

Industrial **BIO-TEST** *Laboratories, Inc.*

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February 9, 1977

Dr. Zeb G. Bell, Jr., Manager
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Chemical Division
PPG Industries, Inc.
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Dear Dr. Bell:

Re: IBT No. 8562-09334 - Dominant Lethal Study with
Trichloroethylene in Albino Rats - Exposed
Via Inhalation

We are submitting herewith our laboratory report prepared in
connection with the above study.

Very truly yours,



J. C. Calandra
President

JCC:jd

SL 032226

REPORT TO
PPG INDUSTRIES, INC.
DOMINANT LETHAL STUDY WITH
TRICHLOROETHYLENE
IN ALBINO RATS

EXPOSED VIA INHALATION

FEBRUARY 9, 1977

IBT NO. 8562-09334

I. Introduction

A mutation is a change in the character of a gene such that morphologic, physiologic and/or biochemical alterations are produced. If this change in gene character occurs in the germinal cell, the alteration can be transmitted to succeeding generations. Changes of this nature can be artificially induced (irradiation, chemical exposure) or they may be spontaneous. A dominant lethal mutation occurring in a male germinal cell may lead upon fertilization by the affected cell, to the failure of development of the resulting zygote beyond the blastocyst stage (implantation). Male rats, treated with the test compound, are mated with untreated females. The numbers of pre-implantation losses and early resorptions in female rats, dissected at mid-gestation, are used to calculate the mutation rate based on the induction of dominant lethal mutations.

II. Summary

A dominant lethal mutagenic study was conducted on albino rats treated via inhalation with Trichloroethylene. Males were obtained from a 2-year chronic study (IBT No. 663-08047), following approximately 9 months exposure to 300 ppm Trichloroethylene. Two control groups were utilized in the investigation; 1 consisting of males approximately 3 months of age (C-I) and 1 consisting of males of a comparable age with the test males (C-II). The males were mated weekly with 2 untreated virgin females for 8 consecutive weeks. The following results were obtained during the investigation.

One test male and 2 C-II males died during the investigation. No other deaths occurred. No untoward behavioral reactions were noted among test or control animals.

Parameters of male and female fertility were similar among test and control animals. The numbers of corpora lutea, implantation sites, deciduomata, and viable embryos obtained for the Trichlorethylene treated group compared favorably with the control groups.

Mutation rates regarding the percentage of early deaths along with the comparisons of the numbers of embryos per female in the test group to those of the controls revealed similar findings for the Trichloroethylene treated group and the control groups.

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It is concluded that exposure to Trichloroethylene via inhalation did not reveal a dominant lethal mutagenic effect in this test system.

Respectfully submitted,

INDUSTRIAL BIO-TEST LABORATORIES, INC.

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III. Procedure

A. Experimental Animals

The animals employed were Charles River* strain albino rats. The test group (T-IV) males were obtained from the 2-year chronic study number 663-08047. These animals were exposed to the test material via inhalation for approximately 9 months prior to initiation of the dominant lethal investigation. Two control groups were utilized; C-I consisting of males approximately 3 months of age which, if necessary, could be compared with cumulative control data and C-II consisting of males of a comparable age with the test males. All females employed in the investigation were approximately 3 months of age. The organization of groups is given in Table I.

TABLE I

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Organization of Groups

Group	Exposure Level (ppm)	Number of Males
C-I	None	15
C-II	None	15
T-IV	300	15

* Charles River Breeding Laboratories, Wilmington, Massachusetts.

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B. Test Material and Dose Administration

The material tested was Trichloroethylene. The test material was administered via inhalation.

The test exposures were carried out in a specially-constructed chamber of stainless steel and glass, having a nominal volume of 9.3 m³. The chamber had a rectangular section, and was equipped with pyramid-shaped top and bottom sections to encourage uniform distribution of the test atmosphere.

The chamber was provided with clean, conditioned air at a rate of 10-15 air changes per hour. Air was exhausted through the bottom of the chamber.

The chamber air flow was balanced to maintain a slight negative pressure inside the chamber relative to the outside air.

The chamber was fitted with sanitary drain connections to facilitate daily cleaning of the chambers.

The test material was metered into the chamber air supply so that it was well-mixed with the incoming air by turbulence. The test material was introduced as a vapor. All test material was supplied by PPG Industries, Inc. The chamber atmospheres were analyzed for Trichloroethylene by gas chromatography at least twice daily.

The inhalation portion of the investigation was conducted at the Decatur facilities. The animals were brought to the Northbrook facilities where the reproduction portion was conducted.

C. Reproductive Performance

Each male was placed in a cage with 2 untreated virgin females. One week later, the males were removed from these breeding cages and placed in another cage with 2 fresh virgin females. This procedure continued for 8 consecutive weeks, the period of time required for maturation of the male rat germ cells.

The females were sacrificed (carbon dioxide asphyxiation) 18 days following initiation of cohabitation. An incision was made in the abdominal wall and the full extent of both uterine horns exposed immediately. Fetal swellings, implantation sites, resorption sites (early and late differentiated), and corpora lutea were recorded.

Resorption sites were divided into 2 groups, early deaths (deciduomata) and late deaths. Late deaths refer to embryos which have developed to a relatively advanced stage prior to death, as evidenced by the presence of visible placenta and fetal membranes or remnants thereof. The frequency of late deaths is apparently unaffected by mutagens and, therefore, would appear to be non-genetic in this test system. Deciduomata occur at the sites of implanted blastocysts which fail to develop following implantation. The mutagenicity of the chemical can be measured by the proportions of all implantations which are deciduomata.

Mutagenicity can also be measured by comparing the mean number of viable embryos in the test group to the number obtained in the control group. Calculation of the mutation rate using this criterion assumes that pre-implantation losses among non-affected test animals will be essentially the same as losses observed among control animals.

Following completion of the mating period, all test males were returned to the Decatur facilities to be placed back on test and all control males were sacrificed.

IV. Results

A. Mortality and Reactions

One T-IV male died during week 7 of the mating period. Two C-II males died; 1 during week 3 and 1 during week 8. No other deaths occurred.

No untoward behavioral reactions occurred among either test or control animals.

B. Mating Performance

Male and female fertility indices are presented in Table II. Parameters of fertility among both males and females were not altered by the exposure to Trichloroethylene.

The indices employed are as follows:

$$\text{Male Fertility Index} = \frac{\text{Number of Sires}}{\text{Number of Males Mated}} \times 100$$

$$\text{Female Fertility Index} = \frac{\text{Number of Pregnant Females}}{\text{Number of Females Mated}} \times 100$$

TABLE II
 TEST MATERIAL: Trichloroethylene
 Dominant Lethal Study - Albino Rats
 Fertility Data

Group	Exposure Level (ppm)	Week Number	Male Fertility		Female Fertility	
			Fraction	Percent	Fraction	Percent
C-I	None	1	15/15	100.0	22/30	73.3
		2	14/15	93.3	20/30	66.7
		3	15/15	100.0	26/30	86.7
		4	15/15	100.0	27/30	90.0
		5	15/15	100.0	26/30	86.7
		6	15/15	100.0	24/30	80.7
		7	15/15	100.0	28/30	93.3
		8	15/15	100.0	27/30	90.0
C-II	None	1	15/15	100.0	26/30	86.7
		2	15/15	100.0	25/30	83.3
		3	14/15	93.3	25/30	83.3
		4	13/14*	92.9	24/28	85.7
		5	13/14	92.9	22/28	78.6
		6	12/14	85.7	18/26 (1)	69.2
		7	12/14	85.7	23/28	82.1
		8	12/14	85.7	17/28	60.7
T-IV	300	1	15/15	100.0	25/30	83.3
		2	15/15	100.0	26/30	86.7
		3	15/15	100.0	26/30	86.7
		4	14/15	93.3	23/29 (2)	79.3
		5	15/15	100.0	25/30	83.3
		6	14/14*	100.0	23/28	82.1
		7	14/14	100.0	25/28	89.3
		8	14/14	100.0	22/28	78.6

* One male died.

(1) Two females delivered prior to sacrifice.

(2) One female delivered prior to sacrifice.

C. Sacrifice Data

Data pertaining to the numbers of corpora lutea, implantation sites, resorption sites (early and late differentiated), and viable embryos are presented in Table III. Data obtained from females mated with Trichloroethylene treated males compared favorably with the concurrent control groups.

TABLE III
TEST MATERIAL: Trichloroethylene
Dominant Lethal Study - Albino Rats
Reproductive Data

Group	Exposure Level (ppm)	Week Number	Number of Females Examined	Corpora Lutea		Implantation Sites		Resorption Sites				Embryos	
				Total	Mean	Total	Mean	Early		Late		Total	Mean
C-I	None	1	22	315	14.3	293	13.3	15	0.7	4	0.2	274	12.4
		2	20	309	15.5	296	14.8	24	1.2	5	0.3	267	13.4
		3	26	323	12.4	302	11.6	17	0.7	1	0.1	284	10.9
		4	27	375	13.8	347	12.8	25	0.9	0	0.0	322	11.9
		5	26	328	12.6	290	11.2	24	0.9	1	0.1	265	10.2
		6	24	313	13.0	276	11.5	10	0.4	5	0.2	261	10.9
		7	28	381	13.6	342	12.2	26	0.9	3	0.1	313	11.2
		8	27	357	13.2	330	12.2	11	0.4	0	0.0	319	11.8
C-II	None	1	26	368	14.2	338	13.0	16	0.6	1	0.1	321	12.3
		2	25	356	14.2	329	13.2	10	0.4	3	0.1	316	12.7
		3	25	287	11.5	270	10.8	13	0.5	4	0.2	253	10.1
		4	24	305	12.7	292	12.2	20	0.8	5	0.2	267	11.1
		5	22	291	13.2	271	12.3	9	0.4	3	0.1	259	11.8
		6	18	244	13.6	227	12.6	9	0.5	2	0.1	216	12.0
		7	23	295	12.8	282	12.3	6	0.3	1	0.1	275	12.0
		8	17	219	12.9	204	12.0	21*	1.2	2	0.1	181	10.7
T-IV	300	1	25	348	13.9	326	13.0	18	0.7	0	0.0	308	12.3
		2	26	378	14.5	349	13.4	16	0.6	0	0.0	333	12.8
		3	26	310	11.9	298	11.5	11	0.4	5	0.2	282	10.8
		4	23	329	14.3	323	14.0	12	0.5	3	0.1	308	13.4
		5	25	292	11.7	278	11.1	9	0.4	2	0.1	267	10.7
		6	23	312	13.6	292	12.7	17	0.7	2	0.1	273	11.9
		7	25	307	12.3	290	11.6	13	0.5	7	0.3	270	10.8
		8	22	277	12.6	264	12.0	10	0.5	1	0.1	253	11.5

* One female accounted for 15 resorption sites.

D. Mutagenic Data

A summary of results of the mutagenic study is presented in Table IV.

1. Pre-Implantation loss is calculated as follows:

$$\frac{\text{Number of Corpora Lutea} - \text{Number of implantation sites}}{\text{Number of Corpora Lutea}} \times 100$$

2. The mutation rate is calculated by comparing the number of early resorptions (deciduomata) to the total number of implantations for each group.

$$\frac{\text{Number of Early Resorption Sites}}{\text{Number of Implantation Sites}} \times 100 \text{ (See A in table)}$$

Another way of expressing the mutation rate, which takes into account pre-implantation losses, is to compare the mean number of normal embryos in each test group to the mean number of embryos in the control group.

$$\frac{\text{Embryos/Female Control} - \text{Embryos/Female Test}}{\text{Embryos/Female Control}} \times 100 \text{ (See B in table)}$$

Values presented for each group were obtained by comparing the mean values of that group to the values of the C-I group (a in table) and to the C-II group (b in table). Values with a minus (-) sign indicate that the mean number of embryos for that group and week was greater than that of controls.

Mutation rates for the Trichloroethylene treated animals compared favorably with those obtained for the concurrent control group.

TABLE IV

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Group	Exposure Level (ppm)	Week Number	Pre-Implantation Loss	A	Mutation Rate	
					B a	b
C-I	None	1	7.0	5.1	-	-0.8
		2	4.2	8.1	-	-5.5
		3	6.5	5.6	-	-7.9
		4	7.5	7.2	-	-7.2
		5	11.6	8.3	-	13.6
		6	11.8	3.6	-	9.2
		7	10.2	7.6	-	6.7
		8	7.6	3.3	-	-10.3
C-II	None	1	8.2	4.7	0.9	-
		2	7.6	3.0	5.2	-
		3	5.9	4.8	7.3	-
		4	4.3	6.8	6.7	-
		5	6.9	3.3	-15.7	-
		6	7.0	4.0	-10.1	-
		7	4.4	2.1	-7.1	-
		8	6.8	10.3	9.3	-
T-IV	300	1	6.3	5.5	0.8	0.0
		2	7.7	4.6	4.5	-0.8
		3	3.9	3.7	0.9	-6.9
		4	1.8	3.7	-12.6	-20.7
		5	4.8	3.2	-4.9	9.3
		6	6.4	5.8	-9.2	0.8
		7	5.5	4.5	3.6	10.0
		8	4.7	3.8	2.5	-7.5

E. Individual Data

Mutation rates determined for each male are presented in Tables V through VII. X denotes no females were pregnant during that week.

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TABLE V

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	Mutation Rate		
					A	B a	b
C-I	None	1	1	30.0	0.0	-	43.1
			2	28.6	0.0	-	-18.1
			3	0.0	16.0	-	-4.0
			4	0.0	10.3	-	-8.1
			5	0.0	4.2	-	2.5
			6	0.0	6.7	-	-16.7
			7	0.0	17.9	-	4.2
			8	3.6	0.0	-	-26.2
		2	1	0.0	0.0	-	-30.1
			2	0.0	7.1	-	-10.2
			3	8.0	0.0	-	-8.9
			4	3.6	3.7	-	-17.1
			5	42.1	9.1	-	57.6
			6	0.0	0.0	-	29.2
			7	62.1	18.2	-	62.5
			8	13.3	0.0	-	-21.5
		3	1	0.0	12.0	-	10.6
			2	3.6	3.7	-	-2.4
			3	0.0	9.1	-	1.0
			4	14.8	17.4	-	14.4
			5	0.0	9.1	-	15.3
			6	14.3	8.3	-	8.3
			7	8.3	27.3	-	33.3
			8	8.0	4.3	-	-2.8
		4	1	40.0	44.4	-	59.3
			2	14.3	11.1	-	-26.0
			3	0.0	4.3	-	-8.9
			4	15.8	12.5	-	-26.1
			5	7.1	0.0	-	-10.2
			6	21.4	4.5	-	12.5
			7	3.7	3.8	-	0.0
			8	26.1	0.0	-	20.6

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TABLE V continued

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						a	B b
C-I	None	5	1	10.3	0.0	-	-1.6
			2	3.1	9.7	-	-10.2
			3	8.0	0.0	-	-13.9
			4	3.2	3.3	-	-30.6
			5	23.1	5.0	-	19.5
			6	0.0	7.7	-	0.2
			7	3.8	8.0	-	8.3
			8	9.4	3.4	-	-30.8
		6	1	0.0	0.0	-	-30.1
			2	X			
			3	6.7	0.0	-	-38.6
			4	4.3	4.5	-	5.4
			5	0.0	0.0	-	-10.2
			6	0.0	4.2	-	4.2
			7	8.0	13.0	-	16.7
			8	8.3	9.1	-	6.5
		7	1	0.0	20.0	-	2.4
			2	0.0	0.0	-	5.5
			3	14.8	17.4	-	5.9
			4	0.0	7.7	-	-8.1
			5	24.1	0.0	-	6.8
			6	12.5	3.6	-	-4.2
			7	0.0	0.0	-	-12.5
			8	4.0	8.3	-	-2.8
		8	1	16.7	6.7	-	-13.8
			2	0.0	3.1	-	-18.1
			3	11.5	13.0	-	1.0
			4	0.0	0.0	-	-8.1
			5	10.0	16.7	-	36.4
			6	0.0	0.0	-	-8.3
			7	42.2	5.3	-	25.0
			8	0.0	6.3	-	29.9

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TABLE V continued

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						B a	b
C-I	None	9	1	0.0	0.0	-	-13.8
			2	6.9	0.0	-	-6.3
			3	4.5	9.5	-	10.9
			4	0.0	7.1	-	-17.1
			5	0.0	0.0	-	-1.7
			6	0.0	0.0	-	0.0
			7	0.0	0.0	-	-20.8
			8	10.3	0.0	-	-21.5
		10	1	0.0	2.9	-	-34.1
			2	0.0	0.0	-	-10.2
			3	20.8	5.3	-	10.9
			4	9.1	10.0	-	18.9
			5	10.7	8.0	-	2.5
			6	50.0	0.0	-	58.3
			7	8.0	0.0	-	8.3
			8	0.0	0.0	-	-26.2
		11	1	0.0	0.0	-	2.4
			2	0.0	100.0	-	100.0
			3	0.0	0.0	-	-18.8
			4	10.7	0.0	-	-12.6
			5	22.7	23.5	-	44.9
			6	0.0	4.0	-	0.0
			7	0.0	20.0	-	16.7
			8	10.0	3.7	-	-21.5
		12	1	0.0	4.0	-	2.4
			2	0.0	3.4	-	-10.2
			3	14.2	0.0	-	-18.8
			4	0.0	9.7	-	-26.1
			5	7.1	0.0	-	-10.2
			6	20.7	0.0	-	4.2
			7	0.0	4.3	-	8.3
			8	0.0	4.2	-	-30.8

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TABLE V continued

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						B a	b
C-I	None	13	1	0.0	6.3	-	-22.0
			2	0.0	6.7	-	-10.2
			3	3.7	3.8	-	-23.8
			4	3.4	0.0	-	-26.1
			5	0.0	8.3	-	6.8
			6	17.9	13.0	-	20.8
			7	0.0	0.0	-	-12.5
			8	0.0	0.0	-	-12.1
		14	1	4.0	0.0	-	6.5
			2	0.0	20.0	-	-18.1
			3	0.0	0.0	-	-23.8
			4	34.8	13.3	-	41.4
			5	6.7	0.0	-	-18.6
			6	33.3	0.0	-	25.0
			7	0.0	8.3	-	8.3
			8	0.0	3.8	-	-16.8
		15	1	22.2	4.8	-	18.7
			2	0.0	0.0	-	-18.1
			3	0.0	0.0	-	-13.9
			4	7.4	8.0	-	-3.6
			5	7.1	34.6	-	32.2
			6	0.0	0.0	-	0.0
			7	0.0	8.7	-	-29.2
			8	3.3	3.4	-	-30.8

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TABLE VI

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						B a	b
C-II	None	16	1	23.5	3.8	-0.8	-
			2	3.6	3.7	3.0	-
			3	4.3	0.0	12.8	-
			4	3.6	7.4	-5.0	-
			5	16.1	3.8	-22.5	-
			6	X			
			7	X			
			8	X			
		17	1	0.0	0.0	-21.0	-
			2	38.9	4.5	21.6	-
			3	4.2	4.3	-0.9	-
			4	17.1	6.9	-13.4	-
			5	0.0	3.6	-32.4	-
			6	0.0	7.1	-19.3	-
			7	4.2	0.0	-2.7	-
			8	0.0	0.0	2.5	-
		18	1	3.3	0.0	-16.9	-
			2	6.5	0.0	-0.7	-
			3	0.0	0.0	-10.1	-
			4	0.0	0.0	-5.0	-
			5	0.0	0.0	-37.3	-
			6	4.0	4.2	-0.9	-
			7	3.6	0.0	-20.5	-
			8	22.2	4.8	19.5	-
		19	1	10.0	7.4	-0.8	-
			2	24.0	5.3	32.8	-
			3	0.0	14.3	17.4	-
			4	0.0	7.4	-5.0	-
			5	0.0	0.0	-27.5	-
			6	40.6	5.3	17.4	-
			7	3.8	0.0	-11.6	-
			8	13.0	0.0	15.3	-

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TABLE VI continued
 TEST MATERIAL: Trichloroethylene
 Dominant Lethal Study - Albino Rats
 Mutagenic Data
 Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	Mutation Rate		
					A	B a	b
C-II	None	20	1	14.3	5.6	31.5	-
			2	0.0	7.1	3.0	-
			3	0.0	4.2	-0.9	-
			4	X			
			5	X			
			6	8.3	0.0	-0.9	-
			7	X			
			8	X			
		21	1	10.0	3.7	-4.8	-
			2	0.0	11.1	10.4	-
			3	14.3	8.3	-0.9	-
			4	11.5	0.0	3.4	-
			5	18.2	0.0	11.8	-
			6	0.0	0.0	-28.4	-
			7	0.0	0.0	-16.1	-
			8	0.0	0.0	15.3	-
		22	1	3.0	0.0	-29.0	-
			2	0.0	0.0	10.4	-
			3	0.0	8.7	3.7	-
			4	0.0	11.1	66.4	-
			5	0.0	8.7	-2.9	-
			6	8.3	0.0	-0.9	-
			7	3.8	0.0	-7.1	-
			8	0.0	100.0	100.0	-
		23	1	0.0	3.6	-8.9	-
			2	0.0	9.1	25.4	-
			3	0.0	0.0	-0.9	-
			4	0.0	7.7	-0.8	-
			5	10.7	4.0	-17.6	-
			6	0.0	0.0	-23.9	-
			7	0.0	0.0	-33.9	-
			8	7.4	0.0	-5.9	-

Industrial BIO-TEST Laboratories, Inc.

TABLE VI continued
 TEST MATERIAL: Trichloroethylene
 Dominant Lethal Study - Albino Rats
 Mutagenic Data
 Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-implantation Loss	A	Mutation Rate	
						B a	b
C-II	None	24	1	0.0	3.7	-4.8	-
			2	3.8	0.0	10.4	-
			3	0.0	0.0	8.3	-
			4	0.0	0.0	-9.2	-
			5	0.0	0.0	-32.5	-
			6	X			
			7	0.0	0.0	-25.0	-
			8	28.6	0.0	57.6	-
		25	1	7.1	0.0	-4.8	-
			2	0.0	0.0	-19.4	-
			3	58.3	0.0	54.1	-
			4	11.1	12.5	45.4	-
			5	3.8	0.0	-17.6	-
			6	0.0	0.0	-56.0	-
			7	3.8	8.0	-2.7	-
			8	0.0	6.9	-14.4	-
		26	1	9.1	10.0	27.4	-
			2	0.0	6.7	-4.5	-
			3	4.3	4.5	3.7	-
			4	3.3	24.1	7.6	-
			5	25.0	0.0	-17.6	-
			6	8.3	9.1	8.3	-
			7	0.0	11.5	-2.7	-
			8	3.1	6.5	-22.9	-
		27	1	45.0	45.5	75.8	-
			2	3.4	0.0	-4.5	-
			3	20.0	5.0	12.8	-
			4	0.0	0.0	-0.8	-
			5	23.8	0.0	16.7	-
			6	0.0	0.0	-10.1	-
			7	0.0	0.0	19.6	-
			8	0.0	6.7	-18.6	-

Industrial BIO-TEST Laboratories, Inc.

TABLE VI continued

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						B a	b
C-II	None	28	1	0.0	0.0	-29.0	-
			2	6.3 Male Died	0.0	-11.9	-
		29	1	0.0	0.0	-16.9	-
			2	0.0	0.0	-4.5	-
			3	0.0	5.3	17.4	-
			4	0.0	10.0	-13.4	-
			5	4.0	12.5	-2.9	-
			6	0.0	3.6	-19.3	-
			7	0.0	3.7	-16.1	-
			8	8.3	0.0	6.8	-
		30	1	0.0	10.0	-4.8	-
			2	3.4	0.0	-4.5	-
			3	0.0	8.7	3.7	-
			4	0.0	0.0	3.4	-
			5	0.0	3.8	-22.5	-
			6	0.0	16.0	3.7	-
			7	33.3	0.0	28.6	-
			8	X			

Industrial BIO-TEST Laboratories, Inc.

TABLE VII

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						B a	b
T-IV	300	4026	1	13.3	7.7	3.2	2.4
			2	29.0	0.0	17.9	13.4
			3	10.0	3.7	-19.2	-28.7
			4	3.6	3.7	-5.0	-12.6
			5	0.0	0.0	-17.6	-1.7
			6	X			
			7	9.1	5.0	15.2	20.8
			8	0.0	6.3	-27.1	-40.2
		4027	1	10.0	3.7	-4.8	-5.7
			2	3.7	3.8	6.7	1.6
			3	4.5	4.8	8.3	1.0
			4	6.9	11.1	-0.8	-8.1
			5	4.2	4.3	-7.8	6.8
			6	3.8	0.0	-14.7	-4.2
			7	3.6	0.0	-20.5	-12.5
			8	9.5	10.5	28.0	20.6
		4028	1	6.7	0.0	-12.9	-13.8
			2	8.7	4.8	25.4	21.3
			3	0.0	0.0	-0.9	-8.9
			4	0.0	6.3	-26.1	-35.1
			5	3.4	0.0	-37.3	-18.6
			6	6.7	7.1	-10.1	0.0
			7	0.0	0.0	-16.1	-8.3
			8	4.0	4.2	2.5	-7.5
		4029	1	0.0	0.0	-8.9	-9.8
			2	6.7	21.4	17.9	13.4
			3	0.0	4.8	8.3	1.0
			4	7.1	0.0	-9.2	-17.1
			5	80.0	100.0	100.0	100.0
			6	3.4	0.0	-28.4	-16.7
			7	20.8	0.0	15.2	20.8
			8	4.0	4.2	2.5	-7.5

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Industrial BIO-TEST Laboratories, Inc.

TABLE VII continued
 TEST MATERIAL: Trichloroethylene
 Dominant Lethal Study - Albino Rats
 Mutagenic Data
 Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						B a	b
T-IV	300	4030	1	15.4	4.5	15.3	14.6
			2	0.0	0.0	-4.5	10.2
			3	9.1	0.0	8.3	1.0
			4	0.0	0.0	16.0	9.9
			5	16.0	0.0	-2.9	11.0
			6	0.0	0.0	-33.0	-20.8
			7	0.0	7.7	-7.1	0.0
			8	7.7	0.0	-1.7	-12.1
		4031	1	4.0	8.3	11.3	10.6
			2	2.9	3.0	-19.4	26.0
			3	0.0	4.8	8.3	1.0
			4	0.0	18.2	24.4	18.9
			5	0.0	4.3	-7.8	6.8
			6	0.0	28.0	17.4	25.0
				Male Died			
		4032	1	0.0	7.4	-0.8	-1.6
			2	15.6	7.4	6.7	1.6
			3	3.8	0.0	-14.8	-23.8
			4	6.3	0.0	-26.1	-35.1
			5	0.0	0.0	26.5	36.4
			6	0.0	0.0	-10.1	0.0
			7	0.0	6.7	37.5	41.7
			8	7.7	0.0	-1.7	-12.1
		4033	1	10.8	9.1	-21.0	-22.0
			2	8.7	4.8	25.4	21.3
			3	4.0	0.0	-10.1	-18.8
			4	X			
			5	0.0	4.3	-2.9	11.0
			6	11.1	6.3	-37.6	-25.0
			7	0.0	18.2	24.1	29.2
			8	11.5	0.0	2.5	-7.5

Industrial BIO-TEST Laboratories, Inc.

TABLE VII continued

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						a	B b
T-IV	300	4034	1	0.0	12.5	15.3	14.6
			2	0.0	0.0	-4.5	-10.2
			3	4.0	0.0	-10.1	-18.8
			4	0.0	3.8	-0.8	-8.1
			5	7.4	0.0	-22.5	-5.9
			6	0.0	3.8	-10.1	0.0
			7	0.0	3.8	-11.6	-4.2
			8	0.0	0.0	6.8	-2.8
		4035	1	0.0	7.1	-4.8	-5.7
			2	3.0	9.4	-8.2	-14.2
			3	0.0	4.8	12.8	5.9
			4	0.0	0.0	-34.5	-44.1
			5	0.0	7.1	-22.5	-5.9
			6	3.7	19.2	3.7	12.5
			7	0.0	3.7	-16.0	-8.3
			8	0.0	12.0	6.8	-2.8
		4036	1	5.9	12.5	-12.9	-13.8
			2	15.6	3.7	3.0	-2.4
			3	4.2	4.3	12.8	5.9
			4	0.0	0.0	-0.8	-8.1
			5	0.0	8.3	-7.8	6.8
			6	0.0	0.0	-19.3	-8.3
			7	0.0	3.4	-20.5	-12.5
			8	0.0	9.1	15.3	6.5
		4037	1	0.0	0.0	-4.8	-5.7
			2	6.3	6.7	-4.5	-10.2
			3	0.0	30.0	35.8	30.7
			4	0.0	0.0	-17.6	-26.1
			5	0.0	8.7	-2.9	11.0
			6	19.2	4.8	8.3	16.7
			7	21.4	4.5	28.6	33.3
			8	10.7	0.0	-5.9	-16.8

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Industrial BIO-TEST Laboratories, Inc.

TABLE VII continued

TEST MATERIAL: Trichloroethylene

Dominant Lethal Study - Albino Rats

Mutagenic Data

Individual Sire Data

Group	Exposure Level (ppm)	Sire Number	Week Number	Pre-Implantation Loss	A	Mutation Rate	
						B a	b
T-IV	300	4038	1	7.4	8.0	7.3	6.5
			2	3.3	0.0	-8.2	-14.2
			3	0.0	0.0	-19.3	-28.7
			4	0.0	0.0	-17.6	-26.1
			5	4.5	0.0	-2.9	11.0
			6	18.2	0.0	17.4	25.0
			7	0.0	0.0	6.3	12.5
			8	0.0	0.0	-10.2	-21.5
		4039	1	15.4	0.0	11.3	10.6
			2	0.0	13.3	3.0	-2.4
			3	0.0	14.3	-10.1	-18.8
			4	0.0	0.0	-30.3	-39.6
			5	0.0	0.0	-17.6	-1.7
			6	16.1	0.0	-19.3	-8.3
			7	15.4	0.0	1.8	-8.3
			8	0.0	9.1	15.3	6.5
		4040	1	0.0	0.0	3.2	2.4
			2	0.0	0.0	6.7	1.6
			3	12.5	0.0	3.7	-4.0
			4	0.0	9.7	-17.6	-26.1
			5	0.0	0.0	-17.6	-1.7
			6	0.0	7.7	-10.1	0.0
			7	3.8	8.0	-2.7	4.2
			8	7.1	0.0	-10.2	-21.5

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