's are available). A high tumor incidence was found for pasting oil, light product residue, and pitch residue.

"Results of Fourth Mouse Skin-Painting", Mellon Institute of Industrial Research (University of Pittsburgh), Report 17-34, February 24, 1954.

A complete summary of this report is attached.

Previous TSCA Section 8(e) or "FYI" Submission(s) related to this substance are:

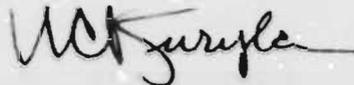
(None)

Previous PMN submissions related to this substance are: (None)

This information is submitted in light of EPA's current guidance. Union Carbide does not necessarily agree that this information reasonably supports the conclusion that the subject chemical presents a substantial risk of injury to health or the environment.

In the attached report the term "CONFIDENTIAL" may appear. This precautionary statement was for internal use at the time of issuance of the report. Confidentiality is hereby waived for purposes of the needs of the Agency in assessing health and safety information. The Agency is advised, however, that the publication rights to the contained information are the property of Union Carbide.

Yours truly,



William C. Kuryla, Ph.D.
Associate Director
Product Safety
(203/794-5230)

WCK/cr

Attachment (3 copies of cover letter, summary, and report)

SUMMARY

Confidential

R: 2-24-54

Report 17-34

MELLON INSTITUTE OF INDUSTRIAL RESEARCH

UNIVERSITY OF PITTSBURGH

SPECIAL REPORT

on

Results of Fourth Mouse Skin-Painting Study

Carbide and Carbon Chem. Co., U.C.C. Industrial Fellowship No. 274-17

Summary

In the fourth mouse skin painting study, groups of approximately 30 Jackson C₃H mice received applications 3 times a week for at least one year of a toluene still residue or of one of 9 materials from the coal hydrogenation unit. As the two "negative" control groups - distilled water or benzene painted - were completely non-tumorigenic, no correction was necessary. A group of mice were concurrently painted with a known carcinogen - methyl cholanthrene.

Of the samples tested, pasting oil was highly carcinogenic and light product residue and pitch residue, the latter tested as a 10% solution in benzol, were only slightly less carcinogenic. The toluene still residue, which has been reported tumorigenic in our 10th subcutaneous study, was non-tumorigenic in this skin painting study. All of these materials, however, should be handled as possible human carcinogens.

Raw wash oil, with or without the bases and phenols, tar acid or phenolic pitch, low and high boiling phenols and high boiling hydrocarbon samples did not produce any papillomas or carcinomas in one year of painting.

Report 17-34

MELLON INSTITUTE OF INDUSTRIAL RESEARCH

UNIVERSITY OF PITTSBURGH

SPECIAL REPORT

on

Results of Fourth Mouse Skin-Painting StudyCarbide and Carbon Chem. Co., U.C.C. Industrial Fellowship No. 274-17Summary

In the fourth mouse skin painting study, groups of approximately 30 Jackson C₃H mice received applications 3 times a week for at least one year of a toluene still residue or of one of 9 materials from the coal hydrogenation unit. As the two "negative" control groups - distilled water or benzene painted - were completely non-tumorigenic, no correction was necessary. A group of mice were concurrently painted with a known carcinogen - methyl cholanthrene.

Of the samples tested, pasting oil was highly carcinogenic and light product residue and pitch residue, the latter tested as a 10% solution in benzol, were only slightly less carcinogenic. The toluene still residue, which has been reported tumorigenic in our 10th subcutaneous study, was non-tumorigenic in this skin painting study. All of these materials, however, should be handled as possible human carcinogens.

Raw wash oil, with or without the bases and phenols, tar acid or phenolic pitch, low and high boiling phenols and high boiling hydrocarbon samples did not produce any papillomas or carcinomas in one year of painting.

Samples Used

The following is a list of our sample numbers by which the samples will be henceforth identified, the sample name, source, quantity received, identification and the date that they were received.

(1) 15-157, Toluene still residue. A residue from live steam stripping operation from the number two toluene refining still (Building 103, Plant CS) was sent to us at the request of Dr. E. V. Henson by V. V. Tilton accompanied by a letter dated May 23, 1952. The analysis number was A-00192-May 9, 1952. One quart was received May 26, 1952.

(2) 15-352, Raw wash oil. One quart received November 17, 1952 with identification HN-1236-11A, from the Coal Hydrogenation Unit.

- (3) 15-355, Raw wash oil. One quart received November 7, 1952. Identification HN-1236-11D, with bases and phenols extracted, from Coal Hydrogenation Unit.
- (4) 15-363, Phenolic pitch. 32 ounces received November 24, 1952. Identification EUS-5, from Coal Hydrogenation Unit. Tested on mice as 80% solution in benzol to reduce viscosity.
- (5) 15-364, Low boiling phenols. One quart received November 24, 1952. Identification RUS-7, from Coal Hydrogenation Unit. Diluted 50% in benzol in attempt to reduce irritation. Toxicity was so extreme that no application was made after April 6, 1953.
- (6) 15-365, High boiling phenols. One quart received November 24, 1952. Identified as RUS-9, from Coal Hydrogenation Unit.
- (7) 15-371, High boiling hydrocarbons. One quart received November 24, 1952. Identified as RUS-4, from Coal Hydrogenation Unit.
- (8) 16-3, Pasting oil. One quart received December 5, 1952. Identified as SU-3000, from Coal Hydrogenation Unit.
- (9) 16-5, Light product residue. One quart received December 5, 1952. Identified as SU-10,000, from Coal Hydrogenation Unit.
- (10) 16-7, Pitch residue. One quart received December 5, 1952. Identified as SU-20,000. Tested as 10% in benzol as it was a solid.

The following control groups were used:

- (a) Benzol
- (b) Distilled water
- (c) Methyl cholanthrene - dosed at 1 ml. = 0.002 grams in benzol

Experimental Method

The procedures used in this study were the same as described in reports from this laboratory numbered 14-60, 15-30, and 15-73, dated July 9, 1951, March 25, 1952 and August 22, 1952 on the results of the first, second, and third mouse skin painting studies. They were patterned after the method of Smith reported in Cancer, 4: 1232 to 1245, 1951 and in the A.M.A. Arch. Indust. Hyg., 4: 299 to 314, 1951. In brief 30 C₃H mice from Roscoe B. Jackson Memorial Laboratory, Bar Harbour, Maine, were painted on Monday, Wednesday and Friday and their hair growth clipped on Tuesday and Thursday of each week for at least one year of doses. In this study, for the first time in this laboratory, certain groups of mice were painted and observed longer than one year as some materials showed signs of activity late in the first year of doses. One brushful, number one, series 197 Grumbacher brush, of each chemical was applied at these tri-weekly intervals. The terms used in this report and on the figures herein included are defined below:

<u>Symbol used in Figure 2.</u>	<u>Term</u>	<u>Definition</u>
•	Non-tumor mortality	$\frac{\text{Mice dead with no tumor}}{\text{Original number of mice}} \times 100$
x	Papilloma mortality	$\frac{\text{Non-tumor and papilloma deaths}}{\text{Original number of mice}} \times 100$
◦	Cancer mortality	$\frac{\text{Non-tumor, papilloma and cancer deaths}}{\text{Original number of mice}} \times 100$
◦	Cancer survival	$\frac{\text{Non-tumor, papilloma and cancer survivors}}{\text{Original number of mice}} \times 100$
◻	Papilloma survival	$\frac{\text{Non-tumor and papilloma survivors}}{\text{Original number of mice}} \times 100$
△	Non-tumor survival	$\frac{\text{Number of mice living with no tumors}}{\text{Original number of mice}} \times 100$
	Smith tumor index (T.I.)	$\frac{\text{Number of mice with tumors}}{\text{Original number of mice minus number dead at 90 days with no tumors}} \times 100$
	Horton tumor index	$\frac{\text{Number of mice with tumors}}{\text{"Effective group"}} \times 100$
	Effective group	Number of mice given adequate exposure. Original number of mice employed less the number that have died without tumors. It is, therefore, a variable number which decreases by one with each non-tumor death. It is arbitrarily held constant after the time of appearance of a tumor in the "average tumor-bearing mouse" - this is designated as the median in a simple arithmetic array of the times of appearance of the tumors.
	Average latent period (A.L.P.)	The length of time necessary to reach a 50% tumor index determined by plotting the Horton tumor index versus time
	Average cancer latent period (A.C.L.P.)	Like A.L.P. but cancers instead of all tumors
	Cancer index (C.I.)	Like Horton tumor index but cancers instead of all tumors.

Results

A summary of the information gleaned from this experiment is presented in Table 17-74 and in Figures 1 to 3. More complete listing of results may be found in Tables 17-75 to 17-87.

Table 17-74

Summary of Results of Fourth Mouse Skin Painting Study

Material	Sample No.	% in Benzol	Horton		Ave. latent period, days	
			T.I.	C.I.	Tumor A.L.P.	Cancer A.C.L.P.
Toluene still residue	15-157	-	0.0	0.0	~	~
Raw wash oil 11A	15-352	-	0.0	0.0	~	~
Raw wash oil	15-355	-	0.0	0.0	~	~
Tar acid (phenolic) pitch	15-363	80.0	0.0	0.0	~	~
Low boiling phenols	15-364	-	0.0	0.0	~	~
High boiling phenols	15-365	-	0.0	0.0	~	~
High boiling hydrocarbons	15-371	-	0.0	0.0	~	~
Benzol, control	-	-	0.0	0.0	~	~
Distilled water control	-	-	0.0	0.0	~	~
Methylcholanthrene	-	0.2	100.0	100.0	145	190
Pasting oil	16-3	-	100.0	100.0	225	245
Light product residue	16-5	-	46.2	38.5	ca. 400	ca. 400
Pitch residue	16-7	10.0	76.9	53.8	375	385

~ = infinity
ca. = approximately

As noted in the eighth annual summary report number 16-103b, issued 12-7-53, we notified Drs. Sexton, Nale, Henson and Kammer and Mr. DeF. Clarke, Jr. of the tumorigenic nature of pasting oil on 7-2-53. Again on 11-4-53, a letter was sent to the above verifying the carcinogenic nature of pasting oil and the possible tumorigenic nature of pitch residue. In this annual report the presence of a few papillomas on mice in the light product residue group was noted.

As is apparent in the summary table and especially in Figures 2 and 3, all those products, pasting oil, pitch residue, and light product residue are tumor and cancer producing materials when painted on the skin of mice. Pasting oil is especially reactive - comparable in average latent period to the known carcinogen, methylcholanthrene. While it took longer to reach this mean time for tumor or cancer production for pitch residue and light product residue, these materials, nevertheless, must be handled as the tumorigens they are in this study. The only indication is that longer contact periods and induction time might be necessary before tumors appear.

hep-rt 17-34, -88-5.

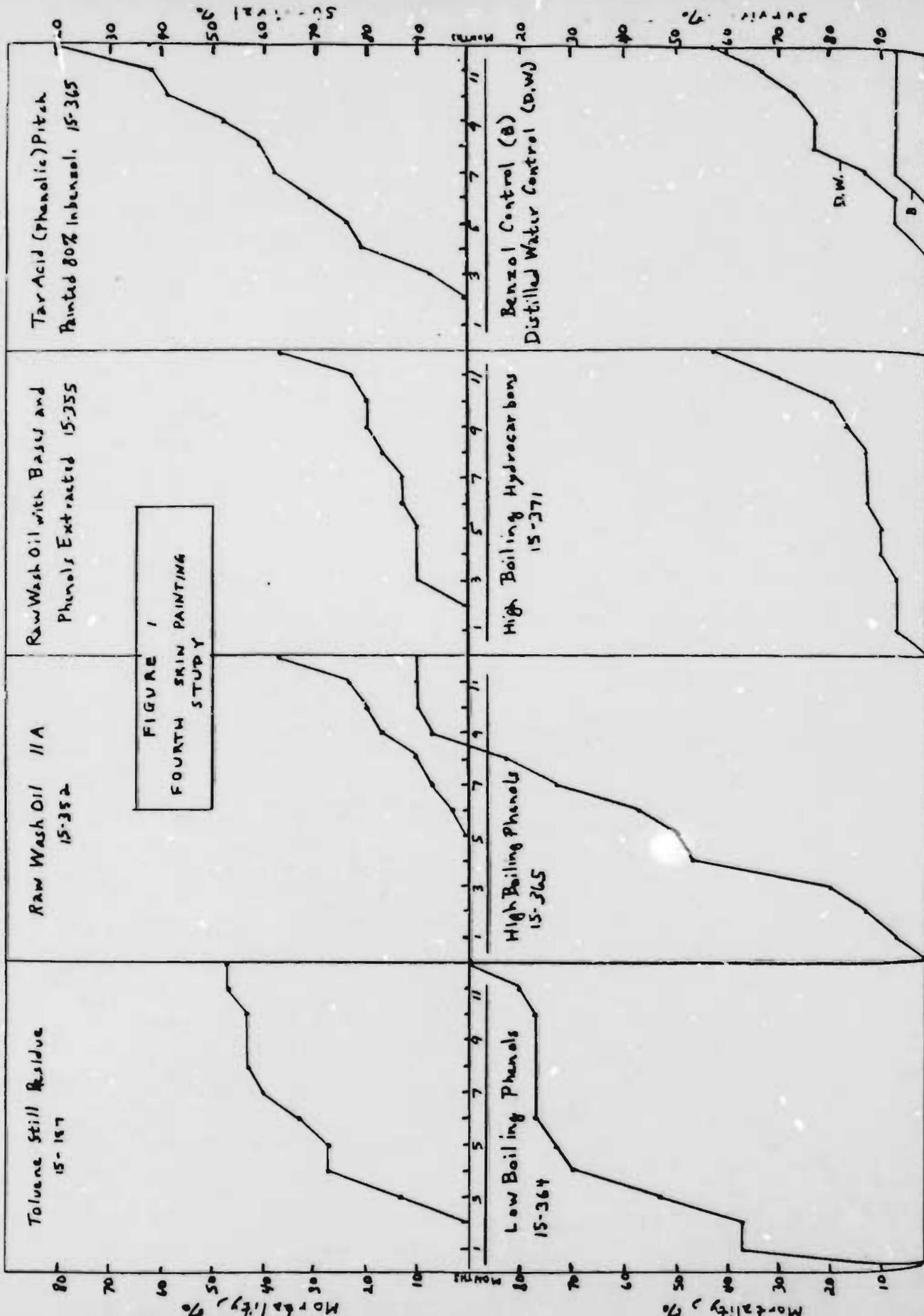


FIGURE 2

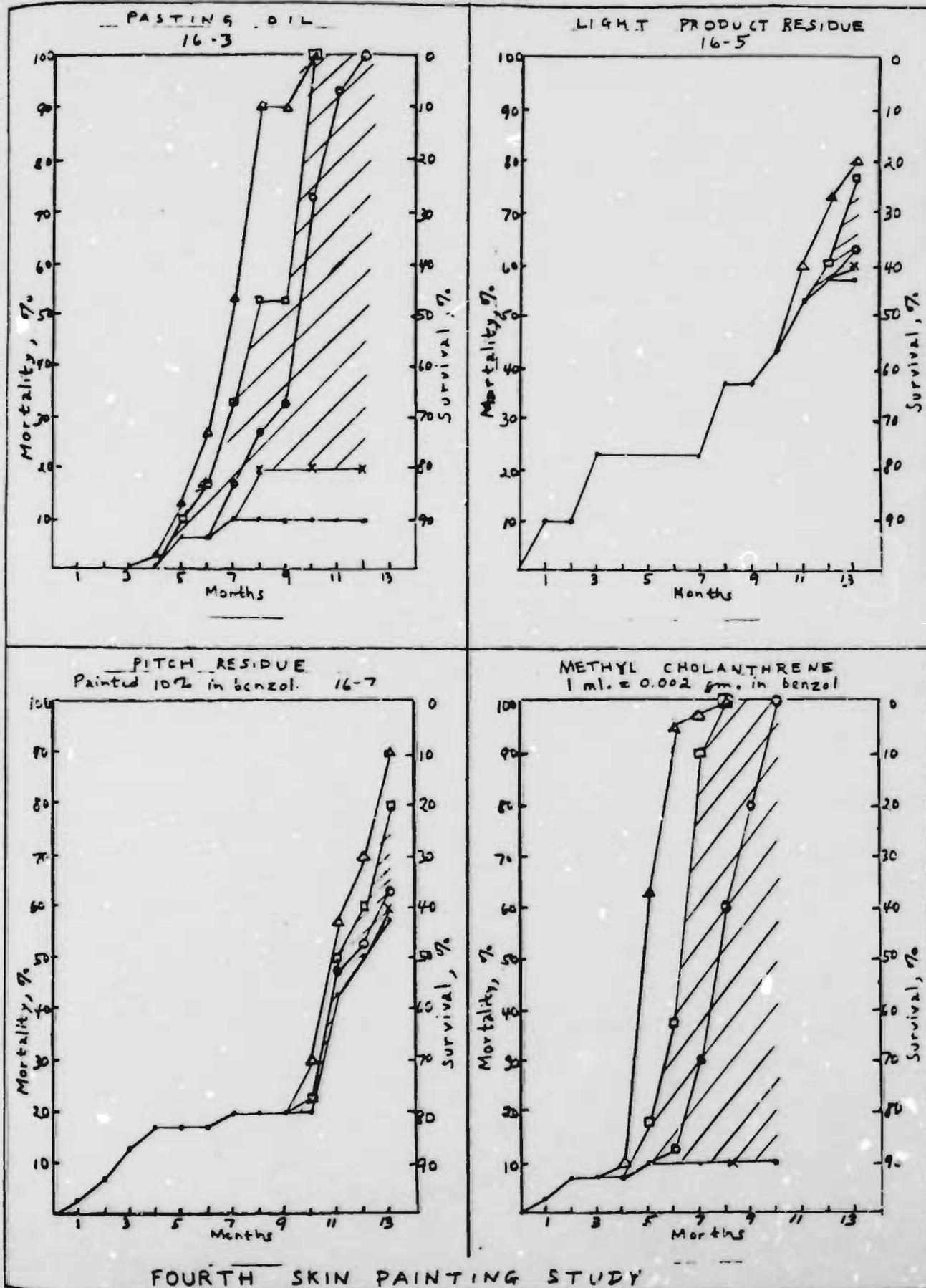
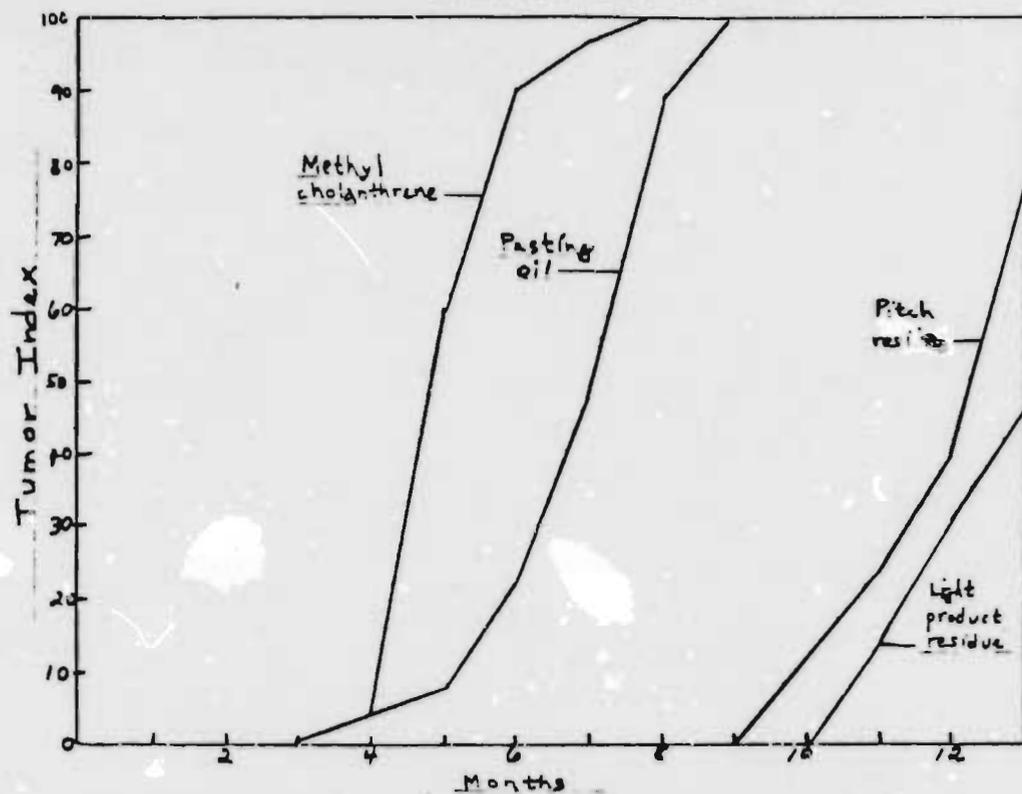
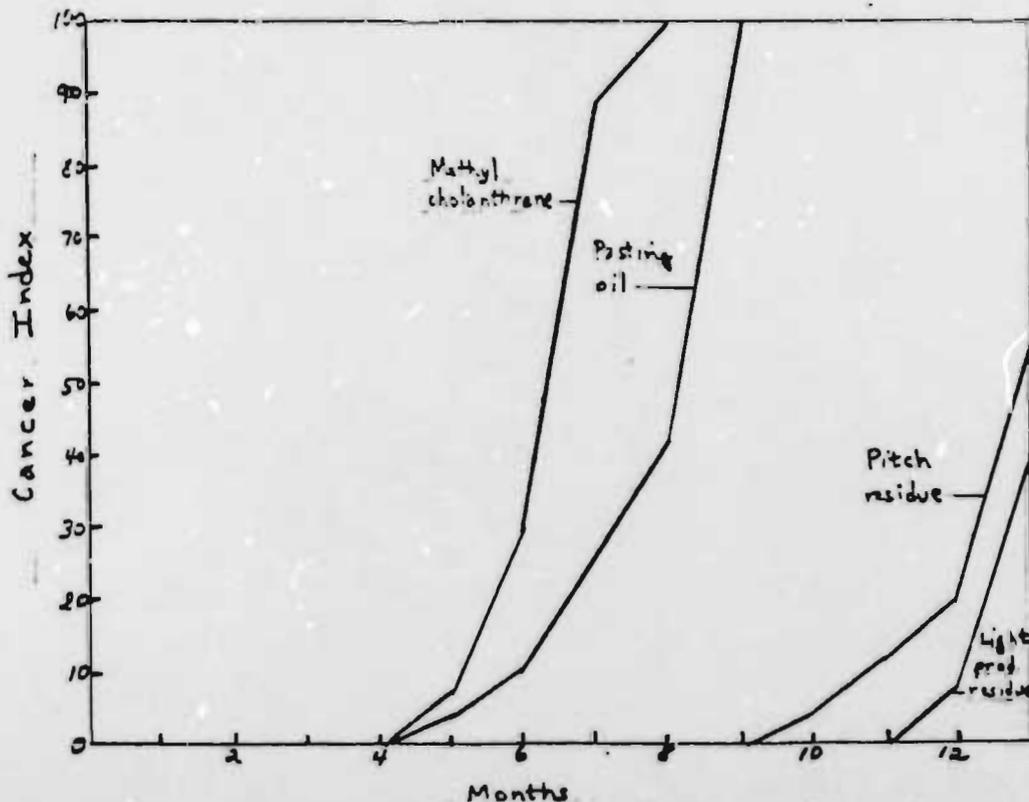


FIGURE 3



RELATIONSHIP BETWEEN MONTHS OF PAINTING AND
MORTON TUMOR OR CANCER INDEX IN FOURTH SKIN
PAINTING STUDY



All of the other materials tested - toluene still residues, raw wash oil, raw wash oil with phenols and bases removed, tar or acid phenolic pitch, low boiling phenols, high boiling hydrocarbons, and benzol or distilled water control groups were completely negative after 12 months of skin painting. No papillomas or cancers were found in any group.

The mice that received the low boiling phenols probably did not get enough exposure to rule this material out as a possible tumorigen. These phenols were so toxic that 11 of the 30 mice died after only one painting with the undiluted material. Two weeks later painting was resumed with a 50% benzol solution of the low boiling phenols but even this was discontinued 2 months after the first painting at which time only 13 of the 30 were still alive. Therefore, the tumorigenic nature of this, and to a lesser extent also of high boiling phenols could not be accurately assayed. These materials are so irritating to the skin and so toxic that they should be handled, of course, with extreme caution.

While the toluene still residue was not tumorigenic in this skin painting study, it was in the tenth subcutaneous injection study recorded in our report 16-103b, issued 12-7-53. This finding was reported to Drs. Kammer and Nale in a letter mailed 8-27-53. It is possible that this residue is a co-carcinogen but, in any case, it should be handled with care.

Carrol S. Weil

Carrol S. Weil
SENIOR INDUSTRIAL FELLOW

Typed: February 25, 1954 - mek

Table 17-75

Results of Skin Painting with Toluene Still Residue

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	0	0	0	100	100	100	0	0
2	0	0	0	100	100	100	0	0
3	13	13	13	87	87	87	0	0
4	27	27	27	73	73	73	0	0
5	27	27	27	73	73	73	0	0
6	33	33	33	67	67	67	0	0
7	40	40	40	60	60	60	0	0
8	43	43	43	57	57	57	0	0
9	43	43	43	57	57	57	0	0
10	43	43	43	57	57	57	0	0
11	47	47	47	53	53	53	0	0
12	47	47	47	53	53	53	0	0

Table 17-76

Results of Skin Painting with Faw Wash Oil 11A 15-352

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	0	0	0	100	100	100	0	0
2	0	0	0	100	100	100	0	0
3	10	10	10	90	90	90	0	0
4	10	10	10	90	90	90	0	0
5	10	10	10	90	90	90	0	0
6	13	13	13	87	87	87	0	0
7	13	13	13	87	87	87	0	0
8	17	17	17	83	83	83	0	0
9	20	20	20	80	80	80	0	0
10	20	20	20	80	80	80	0	0
11	23	23	23	77	77	77	0	0
12	37	37	37	63	63	63	0	0

Table 17-77

Results of Skin Painting with 80% Benzol Solution of Tar Acid (Phenolic) Pitch

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	0	0	0	100	100	100	0	0
2	0	0	0	100	100	100	0	0
3	7	7	7	93	93	93	0	0
4	21	21	21	79	79	79	0	0
5	24	24	24	76	76	76	0	0
6	31	31	31	69	69	69	0	0
7	38	38	38	62	62	62	0	0
8	41	41	41	59	59	59	0	0
9	48	48	48	52	52	52	0	0
10	59	59	59	41	41	41	0	0
11	62	62	62	38	38	38	0	0
12	62	62	62	38	38	38	0	0

Table 17-78

Results of Skin Painting with Low Boiling Phenols

(1 painting undiluted, 30 paintings with 50% benzol solution)

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	37	37	37	63	63	63	0	0
2	37	37	37	63	63	63	0	0
3	53	53	53	47	47	47	0	0
4	70	70	70	30	30	30	0	0
5	73	73	73	27	27	27	0	0
6	77	77	77	23	23	23	0	0
7	77	77	77	23	23	23	0	0
8	77	77	77	23	23	23	0	0
9	77	77	77	23	23	23	0	0
10	77	77	77	23	23	23	0	0
11	80	80	80	20	20	20	0	0
12	90	90	90	10	10	10	0	0

Table 17-79

Results of Skin Painting with High Boiling Phenols

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	7	7	7	93	93	93	0	0
2	13	13	13	87	87	87	0	0
3	20	20	20	80	80	80	0	0
4	47	47	47	53	53	53	0	0
5	50	50	50	50	50	50	0	0
6	57	57	57	43	43	43	0	0
7	73	73	73	27	27	27	0	0
8	83	83	83	17	17	17	0	0
9	97	97	97	3	3	3	0	0
10	100	100	100	0	0	0	0	0

Table 17-80

Results of Skin Painting with Raw Wash Oils (Bases and Phenols Extracted) 15-355

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	0	0	0	100	100	100	0	0
2	0	0	0	100	100	100	0	0
3	10	10	10	90	90	90	0	0
4	10	10	10	90	90	90	0	0
5	10	10	10	90	90	90	0	0
6	13	13	13	87	87	87	0	0
7	13	13	13	87	87	87	0	0
8	17	17	17	83	83	83	0	0
9	20	20	20	80	80	80	0	0
10	20	20	20	80	80	80	0	0
11	23	23	23	77	77	77	0	0
12	37	37	37	63	63	63	0	0

Table 17-81

Results of Skin Painting with Benzol

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	0	0	0	100	100	100	0	0
2	0	0	0	100	100	100	0	0
3	0	0	0	100	100	100	0	0
4	0	0	0	100	100	100	0	0
5	0	0	0	100	100	100	0	0
6	0	0	0	100	100	100	0	0
7	7	7	7	93	93	93	0	0
8	7	7	7	93	93	93	0	0
9	7	7	7	93	93	93	0	0
10	7	7	7	93	93	93	0	0
11	7	7	7	93	93	93	0	0
12	7	7	7	93	93	93	0	0
13	13	13	13	87	87	87	0	0

Table 17-82

Results of Skin Painting with Distilled Water Control

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton T.I.
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		
1	0	0	0	100	100	100	0	0
2	0	0	0	100	100	100	0	0
3	0	0	0	100	100	100	0	0
4	0	0	0	100	100	100	0	0
5	7	7	7	93	93	93	0	0
6	7	7	7	93	93	93	0	0
7	13	13	13	87	87	87	0	0
8	23	23	23	77	77	77	0	0
9	23	23	23	77	77	77	0	0
10	27	27	27	73	73	73	0	0
11	33	33	33	67	67	67	0	0
12	43	43	43	47	47	47	0	0

17-83 } missing
 17-84 }

Table 17-85

Results of Skin Painting with Light Product Residue

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton	
	Non-tumor	Papiloma	Cancer	Non-tumor	Papiloma	Cancer		T.I.	C.I.
1	10	10	10	90	90	90	0	0	0
2	10	10	10	90	90	90	0	0	0
3	23	23	23	77	77	77	0	0	0
4	23	23	23	77	77	77	0	0	0
5	23	23	23	77	77	77	0	0	0
6	23	23	23	77	77	77	0	0	0
7	23	23	23	77	77	77	0	0	0
8	37	37	37	63	63	63	0	0	0
9	37	37	37	63	63	63	0	0	0
10	43	43	43	57	57	57	0	0	0
11	53	43	43	40	57	57	8.7	14.3	0
12	57	57	57	27	40	43	17.4	30.8	7.7
13	57	60	63	20	23	37	26.1	46.2	38.5

Table 17-86

Results of Skin Painting with 10% Benzol Solution of Pitch Residue

Months of Painting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton	
	Non-tumor	Papiloma	Cancer	Non-tumor	Papiloma	Cancer		T.I.	C.I.
1	3	3	3	97	97	97	0	0	0
2	7	7	7	93	93	93	0	0	0
3	13	13	13	87	87	87	0	0	0
4	17	17	17	83	83	83	0	0	0
5	17	17	17	83	83	83	0	0	0
6	17	17	17	83	83	83	0	0	0
7	20	20	20	80	80	80	0	0	0
8	20	20	20	80	80	80	0	0	0
9	20	20	20	80	80	80	0	0	0
10	20	20	20	70	77	80	11.5	12.5	4.2
11	43	43	47	43	50	53	15.4	23.5	11.8
12	50	50	53	30	40	47	23.1	40.0	20.0
13	57	60	63	10	20	37	38.5	76.9	53.8

*Painting oil
 Coal hydrogenation
 & High boiling hydrocarbons
 all from coal
 hydrogenation*

Table 17-87

Results of Skin Fainting with Methyl Cholanthrene, 1 ml. = 0.002 gm. in Benzol

Months of Fainting	Percentage Mortality			Percentage Survival			Smith T.I.	Horton	
	Non- tumor	Papil- loma	Cancer	Non- tumor	Papil- loma	Cancer		T.I.	C.I.
1	3	3	3	97	97	97	0	0	0
2	7	7	7	93	93	93	0	0	0
3	7	7	7	93	93	93	0	0	0
4	7	7	7	93	93	93	0	0	0
5	10	10	10	37	83	90	57.1	59.3	7.4
6	10	10	13	10	63	87	85.7	88.9	29.6
7	10	10	30	3	10	70	92.9	96.3	88.9
8	10	10	60	0	0	40	96.4	100.0	100.0
9	10	10	80	0	0	20	96.4	100.0	100.0
10	10	10	100	0	0	0	96.4	100.0	100.0

OFS DOCUMENT RECEIPT OFCS

92 DEC 11 PM 12:30

CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY that the microimages appearing on this microfiche are accurate and complete reproductions of the records of U.S. Environmental Protection Agency documents as delivered in the regular course of business for microfilming.

Data produced 9 18 93 Marcia Tubalisco
(Month) (Day) (Year) Camera Operator

Place Syracuse New York
(City) (State)



END