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Attn: TSCA Declassification Coordinator
U.S. Environmental Protection Agency
Office of Pollution Prevention and Toxics
Document Control Office (7407M)
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Re: Declassification Activity-TSCA §8(e) Submission
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DuPont-13654 (1-028)
Supplemental Submission - Revised Public Copy of Report

Dear TSCA Declassification Coordinator:

This submission is made in connection with the EPA 2010 CBI Declassification Challenge initiative.

Please find enclosed a revised public copy of the above-identified report, which was previously submitted to EPA and assigned the 8EHQ number referenced above. Any information still claimed as confidential business information (CBI) in the attached report has been redacted and replaced by brackets. The originally assigned 8EHQ number (as bar coded on the submission) has been added by the submitter to the first page of the enclosed revised public copy of the report. Other EPA identifying numbers stamped on the submission or provided on the EPA website are referenced above.

Very truly yours,

Andrea V. Malinowski

8EHQ-07-16691

Enclosure
- DuPont-13654 – 53 pages

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TRADE SECRET

Study Title

H-26027: Inhalation Approximate Lethal Concentration (ALC) in Male Rats Including Histopathology Examination of the Respiratory Tract

AUTHOR: Michael P. DeLorme, Ph.D.

STUDY COMPLETED ON: December 14, 2004

PERFORMING LABORATORY: E.I. du Pont de Nemours and Company
Haskell[SM] Laboratory for Health and Environmental Sciences
Elkton Road, P.O. Box 50
Newark, Delaware 19714-0050

LABORATORY PROJECT ID: DuPont-13654

WORK REQUEST NUMBER: 14799

SERVICE CODE NUMBER: 700

CERTIFICATION

We, the undersigned, declare that this report provides an accurate evaluation of data obtained from this study.

Anatomic Pathology Evaluation by: Steven R. Frame 13-Dec-2004
Steven R. Frame, D.V.M., Ph.D., Diplomate A.C.V.P — Date
Principal Research Pathologist and Research Manager

Issued by Study Director: Michael P. DeLorme 14 DEC 2004
Michael P. DeLorme, Ph.D. — Date
Research Toxicologist

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STUDY INFORMATION

Substance Tested: Zonyl® 9529

Synonyms/Codes:
- H-26027
- Plant Lot #1

Haskell Number: 26027

Composition: [ ]
Partially Fluorinated Urethane Polymer
Partially Fluorinated Urethane Copolymer
Acrylic Copolymer
Water
Hexylene Glycol
Non-ionic and Cationic Dispersants

Known Impurities: Not supplied by the sponsor

Physical Characteristics: White liquid

Stability: The test substance appeared to be stable under the conditions of the study; no evidence of instability was observed.

Sponsor: E.I. du Pont de Nemours and Company
Wilmington, Delaware 19898
U.S.A.

Study Initiated/Completed: September 9, 2003 / (see report cover page)

In-Life Initiated/Completed: September 23, 2003 / October 22, 2003

SUMMARY

The purpose of this study was to determine the 4-hour inhalation approximate lethal concentration (ALC) of H-26027 in male rats as well as determine the no-observable-effect level for histopathology changes in the respiratory tract. Five groups of 6 male and 2 groups of 10 male Crl:CD®(SD)IGS BR rats each were exposed to atmospheres of H-26027 in air. Test atmospheres were generated by aerosolization. Since H-26027 is an aqueous dispersion of fluorinated and acrylic polymers, the total airborne (wet aerosol) concentration was measured gravimetrically and H-26027 solids component of the test atmospheres measured using a desiccation and gravimetric technique. One group of 4 male rats was exposed to air only. Rats were exposed nose-only for a single, 4-hour period. Following exposure, surviving rats were retained for a 1-, 13-, or 14-day recovery period. Rats were weighed and observed for clinical signs of toxicity during the recovery period. Rats were exposed to mean wet aerosol concentrations of 1.0, 10, 110, 120, 510, 1000, or 5900 mg/m³ H-26027 (0.95, 10, 94, 110, 410, 560, or 940 mg/m³ H-26027 solids, repsectively). The mass median aerodynamic diameters for the aerosol atmosphere inhaled by the animals ranged from 0.67 to 5.1 µm.

Fifty percent mortality was observed following exposure to 5900 mg/m³ (940 mg/m³ H-26027 solids) and exposure to 510 and 1000 mg/m³ H-26027 (410 and 560 mg/m³ H-26027 solids, respectively) resulted in an 83% incidence of death. No mortality was observed at the next lowest concentration of 110 - 120 mg/m³ (94 - 110 mg/m³ H-26027 solids, respectively). Deaths generally occurred within 1 day of exposure. Some notable clinical signs of toxicity observed during this study included colored discharge from either the nose or eyes. These signs were typically observed immediately postexposure and had resolved by 2 days postexposure. In addition, rats generally exhibited a slight, 1 to 12% on average, body-weight losses within 1 day of exposure but began to regain weight by 2 days postexposure.

Animals exposed to 120 mg/m³ total wet H-26027 aerosol and less were subject to histopathology examination of the respiratory tract. Exposure to 120 mg/m³ total H-26027 resulted in degeneration and necrosis of the ventral laryngeal mucosa with focal areas of squamous differentiation and/or ulceration. Mild to moderate inflammation in the submucosa and necrosis of cartilage dorsal to the laryngeal saccule were also present in the larynx 24-hours postexposure. Animals exposed to 10 mg/m³ H-26027 demonstrated a slight inflammation of the submucosa in 3 of 5 rats 24-hours postexposure. Test substance-induced changes at 14-days postexposure were limited to residual cartilage necrosis in animals exposed to 110 mg/m³. The inflammation observed at 24-hours postexposure in the rats exposed to 10 mg/m³ was resolved by 14-days postexposure. No test substance-related microscopic changes were present in the rats exposed to 1.0 mg/m³ H-26027.

Under the conditions of this study, the approximate lethal concentration (ALC) for H-26027 is a total wet aerosol of 510 mg/m³ H-26027 (410 mg/m³ H-26027 solids). The ALC is defined as the lowest atmophseric concentration tested which casuses the death of one or more of the exposed animals. Since there concentration-repsponse curve demonstrated a steep slope between 120 and 510 mg/m³ H-26027 (0% and 83% mortalitiy, respectively), an inhalation median lethal concentration (LC_{50}) was calculated since there were a suitable number of data points. In this

case, the LC_{50} more accurately represents the lethal concentration. Therefore, a LC_{50} of 380 mg/m³ wet H-26027 aerosol (120 – 680 mg/m³ 95% confidence interval) and a LC_{50} of 300 mg/m³ H-26027 solids (10 – 450 mg/m³ 95% confidence interval) is derived. According to Haskell Laboratory toxicity classifications, H-26027 is considered to be moderately toxic (LC_{50} 200 -800 mg/m³) in male rats.

INTRODUCTION

The objective of this study was to determine a 4-hour inhalation approximate lethal concentration (ALC) of H-26027 in male rats as well as determine a no-observable-effect level for histopathology changes in the respiratory tract. The ALC is defined as the lowest atmospheric concentration tested which caused the death of one or more exposed rats either on the day of exposure or within at least 14 days following exposure. The inhalation route of exposure was chosen based on the expected route of potential human exposure and was requested by the sponsor.

STUDY DESIGN

Five groups of 6 male rats each and 2 groups of 10 male Crl:CD®(SD)IGS BR rats each were exposed to atmospheres of H-26027 in air. Test atmospheres were generated by aerosolization, and concentrations of H-26027 were measured gravimetrically. One groups of 4 male rats was exposed to air only. Rats were exposed nose-only for a single, 4-hour period. Following exposure, surviving rats were retained for a 1-, 13-, or 14-day recovery period.

Rats were approximately 8 weeks old and weighed between 230 and 301 grams at the time of exposure.

Rats were observed for mortality and clinical signs of toxicity immediately after they were removed from the restrainers following exposure. During the recovery period, all surviving rats were observed each day for mortality. Surviving rats were weighed and observed for clinical signs of toxicity on the day following exposure and at least twice more during the recovery period. At the end of the recovery period, all surviving rats were sacrificed by carbon dioxide asphyxiation and discarded.

MATERIALS AND METHODS

A. Test Substance

The test substance, H-26027, was supplied by the sponsor as a white liquid, which is an aqueous dispersion of fluorinated and acrylic polymers. The test substance was assumed to be stable throughout the exposure phase of the study; no evidence of instability was observed.

B. Test Species

Young adult, male Crl:CD®(SD)IGS BR rats were received from Charles River Laboratories, Inc., Raleigh, North Carolina. The rats were approximately 7 weeks old on the day of arrival.

Rats have historically been used in safety evaluation studies for inhalation toxicity testing. The Crl:CD®(SD)IGS BR rat was selected based on consistently acceptable health status and on extensive experience with the strain at Haskell Laboratory.

C. Animal Husbandry

1. Quarantine

Rats were quarantined after arrival for 5 days prior to testing. During the quarantine period, rats were weighed and observed for clinical signs of disease 3 times.

2. Animal Selection

Prior to each exposure, 6 to 12 male rats were selected for use on the study from the rats that were released from quarantine, had been gaining weight at a normal rate, had no overt signs of disease, and were the appropriate age and body weight. No attempt was made to randomly group animals.

3. Identification

Each rat was assigned an animal number that was recorded on a card affixed to the cage. Prior to exposure, the tail of each animal and cage card were coded with water-insoluble pens so that each animal could be identified after exposure and during the recovery period.

4. Housing

Except during exposure, rats were housed singly in stainless steel, wire-mesh cages suspended above cage boards.

5. Animal Room Environment

Rats were housed in proximity to the inhalation chambers. Animal rooms were maintained at a temperature of 18-26°C (targeted to 22-24°C) and a relative humidity of 30-70% (targeted to 40-60%). Animal rooms were artificially illuminated (fluorescent light) on an approximate 12-hour light/dark cycle. Excursions outside of these ranges were of insufficient magnitude and/or duration to have adversely affected the validity of the study.

6. Feed and Water

Except during exposure, PMI® Nutrition International, LLC Certified Rodent LabDiet® 5002 and tap water were available *ad libitum*.

7. Animal Health and Environmental Monitoring Program

As specified in the Haskell Laboratory animal health and environmental monitoring program, the following procedures are performed periodically to ensure that contaminant levels are below those that would be expected to impact the scientific integrity of the study:

- Water samples are analyzed for total bacterial counts, and the presence of coliforms, lead, and other contaminants.
- Feed samples are analyzed for total bacterial, spore, and fungal counts.

- Samples from freshly washed cages and cage racks are analyzed to ensure adequate sanitation by the cagewashers.

Certified animal feed is used, guaranteed by the manufacturer to meet specified nutritional requirements and not to exceed stated maximum concentrations of key contaminants, including specified heavy metals, aflatoxin, chlorinated hydrocarbons, and organophosphates. The presence of these contaminants below the maximum concentration stated by the manufacturer would not be expected to impact the integrity of the study.

The animal health and environmental monitoring program is administered by the attending laboratory animal veterinarian. Evaluation of these data did not indicate any conditions that affected the validity of the study.

D. Inhalation Exposure System

1. Atmosphere Generation

Chamber atmospheres were generated by aerosolization of the test substance in air with a Spraying Systems nebulizer. The test substance was metered into the nebulizer with a Harvard Apparatus model PHD 4400 syringe infusion pump. Filtered, high-pressure air, metered into the nebulizer by a Brooks model 0154CFD flow controller, carried the resulting atmosphere into the exposure chamber. Chamber concentrations of test substance were controlled by varying the feed rate to the atmosphere generator.

Test atmospheres were exhausted through a dry-ice cold trap followed by an MSA charcoal/HEPA filter cartridge prior to discharge into the fume hood.

2. Chamber Construction and Design

The exposure chamber was constructed of glass (cylindrical) with a nominal internal volume of 34 L. A polycarbonate baffle inside the chamber promoted uniform distribution of the test atmosphere.

3. Exposure Mode

During exposure, animals were individually restrained in perforated stainless steel cylinders with conical nosepieces. The restrainers were inserted into a polymethylmethacrylate faceplate that was attached to the exposure chamber so that the nose of each animal extended into the exposure chamber.

E. Characterization of Chamber Atmosphere

1. Test Substance Sampling and Analysis

The atmospheric concentration of H-26027 was determined by gravimetric analysis at a minimum of 60-minute intervals during each exposure. Known volumes of chamber atmosphere were drawn from the sampling port through a 25 mm filter cassette containing a pre-weighed glass fiber (Type A/E) filter. Immediately following the collection of the chamber atmosphere

sample, the filters were removed from the cassette and weighed on a Cahn Microbalance®. The post-sampling filter weight was recorded and used to determine the total aerosol concentration (wet aerosol) in the exposure chamber. The filters were then placed in a desiccator for at least 2 days, and reweighed. The desiccated filter mass was used to determine the H-26027 solids concentration.

2. Particle Size Determination

A sample to determine particle size distribution (mass median aerodynamic diameter and percent particles less than 10 µm diameter) was taken during each exposure with a Sierra® Series 210 cyclone preseparator/cascade impactor and Sierra® series 110 constant flow air sampler.[1]

3. Environmental Monitoring

Chamber temperature was targeted at 22 ± 4°C. The temperature was monitored continually with a Long Stem traceable thermometer and recorded 3 times during each exposure. Chamber relative humidity was targeted at 50 ± 20%. The relative humidity was measured with an Omega model RH5100C digital psychrometer and recorded 3 times during each exposure. Chamber airflow was set at the beginning of each exposure to achieve at least 10 air changes per hour. The airflow was monitored continually with a Brooks model 0154 flow controller and recorded initially and whenever changes were made during each exposure. Chamber oxygen concentration was targeted to be at least 19%. The oxygen concentration was measured with a Biosystems model 3100R oxygen analyzer and recorded 3 times during each exposure.

F. Anatomic Pathology Evaluation

To determine a no-observable-effect level for histopathology changes in the respiratory tract, rats exposed to 510 mg/m³ total H-26027 and less had the lungs, trachea, pharynx/larynx, and nose grossly examined 1 or 14 days postexposure. Subsequently, target tissues were processed for histopathology and microscopically examined (Table 2).

RESULTS AND DISCUSSION

A. Exposure Conditions
(Table 1)

Animals were exposed to H-26027 aerosols at mean total concentrations of 1.0, 10, 110, 120, 510, 1000, or 5900 mg/m³ (wet), which corresponded to mean H-26027 solids concentrations of 0.95, 10, 94, 110, 410, 560, or 940 mg/m³, respectively. The atmospheres generated at 510 mg/m³ total wet H-26027 and less were considered to be respirable, demonstrating mass median aerodynamic diameters (MMAD) ranging from 0.67 to 2.1 µm. The atmospheres generated at 1000 mg/m³ and greater were considered to be marginally respirable with MMADs ranging from 3.5 – 5.1 µm (Table 1).

Chamber temperature ranged from 19 to 25°C, chamber relative humidity ranged from 50 to 95%, chamber airflow ranged from 18 to 19 L/min, and the oxygen concentration was 21%. Although chamber temperature and relative humidity were outside the targeted parameters, these deviations were considered not to have adversely affected the validity of this study.

B. Mortality, Clinical Signs, and Body Weights

Deaths occurred at wet H-26027 aerosol concentrations of 510, 1000, or 5900 mg/m³ (410, 560, or 940 mg/m³ solids, respectively). Rats died within 2 days of exposure.

Following exposures, when the rats were removed from the restrainers, the clinical signs of toxicity frequently observed included colored discharge from either the eyes or nose. The colored discharge was resolved by 2 days postexposure in all test groups.

Weight losses were observed following exposure. Within 1 day of exposure, weight losses typically ranged from 1 to 12 percent of initial body weight. Surviving rats subsequently resumed normal weight gains (approximately 5-10 g/day) and gained weight for the remainder of the recovery period.

C. Anatomic Pathology Evaluation
(Table 2, Appendix B)

Microscopic changes were present in the larynx of rats exposed to 10 to 120 mg/m³ H-26027.

In the 120 mg/m³ group sacrificed 24 hours following a single exposure, laryngeal changes were characterized by degeneration and necrosis of the ventral laryngeal mucosa which was lined by attenuated epithelium. In some animals, focal areas of squamous differentiation and/or ulceration were also present. Mild to moderate inflammation, as well as necrosis of cartilage dorsal to the laryngeal saccule, was present in the submucosa Changes in the 10 mg/m³ group 24 hours after a single exposure were limited to slight inflammation in the submucosa in 3/5 rats. Since slight inflammation of the laryngeal submucosa may be seen in controls, it is uncertain if these slight changes at 10 mg/m³ represent compound-related effects

Compound-related changes in the larynx of rats sacrificed following 14-days recovery were limited to residual cartilage necrosis in rats exposed to 110 mg/m³. All other changes observed (such as airway hemorrhage, low incidences of minimal laryngeal inflammation) were consistent with findings commonly seen in rats on inhalation studies and thus were not considered compound-related.

No compound-related microscopic changes were present in the larynx of rats exposed to 1 mg/m³.

Degeneration/necrosis of the tracheal mucosa was observed in one rat in the 120 mg/m³ group sacrificed 1 day after exposure. There were no other compound-related effects in respiratory tissue at any of the exposure concentrations tested.

1. Conclusions

Under the conditions of this study, the NOAEL for pathology was 1 mg/m³. This NOAEL is based on minimal and equivocal findings in the larynx of rats exposed to 10 mg/m³. More definitive and more severe laryngeal changes were observed in rats exposed to 110/120 mg/m³. Except for residual cartilage necrosis, laryngeal changes were reversible following 14 days recovery from a single exposure.

CONCLUSIONS

Under the conditions of this study, the approximate lethal concentration (ALC) for H-26027 is a wet aerosol of 510 mg/m³ H-26027 (410 mg/m³ solids). Since numerous exposure concentrations were utilized in this study, and there was a steep slope in the concentration-response curve between the lethal and non-lethal concentrations, a regression analysis was performed and an LC_{50} of 380 mg/m³ total wet aerosol (120 - 680 mg/m³ 95% confidence interval) and an LC_{50} of 300 mg/m³ H-26027solids (9.5 - 450 mg/m³ 95% confidence interval) was calculated. According to Haskell Laboratory toxicity classifications, H-26027 is considered to be moderately toxic (ALC 200-800 mg/m³) in male rats.

The no observable effect level for histopathology changes is 1.0 mg/m³ H-26027.

RECORDS AND SAMPLE STORAGE

Specimens (if applicable), raw data, and the final report will be retained at Haskell Laboratory, Newark, Delaware, or at Iron Mountain Records Management, Wilmington, Delaware.

REFERENCES

1. Calculation described in Sierra Instruments, Inc., Bulletin 7-79-219IM, Instruction Manual: Series 210 Ambient Cascade Impactors and Cyclone Preseparators.

TABLES

TABLE 1

CHARACTERIZATION OF TEST ATMOSPHERES
AND ASSOCIATED ANIMAL MORTALITY

AEROSOL CONCENTRATION (mg/m³)[a]								AEROSOL SIZE			MORTALITY
Wet Aerosol				Solids				MMAD		Percent	(# deaths/
Mean	S.D.	Range	n	Mean	S.D.	Range	n	(μm)[b]	GSD[c]	<10 μm[d]	# exposed)
1.0	0.32	0.68 - 1.5	4	0.95	0.32	0.58 - 1.4	4	2.1	2.1	99	0 / 10
10	32	5.9 - 14	5	10	3.2	5.1 - 13	5	1.6	2.6	98	0 / 10
110	14	88 - 120	9	94	12	78 - 110	9	0.98	2.6	99	0 / 6
120	17	95 - 140	8	110	14	95 - 130	8	0.67	2.6	100	0 / 6
510	77	370 - 610	8	410	41	340 - 460	8	1.7	3.8	91	5 / 6
1000	400	410 - 1600	12	560	230	170 - 840	11	3.5	3.5	80	5 / 6
5900	1100	3500 - 6800	11	940	110	710 - 1000	11	5.1	4.2	68	3 / 6

a Represents the mean, standard deviation (S.D.), and range for each exposure, based on n samples per exposure. Values are reported to 2 significant figures. Calculations were performed prior to rounding values

b The MMAD (Mass Median Aerodynamic Diameter) is based on 1 particle size sample taken during each exposure.

c Geometric Standard Deviation.

d Percent aerosol mass having aerodynamic equivalent diameters of less than 10 μm.

TABLE 2

INCIDENCE OF GROSS OBSERVATIONS IN MALE RATS
DAY 1

LESIONS	TREATMENT	LESION INCIDENCE (Numeric)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
LUNGS		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6
TRACHEA		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6
NOSE		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6

Figure in parentheses is the number of animals grossly examined for this tissue
The absence of a number indicates the finding specified was not identified

TABLE 3

INCIDENCE OF GROSS OBSERVATIONS IN MALE RATS
DAY 14

LESIONS	TREATMENT	LESION INCIDENCE (Numeric)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	110 (Wet) 94 (Solids) mg/m³
LUNGS		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6
TRACHEA		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6
NOSE		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	5	5	6

Figure in parentheses is the number of animals grossly examined for this tissue
The absence of a number indicates the finding specified was not identified

TABLE 4

INCIDENCES AND LESION GRADES OF MICROSCOPIC OBSERVATIONS IN MALE RATS
DAY 1

LESIONS	TREATMENT	LESION INCIDENCE (NUMERIC)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
LUNGS				(5)	(6)
NO ABNORMALITY DETECTED				4	5
INFLAMMATION, SUBACUTE/CHRONIC					
minimal				1	1
Total observations per lesion				1	1
TRACHEA				(5)	(6)
NO ABNORMALITY DETECTED				5	5
DEGENERATION/NECROSIS, MUCOSA.					
moderate					1
Total observations per lesion					1
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		2	1	1	
NECROSIS, CARTILAGE.					6
INFLAMMATION, SUBACUTE/CHRONIC					
minimal				3	
Total observations per lesion				3	
INFLAMMATION, ACUTE.					
mild					4
moderate					2

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

TABLE 4 (Continued)

INCIDENCES AND LESION GRADES OF MICROSCOPIC OBSERVATIONS IN MALE RATS
DAY 1

LESIONS	TREATMENT	LESION INCIDENCE (NUMERIC)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
INFLAMMATION, ACUTE.					
Total observations per lesion					6
HEMORRHAGE.			3	4	5
DEGENERATION/NECROSIS, MUCOSA, VENTRAL					
mild					3
moderate					3
Total observations per lesion					6
TISSUE UNSATISFACTORY/LOST - NOT PRESENT IN BLOCK.			1		
NOSE I & II				(5)	(6)
NO ABNORMALITY DETECTED				4	5
HYPERPLASIA, EPITHELIUM, RESPIRATORY.					
minimal				1	
Total observations per lesion				1	
HEMORRHAGE.					1
EXUDATE, NASAL CAVITY.					
minimal				1	
Total observations per lesion				1	

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

TABLE 4 (Continued)

INCIDENCES AND LESION GRADES OF MICROSCOPIC OBSERVATIONS IN MALE RATS
DAY 1

LESIONS	LESION INCIDENCE (NUMERIC)			
TREATMENT	0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
NOSE III & IV			(5)	(6)
NO ABNORMALITY DETECTED			4	4
HEMORRHAGE.			1	2

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

TABLE 5

INCIDENCES AND LESION GRADES OF MICROSCOPIC OBSERVATIONS IN MALE RATS
DAY 14

LESIONS	TREATMENT	LESION INCIDENCE (NUMERIC)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	110 (Wet) 94 (Solids) mg/m³
LUNGS				(5)	(6)
NO ABNORMALITY DETECTED				5	6
TRACHEA				(5)	(6)
NO ABNORMALITY DETECTED				5	6
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED			2		
NECROSIS, CARTILAGE.					6
INFLAMMATION, SUBACUTE/CHRONIC					
minimal				1	1
Total observations per lesion				1	1
HEMORRHAGE.		2	3	5	5
NOSE I & II				(5)	(6)
NO ABNORMALITY DETECTED				5	6
NOSE III & IV				(5)	(6)
NO ABNORMALITY DETECTED				5	5

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

TABLE 5 (Continued)

INCIDENCES AND LESION GRADES OF MICROSCOPIC OBSERVATIONS IN MALE RATS
DAY 14

LESIONS	TREATMENT	LESION INCIDENCE (NUMERIC)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	110 (Wet) 94 (Solids) mg/m³
NOSE III & IV HEMORRHAGE.				(5)	(6) 1

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

APPENDICES

APPENDIX A

Determination of LC_{50}

Determination of LC_{50} - Wet Aerosol Concentrations

Scale of Concentration is Transformed to $LOG_{(10)}$

Concentration (mg/L)	Log Concentration	Number Exposed	Number Responding	Rate	Probit
0.0010	-3.0000	5.	0.	0 0001	1.2809
0.0100	-2.0000	5.	0	0.0001	1.2809
0.1100	-0.9586	6.	0.	0.0001	1.2809
0.5100	-0 2924	6.	5	0.8333	5.9674
1.0000	0.0000	6.	5.	0.8333	5.9674

Control Sample Size	=	0.
Control Responses	=	0.
Spontaneous Response Rate	=	0.00000
Heterogeneity Factor	=	1.0000
Number of Points	=	5
Degrees of Freedom	=	3
Deviate	=	1.9600
G	=	0 5445
Number of Cycles	=	7
Average X	=	-0.3242
Average Y	=	5.3368
Average V	=	0.0000
Slope	=	3.3759
Lower Limit	=	0.8848
Upper Limit	=	5.8671
Intercept	=	6.4314
CHI Squared	=	1.6323

Point	Concentration (mg/L)	95% Confidence Limits Lower	Upper
P = 0.01	0 0771	0.0004	0.1847
P = 0.05	0 1227	0.0024	0.2496
P = 0.10	0.1572	0.0060	0.2960
P = 0 20	0.2122	0.0177	0.3712
P = 0.50	**0.3767**	**0.1201**	**0.6821**
P = 0.80	0.6688	0 3855	2 6432
P = 0.90	0.9029	0.5285	7 2009
P = 0.95	1.1568	0.6490	17.4088
P = 0.99	1.8411	0.9034	96.2505

Determination of LC_{50} - Dry Aerosol Concentrations

Scale of Concentration is Transformed to $LOG_{(10)}$

Concentration (mg/L)	Log Concentration	Number Exposed	Number Responding	Rate	Probit
0.00095	-3.0223	5.	0.	0.0001	1.2809
0.0100	-2.0000	5.	0.	0.0001	1.2809
0.0940	-1.0269	6.	0.	0.0001	1.2809
0.4100	-0.3872	6.	5.	0.8333	5.9674
0.5600	-0 2518	6.	5.	0.8333	5.9674

Control Sample Size	=	0.
Control Responses	=	0.
Spontaneous Response Rate	=	0.00000
Heterogeneity Factor	=	1.0000
Number of Points	=	5
Degrees of Freedom	=	3
Deviate	=	1.9600
G	=	0.8246
Number of Cycles	=	8
Average X	=	-0.3872
Average Y	=	5.6482
Average V	=	0.0000
Slope	=	4.6393
Lower Limit	=	0.4265
Upper Limit	=	8.8521
Intercept	=	7.4443
CHI Squared	=	0.6099

Point	Concentration (mg/L)	95% Confidence Limits Lower	Upper
P = 0 01	0.0937	0 0000	0.2010
P = 0.05	0.1314	0.0000	0.2443
P = 0.10	0.1574	0.0000	0.2725
P = 0.20	0.1958	0.0001	0.3139
P = 0.50	**0.2973**	**0.0095**	**0.4494**
P = 0.80	0.4514	0 2391	2.1019
P = 0.90	0.5615	0.3708	16.3473
P = 0.95	0.6725	0.4455	106 3359
P = 0.99	0.9431	0.5701	3930 0230

APPENDIX B

Incidences of Gross Observations in Male Rats with Individual Animals Listed

Incidences of Gross Observations in Male Rats with Individual Animals Listed
Day 1

LESIONS	TREATMENT	LESION INCIDENCE (Numeric)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
LUNGS		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		101	301	1	19
		102	302	2	20
			303	3	21
			304	4	22
			305	5	23
					24
TRACHEA		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		101	301	1	19
		102	302	2	20
			303	3	21
			304	4	22
			305	5	23
					24
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		101	301	1	19
		102	302	2	20
			303	3	21
			304	4	22
			305	5	23
					24
NOSE		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		101	301	1	19
		102	302	2	20
			303	3	21
			304	4	22
			305	5	23
					24

Figure in parentheses is the number of animals grossly examined for this tissue
The absence of a number indicates the finding specified was not identified

Incidences of Gross Observations in Male Rats with Individual Animals Listed
Day 14

LESIONS	TREATMENT	LESION INCIDENCE (Numeric)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	110 (Wet) 94 (Solids) mg/m³
LUNGS		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		103	306	6	13
		104	307	7	14
			308	8	15
			309	9	16
			310	10	17
					18
TRACHEA		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		103	306	6	13
		104	307	7	14
			308	8	15
			309	9	16
			310	10	17
					18
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		103	306	6	13
		104	307	7	14
			308	8	15
			309	9	16
			310	10	17
					18
NOSE		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		103	306	6	13
		104	307	7	14
			308	8	15
			309	9	16
			310	10	17
					18

Figure in parentheses is the number of animals grossly examined for this tissue
The absence of a number indicates the finding specified was not identified

APPENDIX C

Incidences of Microscopic Observations in Male Rats with Individual Animals Listed

Incidences of Microscopic Observations in Male Rats with Individual Animals Listed
Day 1

LESIONS	TREATMENT	LESION INCIDENCE (NUMERIC)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
LUNGS				(5)	(6)
NO ABNORMALITY DETECTED				1	20
				3	21
				4	22
				5	23
					24
INFLAMMATION, SUBACUTE/CHRONIC				2	19
TRACHEA				(5)	(6)
NO ABNORMALITY DETECTED				1	19
				2	20
				3	21
				4	22
				5	24
DEGENERATION/NECROSIS, MUCOSA.					23
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED		101	302	3	
		102			
NECROSIS, CARTILAGE					19
					20
					21
					22
					23
					24

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

Incidences of Microscopic Observations in Male Rats with Individual Animals Listed
Day 1

LESIONS	TREATMENT	0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
			LESION INCIDENCE (NUMERIC)		
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
INFLAMMATION, SUBACUTE/CHRONIC.				1	
				2	
				5	
INFLAMMATION, ACUTE.					19
					20
					21
					22
					23
					24
HEMORRHAGE.			301	1	19
			303	2	20
			304	4	21
				5	22
					23
DEGENERATION/NECROSIS, MUCOSA, VENTRAL.					19
					20
					21
					22
					23
					24
TISSUE UNSATISFACTORY/LOST - NOT PRESENT IN BLOCK.			305		

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

Incidences of Microscopic Observations in Male Rats with Individual Animals Listed
Day 1

LESIONS	TREATMENT	0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	120 (Wet) 110 (Solids) mg/m³
			LESION INCIDENCE (NUMERIC)		
NOSE I & II				(5)	(6)
NO ABNORMALITY DETECTED				2	19
				3	21
				4	22
				5	23
					24
HYPERPLASIA, EPITHELIUM, RESPIRATORY.				1	
HEMORRHAGE.					20
EXUDATE, NASAL CAVITY.				1	
NOSE III & IV				(5)	(6)
NO ABNORMALITY DETECTED				1	19
				2	21
				4	23
				5	24
HEMORRHAGE.				3	20
					22

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

Incidences of Microscopic Observations in Male Rats with Individual Animals Listed
Day 14

LESIONS	TREATMENT	LESION INCIDENCE (NUMERIC)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	110 (Wet) 94 (Solids) mg/m³
LUNGS				(5)	(6)
NO ABNORMALITY DETECTED				6	13
				7	14
				8	15
				9	16
				10	17
					18
TRACHEA				(5)	(6)
NO ABNORMALITY DETECTED				6	13
				7	14
				8	15
				9	16
				10	17
					18
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
NO ABNORMALITY DETECTED			306		
			307		
NECROSIS, CARTILAGE.					13
					14
					15
					16
					17
					18

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

Incidences of Microscopic Observations in Male Rats with Individual Animals Listed
Day 14

LESIONS	TREATMENT	LESION INCIDENCE (NUMERIC)			
		0 mg/m³	1.0 (Wet) 0.95 (Solids) mg/m³	10 (Wet) 10 (Solids) mg/m³	110 (Wet) 94 (Solids) mg/m³
PHARYNX/LARYNX		(2)	(5)	(5)	(6)
INFLAMMATION, SUBACUTE/CHRONIC					
minimal				10	16
Total observations per lesion				1	1
HEMORRHAGE		103	308	6	13
		104	309	7	14
			310	8	16
				9	17
				10	18
NOSE I & II				(5)	(6)
NO ABNORMALITY DETECTED				6	13
				7	14
				8	15
				9	16
				10	17
					18
NOSE III & IV				(5)	(6)
NO ABNORMALITY DETECTED				6	13
				7	14
				8	15
				9	17
				10	18
HEMORRHAGE					16

Figure in parentheses is the number of animals microscopically examined for this tissue
The absence of a number indicates the lesion specified was not identified

APPENDIX D

Individual Animal Pathology Data

Individual Animal Pathology Data

Concentration: 0.0 mg/m³ Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
101	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology : No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology : No Microscopic Abnormality Observed : PHARYNX/LARYNX
102	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology : No Macroscopic Abnormality Observed . LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology : No Microscopic Abnormality Observed : PHARYNX/LARYNX
103	Terminal Sacrifice Killed on Day : 14 Exposure Group : Day 14 Animal is signed off from necropsy
	Gross Pathology . No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

103 Continued on the next page ....

Individual Animal Pathology Data

Concentration: 0.0 mg/m³ Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
103	Continued from previous page
	Histopathology :
	PHARYNX/LARYNX :
	HEMORRHAGE
104	Terminal Sacrifice
	Killed on Day : 14
	Exposure Group : Day 14
	Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed :
	LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX :
	HEMORRHAGE

Individual Animal Pathology Data

Concentration: 1.0 mg/m³ (Wet), 0.95 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
301	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX : HEMORRHAGE
302	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	No Microscopic Abnormality Observed : PHARYNX/LARYNX
303	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

303 Continued on the next page ....

Individual Animal Pathology Data

Concentration· 1 0 mg/m³ (Wet), 0.95 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
303	Continued from previous page
	Histopathology ·
	PHARYNX/LARYNX ·
	HEMORRHAGE.
304	Terminal Sacrifice
	Killed on Day : 1
	Exposure Group : Day 1
	Animal is signed off from necropsy
	Gross Pathology ·
	No Macroscopic Abnormality Observed :
	LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX :
	HEMORRHAGE.
305	Terminal Sacrifice
	Killed on Day : 1
	Exposure Group : Day 1
	Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed :
	LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX :
	TISSUE UNSATISFACTORY/LOST - NOT PRESENT IN BLOCK

Individual Animal Pathology Data

Concentration· 1.0 mg/m³ (Wet), 0.95 mg/m³ (Solids) Sex· Males

Animal Ref	Microscopic & Macroscopic Findings
306	Terminal Sacrifice Killed on Day : 14 Exposure Group : Day 14 Animal is signed off from necropsy

Gross Pathology .

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

No Microscopic Abnormality Observed :
PHARYNX/LARYNX

307 Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology .

No Microscopic Abnormality Observed :
PHARYNX/LARYNX

308 Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

308 Continued on the next page . .

Individual Animal Pathology Data

Concentration- 1.0 mg/m³ (Wet), 0.95 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
308	Continued from previous page

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.

309 Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed -
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology .

PHARYNX/LARYNX :
HEMORRHAGE.

310 Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE

Individual Animal Pathology Data

Concentration: 10 mg/m³ (Wet), 10 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
1	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX : HEMORRHAGE. INFLAMMATION, SUBACUTE/CHRONIC, minimal.
	NOSE I & II : EXUDATE, NASAL CAVITY, minimal. HYPERPLASIA, EPITHELIUM, RESPIRATORY, minimal.
	No Microscopic Abnormality Observed : LUNGS, TRACHEA, NOSE III & IV
2	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	LUNGS : INFLAMMATION, SUBACUTE/CHRONIC, minimal.
	PHARYNX/LARYNX : HEMORRHAGE. INFLAMMATION, SUBACUTE/CHRONIC, minimal
	No Microscopic Abnormality Observed : TRACHEA, NOSE I & II, NOSE III & IV

Individual Animal Pathology Data

Concentration. 10 mg/m³ (Wet), 10 mg/m³ (Solids) Sex Males

Animal Ref	Microscopic & Macroscopic Findings
3	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	NOSE III & IV : HEMORRHAGE.
	No Microscopic Abnormality Observed . LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE I & II
4	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX : HEMORRHAGE
	No Microscopic Abnormality Observed : LUNGS, TRACHEA, NOSE I & II, NOSE III & IV
5	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed : LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

5 Continued on the next page ....

Individual Animal Pathology Data

Concentration. 10 mg/m³ (Wet), 10 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
5	Continued from previous page

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.
INFLAMMATION, SUBACUTE/CHRONIC, minimal.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

6 Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

7 Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

7 Continued on the next page ....

Individual Animal Pathology Data

Concentration. 10 mg/m³ (Wet), 10 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
7	Continued from previous page
	Histopathology :
	PHARYNX/LARYNX :
	HEMORRHAGE.
	No Microscopic Abnormality Observed :
	LUNGS, TRACHEA, NOSE I & II, NOSE III & IV
8	Terminal Sacrifice
	Killed on Day : 14
	Exposure Group : Day 14
	Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed :
	LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX :
	HEMORRHAGE.
	No Microscopic Abnormality Observed :
	LUNGS, TRACHEA, NOSE I & II, NOSE III & IV
9	Terminal Sacrifice
	Killed on Day : 14
	Exposure Group : Day 14
	Animal is signed off from necropsy
	Gross Pathology :
	No Macroscopic Abnormality Observed :
	LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE
	Histopathology :
	PHARYNX/LARYNX :
	HEMORRHAGE.

9 Continued on the next page ....

Individual Animal Pathology Data

Concentration: 10 mg/m³ (Wet), 10 mg/m³ (Solids) Sex. Males

Animal Ref	Microscopic & Macroscopic Findings
9	Continued from previous page

Histopathology :

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

10 Terminal Sacrifice
Killed on Day . 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.
INFLAMMATION, SUBACUTE/CHRONIC, minimal.

No Microscopic Abnormality Observed ·
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

Individual Animal Pathology Data

Concentration: 110 mg/m³ (Wet), 94 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
13	Terminal Sacrifice Killed on Day : 14 Exposure Group : Day 14 Animal is signed off from necropsy

Gross Pathology .

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX .
HEMORRHAGE
NECROSIS, CARTILAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

14 Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed .
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX .
HEMORRHAGE,
NECROSIS, CARTILAGE,

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

Individual Animal Pathology Data

Concentration: 110 mg/m³ (Wet), 94 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
15	Terminal Sacrifice Killed on Day : 14 Exposure Group : Day 14 Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
NECROSIS, CARTILAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

16

Terminal Sacrifice
Killed on Day : 14
Exposure Group : Day 14
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.
INFLAMMATION, SUBACUTE/CHRONIC, minimal.
NECROSIS, CARTILAGE.
NOSE III & IV :
HEMORRHAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II

Individual Animal Pathology Data

Concentration: 110 mg/m³ (Wet), 94 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
17	Terminal Sacrifice Killed on Day . 14 Exposure Group : Day 14 Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE,
NECROSIS, CARTILAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

18	Terminal Sacrifice Killed on Day : 14 Exposure Group : Day 14 Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.
NECROSIS, CARTILAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

Individual Animal Pathology Data

Concentration: 120 mg/m³ (Wet), 110 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
19	Terminal Sacrifice Killed on Day . 1 Exposure Group · Day 1 Animal is signed off from necropsy

Gross Pathology .

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology ·

LUNGS :
INFLAMMATION, SUBACUTE/CHRONIC, minimal.
PHAPYNX/LARYNX :
INFLAMMATION, ACUTE, mild
NECROSIS, CARTILAGE
HEMORRHAGE.
DEGENERATION/NECPOSIS, MUCOSA, VENTRAL, moderate

No Microscopic Abnormality Observed :
TRACHEA, NOSE I & II, NOSE III & IV

20 Terminal Sacrifice
Killed on Day · 1
Exposure Group : Day 1
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.
INFLAMMATION, ACUTE, mild.
NECROSIS, CARTILAGE
DEGENERATION/NECROSIS, MUCOSA, VENTRAL, mild.
NOSE I & II :
HEMORRHAGE.

20 Continued on the next page ....

Individual Animal Pathology Data

Concentration: 120 mg/m³ (Wet), 110 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
20	Continued from previous page

Histopathology :

NOSE III & IV :
HEMORRHAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA

21 Terminal Sacrifice
Killed on Day : 1
Exposure Group : Day 1
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.
INFLAMMATION, ACUTE, mild
NECROSIS, CARTILAGE.
DEGENERATION/NECROSIS, MUCOSA, VENTRAL, mild.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV

22 Terminal Sacrifice
Killed on Day : 1
Exposure Group : Day 1
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

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Individual Animal Pathology Data

Concentration: 120 mg/m³ (Wet), 110 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
22	Continued from previous page

Histopathology :

PHARYNX/LARYNX :
HEMORRHAGE.
INFLAMMATION, ACUTE, mild.
NECROSIS, CARTILAGE.
DEGENERATION/NECROSIS, MUCOSA, VENTRAL, mild
NOSE III & IV :
HEMORRHAGE.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II

23 Terminal Sacrifice
Killed on Day : 1
Exposure Group : Day 1
Animal is signed off from necropsy

Gross Pathology :

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

TRACHEA :
DEGENERATION/NECROSIS, MUCOSA, moderate.
PHARYNX/LARYNX :
HEMORRHAGE.
INFLAMMATION, ACUTE, moderate.
NECROSIS, CARTILAGE.
DEGENERATION/NECROSIS, MUCOSA, VENTRAL, moderate.

No Microscopic Abnormality Observed :
LUNGS, NOSE I & II, NOSE III & IV

Individual Animal Pathology Data

Concentration: 120 mg/m³ (Wet), 110 mg/m³ (Solids) Sex: Males

Animal Ref	Microscopic & Macroscopic Findings
24	Terminal Sacrifice Killed on Day : 1 Exposure Group : Day 1 Animal is signed off from necropsy

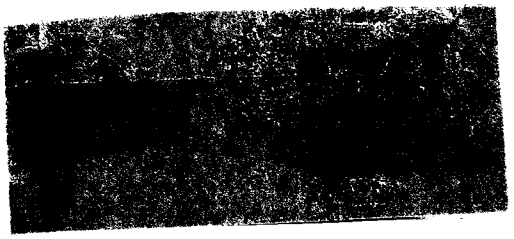
Gross Pathology -

No Macroscopic Abnormality Observed :
LUNGS, TRACHEA, PHARYNX/LARYNX, NOSE

Histopathology :

PHARYNX/LARYNX :
INFLAMMATION, ACUTE, moderate.
NECROSIS, CARTILAGE.
DEGENERATION/NECROSIS, MUCOSA, VENTRAL, moderate.

No Microscopic Abnormality Observed :
LUNGS, TRACHEA, NOSE I & II, NOSE III & IV



CERTIFIED MAIL

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