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August 3, 1989

VISTA

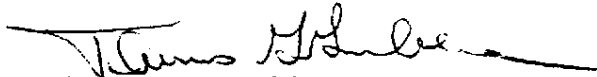
Mr. Andy Lee
S. C. Johnson & Son
1525 Howe St.
Racine, Wisconsin 53403

Dear Andy:

Per your request, attached is a copy of the toxicity studies done by Vista on ALFOL 14 Alcohol.

Two points should be noted. This study was done by Conoco Chemicals which is now Vista chemical. Also this study was done prior to GLP regulations and may not meet all requirements of those guidelines. However, we do believe the data to accurately represent the toxicity of this product.

Sincerely,



Thomas G. Grumbles, C.I.H.
Environmental Quality Manager

dlj

Attachment

VVV 000009436



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November 21, 1977

SUBJECT:

Acute Oral Toxicity (LD₅₀) in Rats
Acute Dermal Toxicity (LD₅₀) in Rabbits
Dermal Irritation Test in Rabbits
Eye Irritation Test in Rabbits
Inhalation Toxicity Test in Rats

SAMPLE DESIGNATION:

ALFOL 14 Alcohol
Sample No. 8714J
S. A. Number 233620

SUBMITTED BY:

Continental Oil Company
P.O. Box 1267
Ponca City, Oklahoma 74601

SUMMARY AND CONCLUSION:

1. Acute Oral Toxicity (LD₅₀) in Rats.

The acute oral LD₅₀ of ALFOL 14 Alcohol, Sample No. 8714J, when administered as a 50% w/w suspension in 1% w/w gum tragacanth to male and female COX-SD rats weighing 210 to 299 grams, was found to be greater than 20.00 g./kg. of body weight (highest practical dosage level).

According to the toxicity ratings of Gleason *et al.*¹, the test compound is classed as practically non-toxic. As the term is defined in the Federal Hazardous Substances Act (FHSA), the product was found not to be a Toxic Substance.

2. Acute Dermal Toxicity (LD₅₀) in Rabbits.

The acute dermal LD₅₀ of ALFOL 14 Alcohol, Sample No. 8714J, when applied as a 50% w/w dilution in 1% w/w gum tragacanth to the intact and abraded skin of male and female New Zealand albino rabbit weighing 2.3 to 2.9 kg., was found to be 8.00 g./kg. of body weight (highest dose practical to test).

As the term is defined in the Federal Hazardous Substances Act (FHSA), the product was found not to be a Toxic Substance.

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¹In Clinical Toxicology of Commercial Products, Williams and Wilkins, Baltimore, 1963.



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SUMMARY AND CONCLUSION: (continued) - 2 -

3. Dermal Irritation Test in Rabbits:

ALFOL 14 Alcohol, Sample No. 8714J, when applied as a 50% w/w dilution in 1% w/w gum tragacanth to the intact and abraded skin of six New Zealand albino rabbits, was found to produce moderate skin damage with a Primary Irritation Index of 4.3. As the term is defined in the Federal Hazardous Substances Act (FHSA), the product was found not to be a Primary Irritant.

4. Eye Irritation Test in Rabbits.

ALFOL 14 Alcohol, Sample No. 8714J, when instilled undiluted (as a solid) into the conjunctival sac of six New Zealand albino rabbits and the treated eyes not washed following instillation of the test compound, produced ocular damage in the form of erythema, chemosis, discharge, iritis (one animal only) and corneal opacity. Barely perceptible to moderate conjunctival irritation (six animals) and corneal opacity (one animal) persisted through termination (seventy-two hours).

5. Inhalation Toxicity Test in Rats.

Ten albino rats (five of each sex, COX-SD strain) weighing 238 to 338 grams, exposed to an ambient chamber concentration of approximately 1.5 mg./liter of ALFOL 14 Alcohol, Sample No. 8714J, at a flow rate of ten liters/minute, survived the one-hour exposure (plus a six-minute equilibration period) and the fourteen-day observation period which followed. As the term is defined in the Federal Hazardous Substances Act (FHSA), the product was found not to be a Toxic Substance, since the levels achieved exceed any to which man could be subjected in any foreseeable use of the material.

EXPERIMENTAL PROCEDURE:

1. Acute Oral Toxicity (LD₅₀) in Rats.

Male and female albino rats (COX-SD strain) weighing 210 to 299 grams were used to evaluate the acute (single-dose) oral toxicity produced by the test compound, ALFOL 14 Alcohol, Sample No. 8714J.

Each animal was examined and only healthy animals were used on this study. The animals were individually housed in metal, wire-bottomed cages elevated above the droppings. Prior to dosing, the animals were fasted overnight; otherwise, feed, consisting of Purina Laboratory Chow, and water were freely available at all times.

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EXPERIMENTAL PROCEDURE: (continued)

1. Acute Oral Toxicity (LD₅₀) in Rats. (continued)

Prior to the actual LD₅₀ determination, exploratory doses were administered to six rats to estimate the order of toxicity of the test compound. Based on the results of the preliminary assay, groups of ten rats (five of each sex) were dosed at levels designed to provide data for the determination of an approximate LD₅₀ value.

2. Acute Dermal Toxicity (LD₅₀) in Rabbits.

Twelve New Zealand albino rabbits, six males and six females, were used to evaluate the potential toxicity following dermal application of ALFOL 14 Alcohol, Sample No. 8714J, by a single exposure for a period of twenty-four hours.

The animals which weighed 2.3 to 2.9 kilograms, were distributed evenly as to sex in each of three dosage groups. The animals were grouped as follows:

Group No.	Dosage Level g./kg. of body weight	No. of Animals	Skin Preparation
I	2.00	2	Intact
		2	Abraded
II	4.00	2	Intact
		2	Abraded
III	8.00	2	Intact
		2	Abraded

The animals were individually housed in metal cages elevated above the droppings with feed, consisting of Purina Rabbit Chow, and tap water freely available at all times.

Prior to exposure, the animals were prepared by clipping the skin of the trunk free of hair and only those animals without observable skin defects or irritation were used. One-half of the animals in each group were further prepared by making epidermal abrasions every two or three centimeters longitudinally over the area of exposure. Abrasions were sufficiently deep to penetrate the stratum corneum but not to disturb the derma.

A plastic binder was slipped onto each animal, which was then placed in a comfortable but immobilized position in a multiple animal holder. By means of a syringe, a 50% w/w dilution of ALFOL 14 Alcohol, Sample No. 8714J, in 1% w/w gum tragacanth was introduced under the plastic binder and spread evenly over the skin of the treatment site; the binder was then fastened tightly to keep the preparation in close contact with the skin for twenty-four hours. At the end of the period of exposure, the binders were removed, the amount of unabsorbed material estimated, the skin reactions recorded, and the remaining test compound

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EXPERIMENTAL PROCEDURE: (continued)

2. Acute Dermal Toxicity (LD₅₀) in Rabbits. (continued)

washed from the animals' bodies. After carefully being blotted dry with absorbent paper hand towels, the animals were housed in their respective cages. The animals were observed for gross effects at regular intervals on the day of dosing and daily thereafter for fourteen days. Animals which succumbed were necropsied. Following the observation period, all surviving animals were weighed, sacrificed and necropsied.

3. Dermal Irritation Test in Rabbits.

Six New Zealand albino rabbits were used to determine the degree of dermal irritation resulting from the topical application of ALFOL 14 Alcohol, Sample No. 8714J, to the skin. The animals were individually housed in metal cages elevated above the droppings with feed, consisting of Purina Rabbit Chow, and tap water freely available at all times.

The backs of the animals were clipped free of hair and the skin examined before testing. Only those animals without skin defects or irritation were used.

Abrasions (minor incisions through the stratum corneum, but not sufficiently deep to disturb the derma) were made on one area of the backs, while another area was left intact. The animals were immobilized in animal holders, and 0.5 grams of ALFOL 14 Alcohol, Sample No. 8714J, in the form of a 50% w/w dilution in 1% w/w gum tragacanth, was applied under each of two one-inch square gauze patches to the prepared areas on the back of each rabbit.

After the patches had been secured by adhesive tape, the entire trunk of each animal was wrapped with a plastic binder to keep the material in position and in contact with the skin for twenty-four hours. Following the twenty-four hours of exposure, the patches were removed; any remaining material was washed off the treated areas, and the resulting reaction evaluated, using the scoring method of Draize, Woodward and Calvery (J. Pharmacol. Exptl. Therap., 82: 377, 1944), as given on the following page.

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EXPERIMENTAL PROCEDURE: (continued)

3. Dermal Irritation Test in Rabbits. (continued)

	<u>Value</u>
Erythema and eschar formation:	
No erythema	0
Very slight erythema (barely perceptible)	1
Well-defined erythema	2
Moderate to severe erythema	3
Severe erythema (beet redness) to slight eschar formation (injuries in depth)	4
<u>Total possible erythema score</u>	<u>4</u>
Edema formation:	
No edema	0
Very slight edema (barely perceptible)	1
Slight edema (edges of area well-defined by definite raising)	2
Moderate edema (raised approximately 1.0 mm.)	3
Severe edema (raised more than 1.0 mm. and extending beyond the area of exposure)	4
<u>Total possible edema score</u>	<u>4</u>

The average values for erythema and eschar formation at twenty-four hours and seventy-two hours for the intact skin areas of exposure were added to the average values of the abraded skin areas of exposure at twenty-four hours and seventy-two hours (four values). Similarly, the average values for edema formation at twenty-four hours and at seventy-two hours for the intact and abraded skin areas of exposure were added (four values). The Primary Irritation Index is the total of the eight average values divided by four. According to the FHSA method of testing, a Primary Irritant is a substance which produces a skin reaction resulting in a score of five or greater.

4. Eye Irritation Test in Rabbits.

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Six New Zealand albino rabbits were used to determine the degree of ocular irritation resulting from the addition of the test compound, ALFOL 14 Alcohol, Sample No. 8714J, into the conjunctival sac of the animals.

The animals were individually housed in metal cages elevated above the droppings with feed, consisting of Purina Rabbit Chow, and tap water freely available at all times.

Both eyes of each animal were examined with Fluorescein Sodium Ophthalmic Solution U.S.P., seventy-two hours before testing and only those animals without observable eye defects or irritation were used.



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EXPERIMENTAL PROCEDURE: (continued)

4. Eye Irritation Test in Rabbits. (continued)

One-hundred mg. of undiluted ALFOL 14 Alcohol, Sample No. 8714J, was placed in one eye of each animal by gently pulling the lower lid away from the eyeball to form a cup into which the test compound was deposited. The lids were then gently held together for one second and the animal was released. The other eye was not treated and served as a control. The eyes were not washed following instillation of the test compound except as noted below. All animals were immobilized in a suitable animal restrainer for one hour subsequent to treatment.

The eyes were examined and the grade of ocular reaction was recorded at 1, 24, 48 and 72 hours, using the scale for scoring ocular lesions as outlined by Lehman, A.J., et al., in Appraisal of the Safety of Chemicals in Foods, Drugs and Cosmetics Assoc., Food and Drug Officials of the U.S., Second Printing, Topeka, Kansas 1965. The evaluation of the data was in accordance with Section 1500.42, Chapter 2, Title 16, Code of Federal Regulations under the FHSA.

After the initial examination at twenty-four hours, all eyes were washed with sufficient isotonic saline at body temperature to remove the residual test sample. All eyes were further examined by placing one drop of Fluorescein Sodium Ophthalmic Solution U.S.P. on the cornea; after fifteen seconds, the excess fluorescein was flushed out with sufficient isotonic saline. Fluorescein Sodium in 2% aqueous solution when applied topically to the eye is used as an ophthalmic diagnostic aid for the detection of corneal lesions. Injured areas of the cornea appear greenish yellow following application of fluorescein.

5. Inhalation Toxicity Test in Rats.

VVV 000009442

Ten albino rats (five of each six, COX-SD strain) weighing 238 to 338 grams were used to determine the respiratory effects of ALFOL 14 Alcohol, Sample No. 8714J, when introduced in the form of a heated vapor into a 57 liter capacity glass chamber containing the animals. Each animal was examined before testing and only those animals without observable defects were used.

ALFOL 14 Alcohol, Lot No. 8714J, was introduced by passing an air flow over the test material as it was heated in a 60° C. water bath at an ambient chamber concentration of approximately 1.5 mg. per liter of air at a flow rate of ten liters per minute for a period of one hour



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EXPERIMENTAL PROCEDURE: (continued)

5. Inhalation Toxicity Test in Rats. (continued)

(plus a six-minute equilibration period).^{*} The animals were observed frequently for gross effects during the exposure; upon removal from the chamber, the animals were cleaned of any accumulated material by washing with lukewarm tap water and then placed in individual wire-bottomed cages elevated above the droppings. Feed, consisting of Purina Laboratory Chow (pelletized), and tap water were freely available at all times. The animals were observed for gross effects at regular intervals on the day of exposure and daily thereafter for fourteen days. Animals which succumbed were necropsied. Following the observation period, all surviving animals were weighed, sacrificed and necropsied.

^{*}Prior to the actual one-hour exposure period, the test material was introduced into the chamber for six minutes at the above flow rate in order that the test atmospheric concentration could reach theoretical equilibrium.

RESULTS:

1. Acute Oral Toxicity (LD₅₀) in Rats.

The mortality results during the observation period of fourteen days are presented on the following page.

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RESULTS: (continued)

1. Acute Oral Toxicity (LD₅₀) in Rats. (continued)

Range Finding Oral Mortality Data*

<u>Dosage Level</u> g./kg.**	<u>Mortality/Number of Animals</u>	<u>% Mortality</u>
1.26	0/2	0
5.02	0/2	0
20.00	0/2	0

Cumulative Oral LD₅₀ Mortality Data

<u>Dosage Level</u> g./kg.**	<u>Time of Death Following Dosage</u> (Days)														<u>% Mortality</u>
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
7.96	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0
12.62	0/10	0/10	0/10	0/10	0/10	0/10	1/10	1/10	1/10	1/10	1/10	1/10	1/10	1/10	10
15.89	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0/10	0
20.00***	0/10	0/10	0/10	0/10	0/10	1/10	1/10	1/10	1/10	2/10	2/10	2/10	2/10	2/10	20

Oral LD₅₀ Mortality Data According to Sex

<u>Dosage Level</u> g./kg.**	<u>Mortality/Number of Animals</u>	<u>% Mortality</u>
7.96	0/10 (OM, OF)	0
12.62	1/10 (OM, 1F)	10
15.89	0/10 (OM, OF)	0
20.00***	2/10 (OM, 2F)	20

* The range finding study was conducted as a separate test; none of the data from this preliminary study is included in the two LD₅₀ mortality tables which follow.

** Specific gravity = 0.9496 at 26° Centigrade.

***Due to volume factor, this was the highest dosage practical to administer.

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RESULTS: (continued)

1. Acute Oral Toxicity (LD₅₀) in Rats. (continued)

Although the mortality data were not suitable for statistical analysis, the acute oral LD₅₀ of ALFOL 14 Alcohol, Sample No. 8714J, when administered as a 50% w/w suspension in 1% w/w gum tragacanth to young adult male and female COX-SD rats, is therefore greater than 20.00 g./kg. of body weight (highest dosage level tested).

Animals at each of the dosage levels displayed one or more of the following gross signs of test compound induced adverse effects: Hypoactivity, diarrhea, hypersalivation, diuresis, ocular porphyrin deposits, unthriftiness, thinness and emaciation. All of the surviving animals which displayed adverse effects, returned to normal between twenty-four hours and ten days following dosage.

Gross necropsy of the animals, which succumbed during the study, showed in two, moderate to severe congestion of the kidneys, adrenals, liver, lungs, stomach and gastrointestinal tract, hemorrhages (one animal only), and erosion of the mucosa of the translucent stomach and hemorrhages of the mucosa of the opaque stomach (one animal only). The remaining animal displayed post-mortem autolysis to the point that necropsy was not significant.

Gross necropsy of the animals, which survived the fourteen-day observation period and were sacrificed, showed in all, the tissues to be not remarkable.

Final bodyweight records of survivors at termination (fourteen days) showed, in all, weight gains within expected limits.

2. Acute Dermal Toxicity (LD₅₀) in Rabbits.

The mortality results during the observation period of fourteen days are presented on the following page.

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RESULTS: (continued)

2. Acute Dermal Toxicity (LD₅₀) in Rabbits. (continued)

Cumulative Skin Mortality Data

Abraded Animals

Time of Death Following Dosage

Group No.	Dosage Level g./kg.*	(Days)														% Mortality
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
I	2.00	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0
II	4.00	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0
III	8.00	0/2	0/2	0/2	0/2	0/2	0/2	0/2	1/2	1/2	2/2	2/2	2/2	2/2	2/2	100

Cumulative Skin Mortality Data

Intact Animals

Time of Death Following Dosage

Group No.	Dosage Level g./kg.*	(Days)														% Mortality
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
I	2.00	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0
II	4.00	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0
III	8.00	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0

Skin LD₅₀ Mortality Data

Abraded and Intact Animals

Group No.	Dosage level g./kg.*	Mortality/No. Animals	% Mortality
I	2.00	0/4 (OM, OF)	0
II	4.00	0/4 (OM, OF)	0
III	8.00	2/4 (1M, 1F)	50

*Specific gravity = 0.9496 at 26° Centigrade

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RESULTS: (continued)

2. Acute Dermal Toxicity (LD₅₀) in Rabbits. (continued)

The acute dermal LD₅₀ of ALFOL 14 Alcohol, Sample 8714J, when applied as a 50% w/w dilution in 1% w/w gum tragacanth to the intact and abraded skin of young adult male and female New Zealand albino rabbits, was found to be 8.00 g./kg. of body weight.

Following the twenty-four hour exposure period, it appeared that most of the test material remained unabsorbed on the skin of the test animals. At twenty-four hours following test application, all animals showed slight to moderate erythema, desquamation, wrinkling and dryness of the skin at the treatment site.

In all surviving animals, desquamation and wrinkling of the skin occurred and persisted in varying degrees through termination (fourteen days).

At the highest dosage level (8.0 g./kg. body weight), two of the surviving animals showed signs of weakness, emaciation and pallor; however, all appeared systemically normal within ninety-six hours following exposure. One animal showed signs of moribundity.

Gross necropsy of animals which succumbed, showed a depletion of visceral fatty tissue (one animal), moderate dermal irritation and desquamation at the treatment site (two animals).

Final bodyweight records of the ten surviving animals at termination (fourteen days), showed a slight loss in one animal, a constant weight in one animal, and gains within expected limits in the eight remaining animals.

Gross necropsy of the animals, which survived the fourteen-day observation period and were sacrificed, showed one animal with slight accumulation of clear, viscous fluid within the peritoneal cavity and crazing over cortex of both kidneys. Eight animals showed no signs of gross systemic abnormalities.

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RESULTS: (continued)

3. Dermal Irritation Test in Rabbits.

The scores for the 24, 48 and 72-hour observations are given below:

Rabbit No.		24 Hours		48 Hours		72 Hours	
		I*	A*	I	A	I	A
1	Erythema and Eschar	2	2	3	3	3	3
	Edema Formation	3	3	2	2	1	2
2	Erythema and Eschar	2	2	3	3	2	3
	Edema Formation	2	2	1	1	1	1
3	Erythema and Eschar	1	1	2	2	1	2
	Edema Formation	2	2	1	1	1	1
4	Erythema and Eschar	2	2	3	3	3	3
	Edema Formation	3	3	3	3	2	2
5	Erythema and Eschar	2	2	3	3	3	3
	Edema Formation	2	2	2	2	2	2
6	Erythema and Eschar	3	3	3	3	3	3
	Edema Formation	3	3	2	2	1	1
Erythema and Eschar Average Value		2.0	2.0	2.8	2.8	2.5	2.8
Edema Formation Average Value		2.5	2.5	1.8	1.8	1.3	1.5

I* - Intact

A* - Abraded

ALFOL 14, Alcohol, Sample No. 8714J, when applied as a 50% w/w dilution in 1% w/w gum tragacanth to the intact and abraded skin of six New Zealand albino rabbits, produced in twenty-four hours in all animals, minimal to moderate erythema and slight to moderate edema. Observations, continued for seventy-two hours following treatment, showed in all animals, an increase or persistence of erythema (minimal to moderate at the final reading) and a decrease or persistence of edema (minimal to slight at the final reading).

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RESULTS: (continued)

4. Eye Irritation Test in Rabbits.

A summary of the scores for the 1, 24, 48 and 72 hour observations is given below:

Rabbit No.	Structure	1 Hour	24 Hours	48 Hours	72 Hours
1	Cornea	0	5	0	0
	Iris	0	0	0	0
	Conjunctivae	8	8	8	6
2	Cornea	0	30	20	10
	Iris	0	5	0	0
	Conjunctivae	8	12	10	8
3	Cornea	0	5	5	0
	Iris	0	0	0	0
	Conjunctivae	6	6	6	4
4	Cornea	0	5	0	0
	Iris	0	0	0	0
	Conjunctivae	6	6	4	2
5	Cornea	0	5	5	0
	Iris	0	0	0	0
	Conjunctivae	6	8	6	4
6	Cornea	0	5	5	0
	Iris	0	0	0	0
	Conjunctivae	6	8	6	2
Average		6.7	18.0	12.5	6.0

ALFOL 14 Alcohol, Sample No. 8714J, when instilled undiluted into the conjunctival sac of six New Zealand albino rabbits and the treated eyes not washed following instillation of the test compound, produced within twenty-four hours in all animals, slight to moderate erythema of the palpebral and bulbar conjunctivae, minimal to pronounced chemosis of the lids, a slight accumulation of watery-mucoid discharge, minimal iritis (one animal only) and corneal opacity (slight to easily discernible and involving approximately 1/4 to 3/4 of the corneal surface).

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RESULTS: (continued)

4. Eye Irritation Test in Rabbits. (continued)

Subsequent observation, continued for seventy-two hours following treatment, revealed a gradual improvement of the test eye in each animal. At the final reading (seventy-two hours), minimal to slight erythema (six animals), barely perceptible to moderate chemosis (four animals), a slight accumulation of watery discharge (two animals) and corneal opacity (easily discernible and involving approximately 1/4 of the surface, one animal) were evident.

A maximum average score of 18.0 was recorded at twenty-four hours.

5. Inhalation Toxicity Test in Rats.

The mortality results during the observation period of fourteen days are presented below.

Inhalation Mortality Data

<u>During</u> <u>Exposure</u>	<u>%</u> <u>Mortality</u>	<u>During 14-Day</u> <u>Observation Period</u>	<u>%</u> <u>Mortality</u>
Mort./No. Animals		Mort./No. Animals	
0/10	0	0/10	0

One gram of ALFOL 14 Alcohol, Sample No. 8714J, was vaporized into the chamber during the one-hour exposure (plus the six-minute equilibration period).

All ten animals survived the one-hour test exposure (plus the six-minute equilibration period) and all ten animals survived the fourteen-day observation period which followed.

During the exposure period, none of the ten test animals displayed any gross toxicity or pharmacological signs. When the animals were removed from the test chamber at the end of the exposure period, all appeared normal and remained so throughout the fourteen-day observation period.

No animals succumbed during the exposure period or the following fourteen-day observation period.

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RESULTS: (continued)

5. Inhalation Toxicity Test in Rats. (continued)

Final bodyweight records of the ten animals at termination (fourteen days) showed weight gains within expected limits for all of the ten animals.

Gross necropsy of the animals sacrificed at termination (fourteen days) showed no remarkable findings.

SCIENTIFIC ASSOCIATES, INC.

By: Robert H. Moulton
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SCALE FOR SCORING OCULAR LESIONS*

(1) Cornea

- (A) Opacity-degree of density (area most dense taken for reading)
- No Opacity 0
 - Scattered or diffuse area, details of iris clearly visible 1
 - Easily discernible translucent areas, details of iris slightly obscured 2
 - Opalescent areas, no details or iris visible, size of pupil barely discernible 3
 - Opaque, iris invisible 4
- (B) Area of cornea involved
- One quarter (or less) but not zero 1
 - Greater than one quarter, but less than half 2
 - Greater than half, but less than three quarters 3
 - Greater than three quarters, up to whole area 4
- Score equals A x B x 5 Total maximum = 80

(2) Iris

- (A) Values
- Normal 0
 - Folds above normal, congestion, swelling, circumcorneal injection (any or all of these or combination of any thereof) iris still reacting to light (sluggish reaction is positive) 1
 - No reaction to light, hemorrhage, gross destruction (any or all of these) 2
- Score equals A x 5 Total maximum = 10

(3) Conjunctivae

- (A) Redness (refers to palpebral and bulbar conjunctivae excluding cornea and iris)
- Vessels normal 0
 - Vessels definitely injected above normal 1
 - More diffuse, deeper crimson red, individual vessels not easily discernible 2
 - Diffuse beefy red 3
- (B) Chemosis
- No swelling 0
 - Any swelling above normal (includes nictitating membrane) 1
 - Obvious swelling with partial eversion of lids 2
 - Swelling with lids about half closed 3
 - Swelling with lids about half closed to completely closed 4
- (C) Discharge
- No discharge 0
 - Any amount different from normal (does not include small amounts observed in inner canthus of normal animals) 1
 - Discharge with moistening of the lids and hairs just adjacent to lids 2
 - Discharge with moistening of the lids and hairs, and considerable area around the eye 3
- Score equals (A + B + C) x 2 Total maximum = 20

The maximum total score is the sum of all scores obtained for the cornea, iris, and conjunctivae. Total maximum score possible = 110.

*Lehman, A.J. et al., Appraisal of the Safety of Chemicals in Foods, Drugs, and Cosmetics, Assoc. Food and Drug Officials of the U.S., Second Printing, Topeka, Kansas 1965.

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