

Experiment Number: 07062 - 01
Test Type: 30-day
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
1020 Long Multiwalled Carbon Nanotube
CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
Time Report Requested: 07:42:27
First Dose M/F: 05/23/11 / 05/23/11
Lab: BNW

F1_HSD

NTP Study Number: C07062
Lock Date: 03/30/2012
Cage Range: ALL
Date Range: ALL
Reasons For Removal: ALL
Removal Date Range: ALL
Treatment Groups: Include ALL
Study Gender: Both
TDMSE Version: 3.0.1.1_001
PWG Approval Date: NONE

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 Lab: BNW

DAY ON TEST	0	0	0	0	0	0	0	0	0	0	HARLAN SPRAGUE DAWLEY RATS MALE Control
	0	0	0	0	1	1	0	0	0	0	
ANIMAL ID	3	3	7	3	5	5	4	3	3	7	* TOTALS
	0	1	2	0	6	6	4	1	0	2	
	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	
	2	2	2	2	3	3	3	3	3	3	
	6	7	8	9	0	1	2	3	4	5	

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial + + 6

Lymph Node, Mediastinal + M 7

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

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HARLAN SPRAGUE DAWLEY RATS MALE Control	DAY ON TEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		3	3	7	3	5	5	4	3	3	7				
		0	1	2	0	6	6	4	1	0	2				
		0	0	0	0	0	0	0	0	0	0				
		0	0	0	0	0	0	0	0	0	0				
		2	2	2	2	3	3	3	3	3	3				
		6	7	8	9	0	1	2	3	4	5				
* TOTALS															

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx		+								+						10
Lung Inflammation, Chronic		+								+						10
		1														5 1.0
Nose		+								+						10
Trachea		+								+						9

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

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 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
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		0	0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS MALE	DAY ON TEST	0	0	0	0	1	1	0	0	0	0	0	0	0	0
		3	3	7	3	5	5	4	3	3	3	7			
		0	1	2	0	6	6	4	1	0	0	2			
	0.1 mg/m3														
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0
		2	2	2	2	2	2	2	2	2	2	2	2	2	2
		2	2	2	2	3	3	3	3	3	3	3	3	3	3
		6	7	8	9	0	1	2	3	4	5				
														* TOTALS	

ALIMENTARY SYSTEM

Liver																1
Necrosis, Focal																1 2.0
Pharynx																10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial																6
Lymph Node, Mediastinal																9
Hyperplasia, Lymphoid																3 1.7

INTEGUMENTARY SYSTEM

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 Lab: BNW

HARLAN SPRAGUE DAWLEY RATS MALE 0.1 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	0	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	
		3	3	7	3	5	5	4	3	3	7	
		0	1	2	0	6	6	4	1	0	2	
		0	0	0	0	0	0	0	0	0	0	
		2	2	2	2	2	2	2	2	2	2	
		2	2	2	2	3	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	5	
* TOTALS												

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx		+				+						10
Lung		+				+						10
Foreign Body		1				1						10 1.0
Inflammation, Chronic												1 1.0
Nose		+				+						10
Olfactory Epithelium, Accumulation, Hyaline Droplet												1 1.0
Trachea		+				+						10

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

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Lab: BNW

HARLAN SPRAGUE DAWLEY RATS MALE 0.1 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	* TOTALS
		0	0	0	0	1	1	0	0	0	
		3	3	7	3	5	5	4	3	3	
		0	1	2	0	6	6	4	1	0	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	
		2	2	2	2	2	2	2	2	2	
		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	
		5									

NONE

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DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS MALE		0	0	0	0	1	1	0	0	0	0	0	0	0
	0.3 mg/m3	3	3	7	3	5	5	4	3	3	3	7	7	7
		0	1	2	0	6	6	4	1	0	0	2	2	2
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0
	4	4	4	4	4	4	4	4	4	4	4	4	4	
	2	2	2	2	3	3	3	3	3	3	3	3	3	
	6	7	8	9	0	1	2	3	4	5	6	7	8	
													* TOTALS	

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial + + 9

Lymph Node, Mediastinal + + 10

Hyperplasia, Lymphoid 1 1.0

INTEGUMENTARY SYSTEM

NONE

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DAY ON TEST	0	0	0	0	0	0	0	0	0	0
	HARLAN SPRAGUE DAWLEY RATS MALE	0	0	0	0	1	1	0	0	0
0.3 mg/m3	3	3	7	3	5	5	4	3	3	7
ANIMAL ID	0	0	0	0	0	0	0	0	0	0
	4	4	4	4	4	4	4	4	4	4
	2	2	2	2	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5
* TOTALS										

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx	+	+	10	
Lung	+	+	10	
Foreign Body	1	1		10 1.0
Inflammation, Chronic				2 1.0
Nose	+	+	10	
Olfactory Epithelium, Accumulation, Hyaline Droplet				3 1.0
Trachea	+	+	10	

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

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Lab: BNW

HARLAN SPRAGUE DAWLEY RATS MALE 1 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
		0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
		7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	0	4	3	4	0	4	3	4	4	3	4	3	4	1	5	6											
ANIMAL ID	2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	2	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	2	3	4	5	6	7	8	9	0	1	1	2	3	4	5	6	7	8	9	0	1	2	2	2	2	3	4	5	6	7	8	9	0	1	2	2	2	3	4	5	6	7	8	9	0	1				

males
(cont...)

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx
Epiglottis, Metaplasia, Squamous

+ + + + + + + +

Lung
Foreign Body
Inflammation, Chronic
Alveolar Epithelium, Hyperplasia

+ + + + + + + +
2 2 2 2 2 2 2 2
1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1

Nose

+ + + + + + + +

Trachea

+ + + + + + + +

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

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+ .. Tissue examined microscopically

X .. Lesion present

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M .. Missing tissue

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Species/Strain: RATS/HSD

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CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNV

	DAY ON TEST																												
HARLAN SPRAGUE DAWLEY RATS MALE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
1 mg/m3	7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	4	5	
	2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	2	1	4	0	4	4	1	6	6		
	ANIMAL ID																												
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	3	2	2	4	5		
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6		males (cont...)	

NONE

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 Lab: BNW

HARLAN SPRAGUE DAWLEY RATS MALE	DAY ON TEST	0	0	0	0	0	0	0	0	0	1 mg/m3	ANIMAL ID	0	0	0	0	0	0	0	0	0
		3	3	7	3	5	5	4	3	3			7	0	0	0	0	0	0	0	0
		0	1	2	0	6	6	4	1	0			2	6	6	6	6	6	6	6	6
		6	6	6	6	6	6	6	6	6			6	2	2	2	2	3	3	3	3
	6	7	8	9	0	1	2	3	4	5											
											* TOTALS										

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial Foreign Body	+ 1	+ 1	7 4	1.0
Lymph Node, Mediastinal Foreign Body	+ 2	1	9 3	1.0
Hyperplasia, Lymphoid			3	1.3

INTEGUMENTARY SYSTEM

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HARLAN SPRAGUE DAWLEY RATS MALE 1 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	
		0	0	0	0	1	1	0	0	0	
		3	3	7	3	5	5	4	3	3	7
		0	1	2	0	6	6	4	1	0	2
	ANIMAL ID	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	
		6	6	6	6	6	6	6	6	6	
		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	5
* TOTALS											

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx		+				+					10	
Epiglottis, Metaplasia, Squamous												1 1.0
Lung		+				+					10	
Foreign Body			2				1					10 1.9
Inflammation, Chronic			1				1					10 1.0
Alveolar Epithelium, Hyperplasia												3 1.0
Nose		+				+					10	
Trachea		+				+					10	

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

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 + .. Tissue examined microscopically
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HARLAN SPRAGUE DAWLEY RATS MALE 1 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0		
		0	0	0	0	1	1	0	0	0		
		3	3	7	3	5	5	4	3	3		
		0	1	2	0	6	6	4	1	0		
	ANIMAL ID	0	0	0	0	0	0	0	0	0		
		0	0	0	0	0	0	0	0			
		6	6	6	6	6	6	6	6			
		2	2	2	2	3	3	3	3			
		6	7	8	9	0	1	2	3	4	5	
* TOTALS												

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

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First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	DAY ON TEST	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
HARLAN SPRAGUE DAWLEY RATS		7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	4	3	5	6		
MALE		2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	0	0	2	1	4	0	4	1	6					
3 mg/m3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		
		0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2		
		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	2	3	4	5	6					

males
(cont...)

ALIMENTARY SYSTEM

Pharynx			+	+	+																											
---------	--	--	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial																																
Foreign Body		+	+	M		+	M						+									M								+		
Hyperplasia, Lymphoid		1	1			1						1																		1		
Lymph Node, Mediastinal		+	+	+		+	I					+										+								+		
Foreign Body		1	1	1		1						1										1								1		
Hyperplasia, Lymphoid		3	2	2		3						2										1										

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

A .. Autolysis precludes evaluation

BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:

1) Minimal 3) Moderate

2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	males (cont...)
HARLAN SPRAGUE DAWLEY RATS MALE 3 mg/m3	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	
		2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	2	1	4	0	4	1	6	6	

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx	+	+	+			+	+			+										+							+
Epiglottis, Metaplasia, Squamous	1	1	1			1	1			1										1							1
Lung	+	+	+			+	+			+										+							+
Foreign Body	2	2	2			3	3			2										2							2
Inflammation, Chronic	2	2	2			2	3			2										2							2
Alveolar Epithelium, Hyperplasia	2	2	1			2	2			2										2							2
Nose	+	+	+			+	+			+										+							+
Respiratory Epithelium, Accumulation, Hyaline Droplet						1																					
Trachea	+	+	+			+	+			+										+							+

SPECIAL SENSES SYSTEM

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically
 1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

DAY ON TEST HARLAN SPRAGUE DAWLEY RATS MALE 3 mg/m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	5
ANIMAL ID	2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	2	1	4	0	4	1	6	6	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	

males
(cont...)

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue

M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS MALE		0	0	0	0	1	1	0	0	0	0	0	0	0	0
		3	3	7	3	5	5	4	3	3	3	7			
		0	1	2	0	6	6	4	1	0	2				
	3 mg/m3														
ANIMAL ID		0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0
		8	8	8	8	8	8	8	8	8	8	8	8	8	8
		2	2	2	2	3	3	3	3	3	3	3	3	3	3
		6	7	8	9	0	1	2	3	4	5				
														* TOTALS	

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial	+	+	7	
Foreign Body	1	1		6 1.0
Hyperplasia, Lymphoid	3	3		6 2.0
Lymph Node, Mediastinal	+	+	9	
Foreign Body	1	1		8 1.0
Hyperplasia, Lymphoid	1	3		8 2.1

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST	0	0	0	0	0	0	0	0	0	0
	HARLAN SPRAGUE DAWLEY RATS MALE	0	0	0	0	1	1	0	0	0
3 mg/m3	3	3	7	3	5	5	4	3	3	7
ANIMAL ID	0	0	0	0	0	0	0	0	0	0
	8	8	8	8	8	8	8	8	8	8
	2	2	2	2	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5
* TOTALS										

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx		+		+					10	
Epiglottis, Metaplasia, Squamous								1		9 1.0
Lung		+		+					10	
Foreign Body			2					2		10 2.2
Inflammation, Chronic			2					2		10 2.1
Alveolar Epithelium, Hyperplasia			1					1		10 1.7
Nose		+		+					10	
Respiratory Epithelium, Accumulation, Hyaline Droplet										1 1.0
Trachea		+		+					10	

SPECIAL SENSES SYSTEM

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

HARLAN SPRAGUE DAWLEY RATS MALE 3 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	* TOTALS
		0	0	0	0	1	1	0	0	0	
		3	3	7	3	5	5	4	3	3	
		0	1	2	0	6	6	4	1	0	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	
		8	8	8	8	8	8	8	8	8	
		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

A .. Autolysis precludes evaluation

BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:

1) Minimal 3) Moderate

2) Mild 4) Marked

Experiment Number: 07062 - 01
Test Type: 30-day
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
Time Report Requested: 07:42:27
First Dose M/F: 05/23/11 / 05/23/11
Lab: BNW

	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
HARLAN SPRAGUE DAWLEY RATS MALE	DAY ON TEST																											males (cont...)		
	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	1
10 mg/m3																														
ANIMAL ID	7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	4	3	5	
	2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	2	1	4	0	4	4	1	6	5	6		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ALIMENTARY SYSTEM

Pharynx + + + + + +

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial Foreign Body	M	+	+		+	M		+											M		+										
Hyperplasia, Lymphoid			2					1											1												
Lymph Node, Mediastinal Foreign Body	+	+	+		+	+		+											+		+										
Hyperplasia, Lymphoid	4		2		3	3		3											4												

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically
 1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
HARLAN SPRAGUE DAWLEY RATS MALE		0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	10 mg/m3	7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	5
ANIMAL ID		2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	0	0	2	1	4	0	4	1	6
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2
		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	

males (cont...)

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx																												
Epiglottis, Metaplasia, Squamous		+	+	+		+	+								+							+						+
					1	1		1	1						1							1						1
Lung		+	+	+		+	+								+							+						+
Foreign Body		3	3	3		3	3								3							3						3
Inflammation, Chronic		3	3	3		3	3								3							3						3
Alveolar Epithelium, Hyperplasia		2	2	2		2	2								2							2						1
Nose		+	+	+		+	+								+							+						+
Olfactory Epithelium, Accumulation, Hyaline Droplet					1		1																					
Respiratory Epithelium, Accumulation, Hyaline Droplet															1													
Trachea		+	+	+		+	+								+							+						+

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

A .. Autolysis precludes evaluation

BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:

1) Minimal 3) Moderate

2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DAY ON TEST		0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
HARLAN SPRAGUE DAWLEY RATS	MALE	7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	4	3	4	3	5	5	5	5	6		
		2	1	1	1	0	2	1	1	6	4	6	0	1	0	4	0	0	0	2	1	4	0	4	4	1	4	1	6	6	6	6	6	6	6	6	6	
10 mg/m3	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
males (cont...)																																						

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS MALE	10 mg/m3	0	0	0	0	1	1	0	0	0	0	0	0	0
		3	3	7	3	5	5	4	3	3	3	7		
		0	1	2	0	6	6	4	1	0	0	2		
ANIMAL ID		0	0	0	0	0	0	0	0	0	0	0	0	0
		1	1	1	1	1	1	1	1	1	1	1	1	1
		0	0	0	0	0	0	0	0	0	0	0	0	0
		2	2	2	2	3	3	3	3	3	3	3	3	3
		6	7	8	9	0	1	2	3	4	5			
													* TOTALS	

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial	+	+	7	
Foreign Body	1	1		7 1.0
Hyperplasia, Lymphoid				2 1.5
<hr/>				
Lymph Node, Mediastinal	+	+	10	
Foreign Body	1	1		10 1.1
Hyperplasia, Lymphoid	1	3		9 2.7

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST	0	0	0	0	0	0	0	0	0	0
	HARLAN SPRAGUE DAWLEY RATS MALE	0	0	0	0	1	1	0	0	0
10 mg/m3	3	3	7	3	5	5	4	3	3	7
ANIMAL ID	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	1
	0	0	0	0	0	0	0	0	0	0
	2	2	2	2	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5
* TOTALS										

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx	+	+	10	
Epiglottis, Metaplasia, Squamous	1	1		9 1.0
Lung	+	+	10	
Foreign Body	3	3		10 3.0
Inflammation, Chronic	3	3		10 3.0
Alveolar Epithelium, Hyperplasia	2	2		10 1.9
Nose	+	+	10	
Olfactory Epithelium, Accumulation, Hyaline Droplet		1		3 1.0
Respiratory Epithelium, Accumulation, Hyaline Droplet				1 1.0
Trachea	+	+	10	

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

HARLAN SPRAGUE DAWLEY RATS MALE 10 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	* TOTALS
		0	0	0	0	1	1	0	0	0	
		3	3	7	3	5	5	4	3	3	
		0	1	2	0	6	6	4	1	0	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	
		1	1	1	1	1	1	1	1	1	
		0	0	0	0	0	0	0	0	0	
		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	
		5									

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

*** END OF MALE DATA ***

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	1	1	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE	3	3	7	3	5	5	4	3	3	7
	1	2	3	1	7	7	5	2	1	3
Control	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
ANIMAL ID	1	1	1	1	1	1	1	1	1	1
	2	2	2	2	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5
* TOTALS										

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial	M	+	7	
Lymph Node, Mediastinal	+	+	10	
Hyperplasia, Lymphoid	1			2 1.0
Pigmentation		1		1 1.0

INTEGUMENTARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE Control		0	0	0	0	1	1	0	0	0	0
		3	3	7	3	5	5	4	3	3	7
		1	2	3	1	7	7	5	2	1	3
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	
	1	1	1	1	1	1	1	1	1	1	
	2	2	2	2	3	3	3	3	3	3	
	6	7	8	9	0	1	2	3	4	5	
* TOTALS											

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx		+				+					10
Lung		+				+					10
Nose		+				+					10
Olfactory Epithelium, Accumulation, Hyaline Droplet											1 1.0
Trachea								M		M	8

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS	0	0	0	0	1	1	0	0	0	0	0	0
	3	3	7	3	5	5	4	3	3	7	7	3
	1	2	3	1	7	7	5	2	1	3		
FEMALE	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	3	3	3	3	3	3	3	3	3	3	3	3
0.1 mg/m3	2	2	2	2	3	3	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5		
											* TOTALS	

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial Hyperplasia, Lymphoid	+	M	6	1	1.0
Lymph Node, Mediastinal Foreign Body Hyperplasia, Lymphoid	+	+	10	3	1.0

INTEGUMENTARY SYSTEM

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE	DAY ON TEST	0	0	0	0	0	0	0	0	0	
		0	0	0	0	1	1	0	0	0	
		3	3	7	3	5	5	4	3	3	
		1	2	3	1	7	7	5	2	1	
		0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	
		3	3	3	3	3	3	3	3	3	
		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	
		0	0	0	0	0	0	0	0	0	

* TOTALS

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx		+		+					10	
Epiglottis, Metaplasia, Squamous										1 1.0
Lung		+		+					10	
Foreign Body		1		1						10 1.0
Inflammation, Chronic		1		1						3 1.0
Nose		+		+					10	
Trachea		+		+					10	

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE	0.3 mg/m3	7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	5
		3	2	2	2	1	3	2	2	7	5	7	1	2	1	5	1	1	1	3	2	5	1	5	2	7
		ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2	5

females (cont...)

ALIMENTARY SYSTEM

Pharynx + + + + + + + +

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial	M	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	M	M
Lymph Node, Mediastinal	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	M	+
Foreign Body																									
Hyperplasia, Lymphoid																									

INTEGUMENTARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically
 1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	3	3	7	3	5	5	4	3	3	3	7	7	3	3
	1	2	3	1	7	7	5	2	1	3	3	5	5	5
0.3 mg/m3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	5	5	5	5	5	5	5	5	5	5	5	5	5	5
ANIMAL ID	2	2	2	2	3	3	3	3	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5	6	7	8	9
														* TOTALS

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial	M	M	4	
Lymph Node, Mediastinal	+	+	9	
Foreign Body				1 1.0
Hyperplasia, Lymphoid				3 1.7

INTEGUMENTARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE	0	0	0	0	1	1	0	0	0	0	0	0
	3	3	7	3	5	5	4	3	3	3	7	3
	1	2	3	1	7	7	5	2	1	3	3	
	0.3 mg/m3											
ANIMAL ID		0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	5	5	5	5	5	5	5	5	5	5	5	5
	2	2	2	2	3	3	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5	5	
* TOTALS												

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx	+	+	10	
Lung	+	+	10	
Foreign Body	1	1		10 1.0
Inflammation, Chronic				2 1.0
Nose	+	+	10	
Olfactory Epithelium, Accumulation, Hyaline Droplet				1 1.0
Trachea	+	+	10	

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE		7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	5	3	5	
	1 mg/m3	3	2	2	2	1	3	2	2	7	5	7	1	2	1	5	1	1	1	3	2	5	1	5	2	5	2	7	5	7	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANIMAL ID	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	

females
(cont...)

ALIMENTARY SYSTEM

Pharynx + + + + + + + +

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

Uterus +
 Endometrium, Hyperplasia, Cystic 3

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial Foreign Body	M	+	M		+	M				+								+												+
Hyperplasia, Lymphoid				2																		1								
Lymph Node, Mediastinal Foreign Body	+	+	+					+	+					+						+										+
Hyperplasia, Lymphoid	3	1					3							1								1								1

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

Date Report Requested: 04/17/2013

Test Type: 30-day

1020 Long Multiwalled Carbon Nanotube

Time Report Requested: 07:42:27

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: L-MWNT-1020

First Dose M/F: 05/23/11 / 05/23/11

Species/Strain: RATS/HSD

Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE 1 mg/m3		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	females (cont...)
DAY ON TEST		0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
ANIMAL ID		7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4	3	4	3	4	3	5	2	7	2	7		

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx																																						
Epiglottis, Metaplasia, Squamous	+	+	+					+	+																+												+	
Lung																																						
Foreign Body	+	+	+					+	+						+										+												+	
Inflammation, Chronic	2	2	2					1	2						2										2												2	
Alveolar Epithelium, Hyperplasia	1							1	1																													
Nose																																						
Olfactory Epithelium, Accumulation, Hyaline Droplet	+	+	+					+	+						+										+												+	
Trachea																																						
	+	+	+					+	+						+										+												+	

SPECIAL SENSES SYSTEM

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically
 1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
Test Type: 30-day
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
Time Report Requested: 07:42:27
First Dose M/F: 05/23/11 / 05/23/11
Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE 1 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	5
	3	2	2	2	1	3	2	2	7	5	7	1	2	1	5	1	1	1	3	2	5	1	5	2	7	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
		0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	
		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	
																									females (cont...)	

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS	0	0	0	0	1	1	0	0	0	0	0	0	0	0
	3	3	7	3	5	5	4	3	3	3	7	7	7	7
	1	2	3	1	7	7	5	2	1	3	3	1	3	3
FEMALE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	7	7	7	7	7	7	7	7	7	7	7	7	7	7
1 mg/m3	2	2	2	2	3	3	3	3	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5	6	7	8	9
													* TOTALS	

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

Uterus 1
 Endometrium, Hyperplasia, Cystic 1 3.0

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial M + 6
 Foreign Body 4 1.0
 Hyperplasia, Lymphoid 2 1.5

Lymph Node, Mediastinal + + 10
 Foreign Body 1 6 1.0
 Hyperplasia, Lymphoid 3 7 2.0

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	1	1	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE	3	3	7	3	5	5	4	3	3	7
	1	2	3	1	7	7	5	2	1	3
1 mg/m3	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
ANIMAL ID	7	7	7	7	7	7	7	7	7	7
	2	2	2	2	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5
* TOTALS										

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx	+		+							10		
Epiglottis, Metaplasia, Squamous	1											6 1.0
Lung	+					+						10
Foreign Body	2					2						10 1.9
Inflammation, Chronic	1											6 1.0
Alveolar Epithelium, Hyperplasia	1											2 1.0
Nose	+							+				10
Olfactory Epithelium, Accumulation, Hyaline Droplet												1 1.0
Trachea	+							+				10

SPECIAL SENSES SYSTEM

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE 1 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	* TOTALS
		0	0	0	0	1	1	0	0	0	
		3	3	7	3	5	5	4	3	3	
		1	2	3	1	7	7	5	2	1	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	
		7	7	7	7	7	7	7	7	7	
		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	
		5									

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

A .. Autolysis precludes evaluation

BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:

1) Minimal 3) Moderate

2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST	HARLAN SPRAGUE DAWLEY RATS FEMALE																								ANIMAL ID	females (cont...)	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			0
7	3	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	5	9	1
3	2	2	2	2	1	3	2	2	7	5	7	1	2	1	5	1	1	1	3	2	5	1	5	2	7	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx	+	+	+	+	+	+	+
Epiglottis, Metaplasia, Squamous	1	1	1	1	1		1
Lung	+	+	+	+	+	+	+
Foreign Body	2	3	2	2	2	2	2
Inflammation, Chronic	2	2	2	2	2	2	2
Alveolar Epithelium, Hyperplasia	1	1	1	1	1	1	1
Nose	+	+	+	+	+	+	+
Trachea	+	+	+	+	+	+	+

SPECIAL SENSES SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically
 1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE 3 mg/m3		DAY ON TEST	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	females (cont...)	
			0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0
			7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	4		3
ANIMAL ID	3	2	2	2	1	3	2	2	7	5	7	1	2	1	5	1	1	1	3	2	5	1	5	2	5	7			
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9		
	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2		
	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7		

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE 3 mg/m3		0	0	0	0	1	1	0	0	0	0	0	0	0
		3	3	7	3	5	5	4	3	3	3	7	7	3
		1	2	3	1	7	7	5	2	1	3	3	3	3
	ANIMAL ID	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	
	9	9	9	9	9	9	9	9	9	9	9	9	9	
	2	2	2	2	3	3	3	3	3	3	3	3	3	
	6	7	8	9	0	1	2	3	3	4	5	5	5	
													* TOTALS	

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node, Bronchial	M		+		7		
Foreign Body				1		7	1.0
Hyperplasia, Lymphoid						6	1.7
<hr/>							
Lymph Node, Mediastinal	+		+		10		
Foreign Body				1		10	1.0
Hyperplasia, Lymphoid				3		9	2.8

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	1	1	0	0	0	0
HARLAN SPRAGUE DAWLEY RATS FEMALE	3	3	7	3	5	5	4	3	3	7
	1	2	3	1	7	7	5	2	1	3
3 mg/m3	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
ANIMAL ID	9	9	9	9	9	9	9	9	9	9
	2	2	2	2	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5
* TOTALS										

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx	+	+	10
Epiglottis, Metaplasia, Squamous	1	1	9 1.0
Lung	+	+	10
Foreign Body	2	2	10 2.1
Inflammation, Chronic	2	1	10 1.8
Alveolar Epithelium, Hyperplasia	2	1	10 1.1
Nose	+	+	10
Trachea	+	+	10

SPECIAL SENSES SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE 3 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0
		0	0	0	0	1	1	0	0	0
		3	3	7	3	5	5	4	3	3
		1	2	3	1	7	7	5	2	1
		0	0	0	0	0	0	0	0	0
	ANIMAL ID	0	0	0	0	0	0	0	0	0
		9	9	9	9	9	9	9	9	9
		2	2	2	2	3	3	3	3	3
		6	7	8	9	0	1	2	3	4

*** TOTALS**

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

A .. Autolysis precludes evaluation

BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:

1) Minimal 3) Moderate

2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE 10 mg/m3	DAY ON TEST																									females (cont...)
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	7	3	3	3	3	7	3	3	5	4	5	3	3	3	4	3	3	3	7	3	4	3	4	3	5	
	3	2	2	2	1	3	2	2	7	5	7	1	2	1	5	1	1	1	3	2	5	1	5	2	7	
	ANIMAL ID																									
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2		

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

A .. Autolysis precludes evaluation

BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:

1) Minimal 3) Moderate

2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST	0	0	0	0	0	0	0	0	0	0
	HARLAN SPRAGUE DAWLEY RATS FEMALE	0	0	0	0	1	1	0	0	0
10 mg/m3	3	3	7	3	5	5	4	3	3	7
ANIMAL ID	1	2	3	1	7	7	5	2	1	3
	0	0	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1
	2	2	2	2	3	3	3	3	3	3
	6	7	8	9	0	1	2	3	4	5
* TOTALS										

ALIMENTARY SYSTEM

Pharynx + + 10

CARDIOVASCULAR SYSTEM

NONE

ENDOCRINE SYSTEM

NONE

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

NONE

HEMATOPOIETIC SYSTEM

Lymph Node										1
Iliac, Pigmentation										1 2.0
Lymph Node, Bronchial	+						+			9
Foreign Body	1						1			9 1.0
Hyperplasia, Lymphoid	4						4			7 2.6
Lymph Node, Mediastinal	+						+			10
Foreign Body	2						1			10 1.2

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically M .. Missing tissue
 X .. Lesion present A .. Autolysis precludes evaluation
 I .. Insufficient tissue BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01
 Test Type: 30-day
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 1020 Long Multiwalled Carbon Nanotube
 CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013
 Time Report Requested: 07:42:27
 First Dose M/F: 05/23/11 / 05/23/11
 Lab: BNW

DAY ON TEST		0	0	0	0	0	0	0	0	0	
HARLAN SPRAGUE DAWLEY RATS FEMALE	0	0	0	0	1	1	0	0	0	0	
	3	3	7	3	5	5	4	3	3	7	
	1	2	3	1	7	7	5	2	1	3	
10 mg/m3	0	0	0	0	0	0	0	0	0	0	
	1	1	1	1	1	1	1	1	1	1	
	1	1	1	1	1	1	1	1	1	1	
ANIMAL ID		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	5
										* TOTALS	
Hyperplasia, Lymphoid		4				3				10 3.4	

INTEGUMENTARY SYSTEM

NONE

MUSCULOSKELETAL SYSTEM

NONE

NERVOUS SYSTEM

NONE

RESPIRATORY SYSTEM

Larynx		+									10	
Epiglottis, Metaplasia, Squamous												7 1.0
Lung		+									10	
Foreign Body												10 3.0
Inflammation, Chronic												10 3.0
Alveolar Epithelium, Hyperplasia												10 1.4
Nose		+									10	
Olfactory Epithelium, Accumulation, Hyaline Droplet												4 1.0
Respiratory Epithelium, Accumulation, Hyaline Droplet												1 1.0
Trachea		+									10	

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
 I .. Insufficient tissue
 M .. Missing tissue
 A .. Autolysis precludes evaluation
 BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:
 1) Minimal 3) Moderate
 2) Mild 4) Marked

Experiment Number: 07062 - 01

Test Type: 30-day

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/HSD

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

1020 Long Multiwalled Carbon Nanotube

CAS Number: L-MWNT-1020

Date Report Requested: 04/17/2013

Time Report Requested: 07:42:27

First Dose M/F: 05/23/11 / 05/23/11

Lab: BNW

HARLAN SPRAGUE DAWLEY RATS FEMALE 10 mg/m3	DAY ON TEST	0	0	0	0	0	0	0	0	0	* TOTALS
		0	0	0	0	1	1	0	0	0	
		3	3	7	3	5	5	4	3	3	
		1	2	3	1	7	7	5	2	1	
	ANIMAL ID	0	0	0	0	0	0	0	0	0	
		1	1	1	1	1	1	1	1	1	
		1	1	1	1	1	1	1	1	1	
		2	2	2	2	3	3	3	3	3	
		6	7	8	9	0	1	2	3	4	
		5									

SPECIAL SENSES SYSTEM

NONE

URINARY SYSTEM

NONE

*** END OF REPORT ***

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade

+ .. Tissue examined microscopically

X .. Lesion present

I .. Insufficient tissue

M .. Missing tissue

A .. Autolysis precludes evaluation

BLANK .. Not examined microscopically

1-4 .. Lesion qualified as:

1) Minimal 3) Moderate

2) Mild 4) Marked