PROJECT NO. Y-71-187
FILE

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YOUNGER LABORATORIES
INCORPORATED

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January 12th, 1972

Certificate of Analysis

SUBJECT -

Toxicological Investigation Of: MCS 1230 German Mine Fluid --
Lot: OR 162483

Monsanto Sample Number 187

Monsanto Project Number Y-71-187

STUDY CONDUCTED FOR -

Monsanto Company, St. Louis, Missouri

EXPERIMENTAL PROCEDURE -

A) Acute Oral Minimal Lethal Dose (Rats, Mixed Sex)

The undiluted compound was fed by stomach tube to Sprague-Dawley strain albino male and female rats in increasing doses at increments of 0.1 fractional log intervals.

Observations were made for toxic signs and the viscera of the test animals were examined macroscopically.

The data are shown in Table I.

B) Acute Skin Absorption Minimal Lethal Dose (Rabbits, Mixed Sex)

The undiluted compound was applied in increasing doses at increments of 0.2 fractional log intervals to the closely clipped, intact skin of New Zealand white male and female rabbits.

The treated areas were covered with plastic strips and the animals held in wooden stocks for periods up to twenty-four hours, after which time they were assigned to individual cages.

Observations were made for toxic signs and the viscera of the test animals were examined macroscopically.

The data are shown in Table II.

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EXPERIMENTAL PROCEDURE - (Continued)

C) Skin Irritation (Rabbits, Mixed Sex)

0.5 Milliliter of undiluted sample was applied to the clipped, intact skin of New Zealand white male and female rabbits under a one inch by one inch square patch, two single layers thick. The patches were held in place with adhesive tape. The trunk of each animal was wrapped with plastic strips, to retard evaporation and avoid contamination, for the twenty-four hour exposure period.

Observations were made over a period of seven days for irritation.

The data, scored according to the method of Draize, Woodard and Calvery (Journal of Pharm. and Exp. Therapeutics, Volume 82, December, 1944) are shown in Table III.

D) Eye Irritation (Rabbits, Mixed Sex)

0.1 Milliliter of undiluted sample was placed in the conjunctival sac of the right eye of each of three albino male and female rabbits and observations made over a period of seven days for inflammation.

The eyes were rinsed with warm isotonic saline solution after the twenty-four hour reading. The left eye served as a control.

The data, scored according to the method of Draize, et al, are shown in Table IV.

E) Vapor Inhalation (Male Rats) - Ambient Temperature

Six mature male rats were placed in a stainless steel chamber of 35-liters capacity and exposed for six hours to a concentrated atmosphere of vapors produced by passing a stream of air through 141.0 grams of the compound contained in a 500-milliliter erlenmeyer flask.

Vapors from the flask passed into a one liter bottle to remove droplets and then into the chamber.

Air flow through the sample was 4.0 liters per minute as measured by a calibrated rotameter. This was sufficient to violently agitate the liquid. No supplementary air was introduced inasmuch as the above supply was ample for the animals oxygen requirements.

The animals were observed for behavior during exposure and for ten days following exposure. The viscera of the test animals were examined macroscopically.

The data are shown in Table V.

F) Vapor Inhalation (Male Rats) - Sample Heated to 150° C.

Six mature male rats were placed in a stainless steel chamber of 35-liters capacity and exposed for six hours to a concentrated atmosphere of vapors produced by passing a stream of air through 138.4 grams of the compound contained in a 300-milliliter erlenmeyer flask. The sample was maintained at a temperature of 150°C. by immersing the flask in a heated sand bath.

Vapors from the flask passed into a one liter bottle to remove droplets and then into the chamber.

Air flow through the sample was 4.0 liters per minute as measured by a calibrated rotameter. This was sufficient to violently agitate the liquid. No supplementary air was introduced inasmuch as the above supply was ample for the animals oxygen requirements.

The animals were observed for behavior during exposure and for ten days following exposure. The viscera of the test animals were examined macroscopically.

The data are shown in Table VI.

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SUMMARY -

MCS 1230 German Mine Fluid -- Lot: OR 162483

A) Acute Oral Minimal Lethal Dose (Rats, Mixed Sex)

The Acute Oral Minimal Lethal Dose for male and female rats was found to be greater than 10,000 milligrams per kilogram and less than 12,600 milligrams per kilogram.

The compound was classed as practically non-toxic by oral ingestion in male and female rats.

B) Acute Skin Absorption Minimal Lethal Dose (Rabbits, Mixed Sex)

The Acute Skin Absorption Minimal Lethal Dose for male and female rabbits was found to be greater than 7940 milligrams per kilogram.

The compound was classed as practically non-toxic by skin absorption in male and female rabbits.

C) Skin Irritation (Rabbits, Mixed Sex)

The compound was classed as non-irritating when applied undiluted to intact skin of male and female rabbits.

The average maximum score was 0.3 out of a possible 8 in twenty-four hours.

D) Eye Irritation (Rabbits, Mixed Sex)

The compound was classed as a slight eye irritant in male and female rabbits.

The average maximum score was 10.0 out of a possible 110 in one hour.

E) Vapor Inhalation (Male Rats) - Ambient Temperature

All animals survived the six hour exposure as well as the following ten day observation period.

It was concluded that the vapors were practically non-toxic under conditions of the test.

F) Vapor Inhalation (Male Rats) - Sample Heated to 150°C.

All animals survived the six hour exposure as well as the following ten day observation period.

It was concluded that the vapors were practically non-toxic under conditions of the test.

YOUNGER LABORATORIES, INC.

BY: MELVIN D. BIRCH

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TABLE I

THE ACUTE ORAL MINIMAL LETHAL DOSE OF

'MCS 1230 German Mine Fluid -- Lot: OR 162483'

FOR RATS

Sample Fed Undiluted

Animal No. - Sex	Weight Gm.	Dose Mg./Kg.	Fate
1- Female	250	10,000	Survived
2- Male	210	10,000	Survived
3- Female	235	10,000	Survived
4- Male	225	10,000	Survived
5- Female	220	10,000	Survived
6- Male	225	12,600	Survived
7- Female	215	12,600	Survived
8- Male	245	12,600	Survived
9- Female	225	12,600	Died
10- Male	260	12,600	Survived
11- Female	210	15,800	Survived
12- Male	215	15,800	Survived
13- Female	220	15,800	Died
14- Male	230	15,800	Survived
15- Female	230	15,800	Died

DISCUSSION -

The Acute Oral Minimal Lethal Dose for male and female rats was found to be greater than 10,000 milligrams per kilogram and less than 12,600 milligrams per kilogram.

The compound was classed as practically non-toxic by oral ingestion in male and female rats.

Survival time was two to four days.

Toxic signs included reduced appetite and activity (two to four days in survivors), increasing weakness, collapse, and death.

At autopsy there was slight liver discoloration and gastrointestinal inflammation.

Surviving animals were sacrificed seven days after dosing. The viscera appeared normal by macroscopic examination.

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TABLE II

THE ACUTE SKIN ABSORPTION MINIMAL LETHAL DOSE OF
'MCS 1230 German Mine Fluid -- Lot: OR 162483'
FOR RABBITS

Sample Applied Undiluted

Animal No. - Sex	Weight Kg.	Dose Mg./Kg.	Weight Change 5 Days Later Kg.	Fate
1 - Male	2.6	3160	- 0.2	Survived
2 - Female	2.5	5010	- 0.3	Survived
3 - Male	2.7	7940	- 0.4	Survived
4 - Female	2.2	7940	- 0.3	Survived

DISCUSSION -

The Acute Skin Absorption Minimal Lethal Dose for male and female rabbits was found to be greater than 7940 milligrams per kilogram.

The compound was classed as practically non-toxic by skin absorption in male and female rabbits.

Toxic signs included reduced appetite and activity for four to seven days.

Surviving animals were sacrificed fourteen days after dosing. The viscera appeared normal by macroscopic examination.

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TABLE III

SKIN IRRITATION IN RABBITS AFTER APPLICATION OF

'MCS 1230 German Mine Fluid -- Lot: OR 162483'

Sample (0.5 Milliliter) Applied Undiluted

Animal No. - Sex	Numerical Evaluation At The End Of 1 Hour	24 Hours	48 Hours	72 Hours	120 Hours	168 Hours
1 - Female	0	0	0	0	0	0
2 - Male	0	1	1	0	0	0
3 - Female	0	0	0	0	0	0
Average	0.0	0.3	0.3	0.0	0.0	0.0

DISCUSSION -

The compound was classed as non-irritating when applied undiluted to intact skin of male and female rabbits.

The average maximum score was 0.3 out of a possible 8 in twenty-four hours.

Observations following application --

1-Hour:	No skin changes; zero readings
24-Hours:	Very slight erythema in one instance; no edema
48-Hours:	Very slight erythema in one instance; no edema
72-Hours:	No erythema or edema; zero readings
120- 168-Hours:	No erythema or edema; zero readings

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TABLE IV

EYE IRRITATION IN RABBITS AFTER APPLICATION OF

'MCS 1230 German Mine Fluid -- Lot: OR 162483'

Sample (0.1 Milliliter) Applied Undiluted

Animal No. - Sex	Numerical Evaluation At The End Of 1 Hour	24 Hours	48 Hours	72 Hours	120 Hours	168 Hours
1 - Female	10	2	0	0	0	0
2 - Male	10	2	0	0	0	0
3 - Female	10	4	0	0	0	0
Average	10.0	2.6	0.0	0.0	0.0	0.0

DISCUSSION -

The compound was classed as a slight eye irritant in male and female rabbits. The average maximum score was 10.0 out of a possible 110 in one hour.

Observations following application --

Immediate:	Discomfort was slight
10-Minutes:	Slight erythema, moderate discharge; no edema
1-Hour:	Moderate erythema, copious discharge; no edema
24-Hours:	Slight erythema, slight discharge in one instance; no edema
48-Hours:	No erythema, edema, or discharge; zero readings
72- 168-Hours:	No erythema, edema, or discharge; zero readings

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TABLE V

INHALATION OF

'MCS 1230 German Mine Fluid -- Lot: OR 162483' VAPORS
BY RATS (AMBIENT TEMPERATURE)

Average Temperature Inside Chamber ..... 72° F.

Average Relative Humidity Inside Chamber ..... 78 %

Amount of Sample -- To start ..... 141.0 Grams
Recovered ..... 141.0 Grams
Vaporized or left in equipment ..... 0.0 Gram (0.0%)

Average Concentration Of Vapors In Chamber ... 0.0 Gram / M^3

Animal No. - Sex	Fate	Observations During Exposure
1 - Male	Survived	No nasal or ocular discharge ...
2 - Male	Survived	No weakness or drowsiness of consequence ...
3 - Male	Survived	
4 - Male	Survived	Respiration appeared normal.
5 - Male	Survived	
6 - Male	Survived	

DISCUSSION -

All animals survived the six hour exposure as well as the following ten day observation period.

It was concluded that the vapors were practically non-toxic under conditions of the test.

Observations following exposure --

Respiration was normal when animals were removed from the chamber.

The ten day observation period was uneventful. Weight gain was normal.

Surviving animals were sacrificed ten days after exposure. The viscera appeared normal by macroscopic examination.

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TABLE VI

INHALATION OF

'MCS 1230' German Mine Fluid -- Lot: OR 162483' VAPORS

BY RATS (SAMPLE HEATED TO 150° F.)

Average Temperature Inside Chamber ..... 78° F.
Average Relative Humidity Inside Chamber ..... 85 %

Amount of Sample -- To start ..... 138.4 Grams
Recovered ..... 131.0 Grams
Total Vaporized ..... 7.4 Grams (5.3 %)
Recovered from Condenser ..... 2.0 Grams (1.4 %)
Weight of Vapors Entering Chamber .. 5.4 Grams (3.9 %)

Average Concentration Of Vapors In Chamber ..... 3.75 Grams / M^3

Animal No. - Sex	Fate	Observations During Exposure
1 - Male	Survived	No nasal or ocular discharge ...
2 - Male	Survived	No weakness or drowsiness of consequence ...
3 - Male	Survived	
4 - Male	Survived	Respiration appeared normal.
5 - Male	Survived	
6 - Male	Survived	

DISCUSSION -

All animals survived the six hour exposure as well as the following ten day observation period.

It was concluded that the vapors were practically non-toxic under conditions of the test.

Observations following exposure -

Respiration was normal when animals were removed from the chamber.

The ten day observation period was uneventful. Weight gain was normal.

Surviving animals were sacrificed ten days after exposure. The viscera appeared normal by macroscopic examination.

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