

Experiment Number: 60311 - 05
Test Type: CHRONIC
Route: RESPIRATORY EXPOSURE WHOLE BODY
Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
Cobalt
CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
Time Report Requested: 14:48:12
First Dose M/F: 05/08/06 / 05/08/06
Lab: BNW

F2_RD

NTP Study Number: C60311
Lock Date: 12/03/2008
Cage Range: ALL
Date Range: ALL
Reasons For Removal: ALL
Removal Date Range: ALL
Treatment Groups: Include ALL
Study Gender: Both
TDMSE Version: 2.6.0.0_007
PWG Approval Date: NONE

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FISCHER 344-TACONIC RATS MALE	DAY ON TEST																									males (cont...)
	0 3 8 3	0 6 1 1	0 6 2 6	0 6 9 7	0 7 2 9	0 6 8 2	0 6 1 6	0 7 3 0	0 6 7 6	0 7 2 9	0 6 6 3	0 5 4 2	0 7 3 0	0 5 2 2	0 7 6 9	0 6 8 8	0 7 0 5	0 6 3 0	0 5 8 3	0 7 8 3	0 5 0 2	0 7 1 2	0 6 6 2	0 8 8 2		
Control	0 0 0 0 1	0 0 0 0 2	0 0 0 0 3	0 0 0 0 4	0 0 0 0 5	0 0 0 0 6	0 0 0 0 7	0 0 0 0 8	0 0 0 0 9	0 0 0 0 0	0 0 0 0 1	0 0 0 0 1	0 0 0 0 2	0 0 0 0 3	0 0 0 0 4	0 0 0 0 5	0 0 0 0 6	0 0 0 0 7	0 0 0 0 8	0 0 0 0 9	0 0 0 0 0	0 0 0 0 1	0 0 0 0 2	0 0 0 0 3	0 0 0 0 4	0 0 0 0 5

Adrenal Cortex	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Accessory Adrenal Cortical Nodule Degeneration																							1		
Hyperplasia		1	1	1	2	1			1	3		1	3	1		1		2	1			1	2		2
Adrenal Medulla	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hyperplasia		1		2				3	4		3		1	3				1	4					2	
Islets, Pancreatic	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Parathyroid Gland	+	+	+	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pituitary Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Angiectasis			1																						
Cyst											X														
Pars Distalis, Hyperplasia				1	2		1					1										1			
Thyroid Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Hemorrhage																									
C-cell, Hyperplasia									1					1	2					3			1		

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

Epididymis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Cyst																									
Preputial Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

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	0383	0681	0662	0669	0722	0681	0663	0737	0672	0666	0754	0677	0775	0657	0768	0677	0677	0665	0676	0577	0777	0666	0666	0668		
ANIMAL ID	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000		
Ectasia Inflammation, Chronic Active	2				1		1														2			2		
Prostate Hyperplasia Inflammation, Chronic Active	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		2	2	1		1		1	3	1	2		2	4		1	2	1	1	2		3	3	1	1	
Seminal Vesicle Inflammation, Chronic Active	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Testes Atrophy Infarct Arteriole, Inflammation, Chronic Active Interstitial Cell, Hyperplasia	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
		1	1	4	4			4	4	4	3		3	2		4			2	4	2	4	4	4	4	
										3										3						
			1								3				3				2							
HEMATOPOIETIC SYSTEM																										
Bone Marrow	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+		
Lymph Node Iliac, Ectasia Pancreatic, Ectasia Renal, Ectasia					+		+				+					+							+	+		
																								3		
Lymph Node, Bronchial	M	M	M	+	+	+	M	+	M	+	M	M	+	M	M	+	+	M	+	M	+	M	+	M		
Lymph Node, Mandibular Atrophy Ectasia Hyperplasia	+	+	+	+	+	+	+	+	+	+	M	+	+	+	+	+	+	+	+	+	+	+	+	+		
																							4			
	2																									

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FISCHER 344-TACONIC RATS MALE	DAY ON TEST																									males (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	
Control	3	6	6	6	7	6	6	7	6	7	6	5	7	7	5	7	6	7	7	6	5	7	7	6	6	
	8	1	2	9	2	8	1	3	7	2	6	4	3	2	6	2	8	0	3	8	8	0	1	6	8	
	3	1	6	7	9	2	6	0	6	9	3	2	0	9	2	9	8	5	0	3	3	2	9	8	8	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	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	

Necrosis

Lymph Node, Mediastinal

Lymph Node, Mesenteric
Hemorrhage

Spleen
Fibrosis
Hematopoietic Cell Proliferation
Hemorrhage
Necrosis
Capsule, Angiectasis

Thymus

INTEGUMENTARY SYSTEM

Mammary Gland
Galactocele
Hyperplasia
Inflammation, Chronic Active

Skin
Cyst Epithelial Inclusion
Hyperplasia, Squamous
Inflammation

MUSCULOSKELETAL SYSTEM

Bone

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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Control	3	6	6	6	7	6	6	7	6	7	6	5	7	7	5	7	6	7	6	5	7	7	6	6	6	
ANIMAL ID	8	1	2	9	2	8	1	3	7	2	6	4	3	2	6	2	8	0	3	8	8	0	1	6	8	
	3	1	6	7	9	2	6	0	6	9	3	2	0	9	2	9	8	5	0	3	3	3	2	9	8	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	0	0	0	0	0	0	0	0	0	0	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	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	

Nose	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	I	+	+	+	+	+
Foreign Body			X																					X	
Inflammation, Suppurative			1						1															1	
Inflammation, Chronic Active	1		1		1		1			1	2		1		1	1		1	1		1		1	1	1
Thrombosis																				4			2		
Olfactory Epithelium, Accumulation, Hyaline Droplet																2									
Olfactory Epithelium, Atrophy		1																1							
Olfactory Epithelium, Metaplasia, Respiratory		1						1					1										1	1	
Respiratory Epithelium, Hyperplasia			2					1	1		1				1	2		1	1		1	1			
Respiratory Epithelium, Necrosis																									
Turbinate, Atrophy			1																						
Turbinate, Hyperostosis							1																		

Trachea	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
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SPECIAL SENSES SYSTEM

Ear																										
Inflammation, Chronic Active																									+	3
Eye	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Cataract																1									1	
Inflammation, Suppurative																										
Metaplasia, Osseous			1	1	1	1	1	1	2	1		1		1		1		1			1		1	1		
Harderian Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	
Zymbal's Gland	+						+			+																

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FISCHER 344-TACONIC RATS MALE Control	DAY ON TEST																				* TOTALS		
	0730	0722	0722	0722	0722	0713	0708	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706		0706	0706
ANIMAL ID	00026	00007	00008	00009	00010	00011	00012	00013	00014	00015	00016	00017	00018	00019	00020	00021	00022	00023	00024	00025	00026	00027	
Fat, Necrosis	2	1							1									1	1				14 1.1
Pancreas	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
Acinus, Atrophy			1	1	1			1	1					1				1	3		1	1	23 1.1
Acinus, Hyperplasia																							1 2.0
Salivary Glands	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
Stomach, Forestomach	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
Edema																							2 2.5
Hyperplasia, Squamous			2						2												2	2	10 2.2
Inflammation, Chronic Active								2															2 1.5
Mineralization																			1	3			2 2.0
Ulcer																							4 2.5
Stomach, Glandular	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
Edema																							1 2.0
Mineralization																					2		1 2.0
Ulcer												3											1 3.0
CARDIOVASCULAR SYSTEM																							
Blood Vessel																							1
Aorta, Mineralization																					3		1 3.0
Heart	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
Cardiomyopathy	1	2	1	2	2	2	1	3	2	1		2		2	1	2	1	1	1	3	2	3	45 1.7
Thrombosis									3			2		3							4		4 3.0
ENDOCRINE SYSTEM																							

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	0730	0732	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739	0739		0739	0739				
Control	00026	00027	00028	00029	00030	00031	00032	00033	00034	00035	00036	00037	00038	00039	00040	00041	00042	00043	00044	00045	00046	00047	00048	00049	00050		
Necrosis																										2	1 2.0
Lymph Node, Mediastinal	+	+	+	+	M	+	+	+	+	+	+	+	+	+	M	+	+	+	+	M	+	+	+	+	+	46	
Lymph Node, Mesenteric Hemorrhage	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	M	+	+	+	49	1 2.0
Spleen	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50		
Fibrosis		2													1					2	3				8	1.6	
Hematopoietic Cell Proliferation															2	2						2			3	2.0	
Hemorrhage											2														1	2.0	
Necrosis									3												3				3	3.0	
Capsule, Angiectasis																									1	1.0	
Thymus	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	M	+	46	
INTEGUMENTARY SYSTEM																											
Mammary Gland	+	M	M	+	+	M	M	M	M	+	M	+	M	+	+	+	M	+	+	+	+	+	+	+	M	31	
Galactocele																										2	2.0
Hyperplasia																4										2	3.5
Inflammation, Chronic Active																										1	1.0
Skin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50		
Cyst Epithelial Inclusion																									1	2.0	
Hyperplasia, Squamous																							4		2	3.5	
Inflammation																									7	2.4	
MUSCULOSKELETAL SYSTEM																											
Bone	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50		

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FISCHER 344-TACONIC RATS MALE 1.25 mg/m3	DAY ON TEST																									ANIMAL ID	males (cont...)	
	0 5 4 0	0 7 3 0	0 7 2 0	0 6 2 4	0 7 0 8	0 6 8 3	0 7 2 5	0 6 7 9	0 7 2 9	0 7 2 9	0 6 8 4	0 7 3 0	0 7 2 9	0 6 9 4	0 6 8 3	0 5 3 0	0 7 6 4	0 6 7 7	0 6 6 3	0 6 6 7	0 5 7 4	0 6 8 2	0 6 7 9					
Adrenal Cortex Atrophy	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0 0 2 0 1	+		
Adrenal Cortex Hyperplasia		2	1						3	1		2	1		2	3			2			1		3	1	0 0 2 0 1		
Adrenal Cortex Necrosis							2																			0 0 2 0 1		
Adrenal Medulla Hyperplasia	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0 0 2 0 1	+		
Adrenal Medulla Necrosis	2		3		1				4									1	2	2	4	1		1	1	3	0 0 2 0 1	
Islets, Pancreatic Hyperplasia	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0 0 2 0 1	+		
Parathyroid Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	M	+	+	+	+	+	+	+	+	+	0 0 2 0 1	M		
Pituitary Gland Hemorrhage	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0 0 2 0 1	+		
Pituitary Gland Pars Distalis, Hyperplasia	2	2			1						1	1						1	1					1	0 0 2 0 1	1		
Thyroid Gland C-cell, Hyperplasia	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	0 0 2 0 1	+		

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

Epididymis

+ + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

Penis

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FISCHER 344-TACONIC RATS MALE 1.25 mg/m3	DAY ON TEST																				males (cont...)		
	0 5 4 0	0 7 3 0	0 7 2 0	0 6 2 4	0 7 0 8	0 6 8 3	0 7 2 9	0 6 7 5	0 7 2 9	0 7 2 9	0 6 8 4	0 7 3 0	0 7 2 9	0 6 9 4	0 6 3 8	0 5 8 3	0 7 6 4	0 6 6 7	0 6 6 3	0 5 7 4		0 6 8 2	0 7 9 5
ANIMAL ID	0 0 2 0 1	0 0 2 0 2	0 0 2 0 3	0 0 2 0 4	0 0 2 0 5	0 0 2 0 6	0 0 2 0 7	0 0 2 0 8	0 0 2 0 9	0 0 2 1 0	0 0 2 1 1	0 0 2 1 1	0 0 2 1 1	0 0 2 1 1	0 0 2 1 1	0 0 2 1 1	0 0 2 1 1	0 0 2 2 0	0 0 2 2 1	0 0 2 2 2	0 0 2 2 3	0 0 2 2 4	0 0 2 2 5

Concretion

Preputial Gland
 Ectasia
 Inflammation, Chronic Active

+
 1 2 1

Prostate
 Hyperplasia
 Inflammation, Chronic Active

+
 2 4 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 2 3 1

Seminal Vesicle
 Inflammation, Chronic Active

+ +

Testes
 Atrophy
 Interstitial Cell, Hyperplasia

+
 2 2 2 2 1 4 4 4 4 3 4 4 4 3 3 2 3 3 2
 4 2 3

HEMATOPOIETIC SYSTEM

Bone Marrow

+ +

Lymph Node
 Iliac, Lumbar, Ectasia
 Iliac, Renal, Ectasia
 Lumbar, Hyperplasia
 Pancreatic, Necrosis
 Renal, Ectasia

+
 +
 1 2

Lymph Node, Bronchial

+ + + + M M + M + M M + M M M M + M + M M + + M M

Lymph Node, Mandibular

+ M + +

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) | | | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------|--------------------|------------------|------------------|---|
| | 0
5
4
0 | 0
7
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7
2
0 | 0
6
2
4 | 0
7
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8 | 0
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8
3 | 0
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9 | 0
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5 | 0
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9 | 0
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9 | 0
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8
4 | 0
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4 | 0
6
3
3 | 0
5
8
0 | 0
7
3
4 | 0
6
6
7 | 0
6
6
3 | 0
5
7
4 | | | 0
6
8
2 | 0
7
9
5 | |
| Inflammation, Chronic Active | | 1 | | 1 | 2 | | 1 | | 2 | 1 | 1 | | 1 | 1 | | 2 | 1 | 1 | 2 | | 2 | 1 | 1 | 2 | 2 |
| Thrombosis | 2 | | | | | | | | | | | | | | | | | | 3 | | | | | | |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | | | | | | | | | | | | | 1 | | | | | |
| Olfactory Epithelium, Atrophy | | 1 | | 1 | | | 1 | | | 1 | | 1 | | | | | 1 | 1 | 1 | | | | | | 1 |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | 1 | | | | | | | | | |
| Olfactory Epithelium, Hyperplasia, Basal Cell | | | | | | | | | | | | | | | | | | | | | | | | | |
| Olfactory Epithelium, Metaplasia, Respiratory | | 1 | | | | | 1 | 2 | | 2 | | 2 | | 2 | 1 | | 1 | 1 | | 1 | 3 | 1 | | 3 | 4 |
| Olfactory Epithelium, Necrosis | | | | | | | 1 | | | | | | | | | | | | | | | | | | 1 |
| Respiratory Epithelium, Hyperplasia | 1 | 2 | | 1 | 1 | | 1 | | 1 | 1 | 1 | | | 1 | | 1 | | | 1 | 1 | | | | 1 | 3 |
| Respiratory Epithelium, Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | 1 | | | | | | |
| Respiratory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | |
| Turbinate, Atrophy | 1 | 1 | 1 | 1 | | 1 | 1 | | 1 | 1 | 1 | | | 1 | | | | 1 | | 1 | 1 | | 1 | 1 | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | |

SPECIAL SENSES SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ear | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | + |
| | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Eye | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | |
| Cataract | | | 1 | | | | 2 | | | | | | 2 | | | | | | | | | | | | 1 |
| Metaplasia, Osseous | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | | | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | | | 1 | 1 | |
| Harderian Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | |
| Zymbal's Gland | | | | | | + | | | | | | | | | | + | | | | | | | | | |

URINARY 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|--------------------|
| | 0540 | 0730 | 0774 | 0624 | 0708 | 0673 | 0765 | 0776 | 0776 | 0776 | 0676 | 0776 | 0776 | 0676 | 0664 | 0664 | 0573 | 0776 | 0666 | 0666 | 0666 | 0666 | 0577 | 0666 | 0784 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 0 | 0 | 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 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | |
| | 0 | 0 | 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 | 5 | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | |
| Accumulation, Hyaline Droplet | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cyst | | | | | | | | | X | | | | | | | | | | | | | | | | | | |
| Nephropathy | 2 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 3 | 3 | 4 | 2 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Urinary Bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | |
| Transitional Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* .. 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
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 Cobalt
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 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | |
|---|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------------|
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29 | 07
29 | | |
| ANIMAL ID | 00226 | 00077 | 00088 | 00099 | 00100 | 00111 | 00122 | 00133 | 00144 | 00155 | 00166 | 00177 | 00188 | 00199 | 00200 | 00211 | 00222 | 00233 | 00244 | 00255 | 00266 | 00277 | 00288 | 00299 | 00300 | |
| Acinus, Atrophy | | 2 | 1 | 1 | 4 | 1 | 1 | 1 | | 1 | 1 | 2 | | 1 | 2 | 1 | | | | 1 | 1 | 1 | | | | 35 1.4 |
| Salivary Glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, Forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hyperplasia, Squamous | | 1 | | | | 2 | 2 | | | | | | | 3 | 3 | 3 | 3 | 1 | | 1 | 3 | | 3 | 2 | | 14 2.2 |
| Inflammation, Chronic Active | | | | | | | | | | | | 3 | | | 3 | 3 | | | | | | | | | | 4 2.8 |
| Ulcer | | | | | | 1 | | | | | | | | | | | | | | | | | 2 | | | 4 2.0 |
| Stomach, Glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Erosion | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 1 1.0 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | 3 | | | | | | | | | | 1 3.0 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | 2 | | | 2 1.5 |
| Tooth | | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | 2 | | | | | | | | | | 2 2.5 |

CARDIOVASCULAR SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------|
| Blood Vessel | | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Cardiomyopathy | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 | 2 | 1 | 4 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | | | 44 1.5 |
| Inflammation, Suppurative | | | | | | | | | 2 | | | | | | | | | | | | | | | | | 1 2.0 |
| Thrombosis | | 2 | | | | | | | | | | | | | | | | | | | | | | | | 2 2.0 |
| Artery, Inflammation, Chronic Active | | | | | | | | | | | | | 3 | | | | | | | | | | | | | 1 3.0 |
| Atrium, Congestion | | | | | | | | | 2 | | | | | | | | | | | | | | | | | 1 2.0 |
| Epicardium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | 2 | | | 1 2.0 |

ENDOCRINE 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:
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 Lab: BNW

| FISCHER 344-TACONIC RATS MALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------|
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29 | 04
29 | 07
29 | 04
29 | 07
29 | 06
29 | | 05
29 |
| ANIMAL ID | 00
22
22
66 | 00
22
22
67 | 00
22
22
68 | 00
22
22
69 | 00
22
22
70 | 00
22
22
71 | 00
22
22
72 | 00
22
22
73 | 00
22
22
74 | 00
22
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75 | 00
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76 | 00
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85 | 00
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22
86 | 00
22
22
87 | 00
22
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88 | 00
22
22
89 | 00
22
22
90 | |
| Adrenal Cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Atrophy | 1 | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Hyperplasia | 2 | | | 1 | | | 1 | 1 | | 1 | | 1 | 1 | 2 | 1 | | | | | | 1 | 3 | | 1 | | 24 1.6 |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Adrenal Medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hyperplasia | | 1 | 3 | | | | 1 | 3 | | | | 3 | 4 | 4 | | 4 | 4 | | | + | + | + | + | + | + | 21 2.5 |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | 1 4.0 |
| Islets, Pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 2 | | 1 2.0 |
| Parathyroid Gland | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | M | M | + | + | + | + | + | 45 |
| Pituitary Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | 3 | | | | | | 1 3.0 |
| Pars Distalis, Hyperplasia | 3 | 2 | | | 4 | | | | | | | | 3 | | | | | | | | | | | | | 12 1.8 |
| Thyroid Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, Hyperplasia | | | 3 | | 4 | | | | | | | | | 1 | | | | | | | | | | 1 | | 8 1.6 |

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Penis | | | | | | | | | | | | | + | | | | | | | | | | | | | 1 |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
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1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------------|----------------------|
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05 |
| ANIMAL ID | 00
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44 |
| Concretion | 2 | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| Preputial Gland
Ectasia
Inflammation, Chronic Active | + | | | | | | | | | | | | | | | | | | | | | | | 50
1 3.0
4 1.3 | |
| Prostate
Hyperplasia
Inflammation, Chronic Active | + | | | | | | | | | | | | | | | | | | | | | | | 50
6 2.0
39 1.5 | |
| Seminal Vesicle
Inflammation, Chronic Active | + | | | | | | | | | | | | | | | | | | | | | | | 50
1 2.0 | |
| Testes
Atrophy
Interstitial Cell, Hyperplasia | + | | | | | | | | | | | | | | | | | | | | | | | 50
34 3.0
10 2.1 | |

HEMATOPOIETIC SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Bone Marrow | + | | | | | | | | | | | | | | | | | | | | | | | 50 |
| Lymph Node
Iliac, Lumbar, Ectasia
Iliac, Renal, Ectasia
Lumbar, Hyperplasia
Pancreatic, Necrosis
Renal, Ectasia | + | | | | | | | | | | | | | | | | | | | | | | | 9
1 1.0
1 3.0
1 1.0
1 4.0
3 2.7 |
| Lymph Node, Bronchial | + M + M M + M + + M M M + + M M + M + M + + + + | | | | | | | | | | | | | | | | | | | | | | | 25 |
| Lymph Node, Mandibular | + | | | | | | | | | | | | | | | | | | | | | | | 49 |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
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|---|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---|---|-----|----|-----|-----|-----|
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| ANIMAL ID | 00226 | 00002 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | 00000 | | | | | | | |
| Congestion | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 | 3.0 | | | | |
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | 3.0 | | |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | 1.5 | | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 | | |
| Lymph Node, Mediastinal | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | 48 | | | | |
| Lymph Node, Mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | |
| Congestion | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | | |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | 8 | 1.6 | |
| Hematopoietic Cell Proliferation | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.0 | |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | 2 | 2.0 | |
| Thymus | + | + | + | + | M | + | + | M | + | + | M | + | + | + | + | + | + | + | M | + | + | + | + | M | + | 44 | | | |
| INTEGUMENTARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary Gland | + | M | M | + | M | + | + | + | M | + | + | + | + | M | + | M | M | M | M | + | + | M | + | | 32 | | | | |
| Galactocele | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | 1 | 2.0 | |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 | 3.0 | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 | |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2 | 2.5 | |
| Inflammation | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 5 | 2.2 |
| Inflammation, Granulomatous | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 | 4.0 |
| MUSCULOSKELETAL 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | | | |
|---|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
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29 |
| ANIMAL ID | 002226 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Cranium, Fibrosis | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Cranium, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Vertebra, Degeneration | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| NERVOUS SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Compression | | | 2 | | | | | | | | | | | | | | 1 | 2 | 2 | 2 | | 2 | | | 2 | | 14 1.9 |
| Hemorrhage | | | | | | | | | | | | | | | | | | | 2 | 2 | | | | | | | 3 2.0 |
| RESPIRATORY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation | | 1 | | 1 | 1 | 1 | | 1 | 1 | | | | | | 1 | | | | | | 2 | | 1 | 1 | | 1 | 18 1.1 |
| Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation, Suppurative | | | | | | | | | | | 4 | | | | | | | | | | | | | | | | 1 4.0 |
| Inflammation, Chronic Active | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 50 3.0 |
| Metaplasia, Osseous | | | | | | | | 1 | | | | | | | | | | | | | | | | | | | 3 2.0 |
| Alveolar Epithelium, Hyperplasia | 4 | 3 | 3 | 4 | 2 | 2 | 2 | 2 | 4 | 3 | 3 | 4 | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 3 | 4 | 2 | 2 | | 47 2.8 |
| Alveolus, Proteinosis | 3 | 1 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | 48 2.6 |
| Artery, Mediastinum, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | 1 2.0 |
| Bronchiole, Epithelium, Hyperplasia | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 3 | 4 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 3 | 1 | 1 | | 44 1.5 |
| Mediastinum, Metaplasia, Osseous | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 4.0 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | I | + | + | + | + | + | + | + | + | + | + | 47 |
| Foreign Body | | | | | | | | | | | | | X | | | | X | | | | | | | | | | 2 |
| Inflammation, Suppurative | | | | | | | | | 1 | | 1 | 2 | | | | | | | | | 1 | 1 | 3 | | | | 12 1.7 |

* .. 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:

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 Cobalt
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| FISCHER 344-TACONIC RATS MALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | | | |
|---|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------------|--------------|
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29 | 07
29 | | 06
29 | 05
29 | |
| ANIMAL ID | 002226 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | 000022 | |
| Inflammation, Chronic Active | 1 | | 1 | 1 | 1 | | | 1 | | 1 | 1 | 1 | 2 | 1 | | | 1 | 1 | | 1 | 1 | 1 | 3 | 1 | | | 35 1.3 | |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 2.5 |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | 1 | 1 | | | | | | | | | 1 | | | | | | | | | 4 1.0 | |
| Olfactory Epithelium, Atrophy | 1 | | | 1 | 1 | | | 1 | 1 | | | | 1 | 1 | | | | 1 | | | 1 | 1 | 1 | | | 1 | 21 1.0 | |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | |
| Olfactory Epithelium, Hyperplasia, Basal Cell | | | | | | | | | | | | | | | | | | | | | 1 | | | | | | 1 1.0 | |
| Olfactory Epithelium, Metaplasia, Respiratory | 1 | 2 | | 1 | | 1 | | 1 | | | 1 | | 3 | | 2 | | | | | 2 | 1 | | 2 | | 1 | | 26 1.7 | |
| Olfactory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | |
| Respiratory Epithelium, Hyperplasia | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | | | 1 | 1 | | 1 | 2 | 1 | 3 | 1 | | | 35 1.2 | |
| Respiratory Epithelium, Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | |
| Respiratory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | 1 | | | | | 4 1.8 | |
| Turbinate, Atrophy | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 35 1.0 | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |

SPECIAL SENSES SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------------|--------------|
| Ear | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5 1.8 |
| Eye | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Cataract | 1 | | 3 | 1 | | | | | | | | | 2 | | | | | | | | | 3 | | | | | 9 1.8 | |
| Metaplasia, Osseous | 1 | 2 | 1 | 1 | 1 | | 1 | | 1 | | | 1 | | 2 | 1 | 2 | | 1 | | 2 | | 1 | 1 | | | | 36 1.3 | |
| Harderian Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Zymbal's Gland | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |

URINARY 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
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 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | | males
(cont...) |
|-------------------------------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------------|
| | 0719 | 0705 | 0667 | 0677 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | 0666 | 0677 | |
| 2.5 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 | |
| ANIMAL ID | 0040 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | 0044 | |

ALIMENTARY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Cecum
Epithelium, Hyperplasia | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intestine Large, Colon
Epithelium, Hyperplasia | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intestine Large, Rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Duodenum
Inflammation, Chronic Active
Necrosis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intestine Small, Ileum
Inflammation, Suppurative
Epithelium, Hyperplasia | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| Intestine Small, Jejunum
Epithelium, Hyperplasia | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Basophilic Focus | | | | X | X | | | | | X | X | X | X | X | X | | | X | | | | | | X | |
| Clear Cell Focus | | | | X | | | | | | X | X | | | X | | X | | | | | | | | | |
| Fatty Change | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatodiaphragmatic Nodule | | | | | X | | | | | | | | X | | X | X | | X | | X | X | X | X | | |
| Mixed Cell Focus | | | | | | | | | | | | | | | | | | | | | | | | | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | |

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

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) | |
|-------------------------------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|--------------------|------|
| | 0719 | 0705 | 0667 | 0779 | 0779 | 0663 | 0779 | 0662 | 0779 | 0661 | 0779 | 0667 | 0779 | 0666 | 0779 | 0667 | 0779 | 0667 | 0779 | 0665 | | | 0556 |
| 2.5 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 |
| | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| | 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 |

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | 1 | 1 | |
| Prostate | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | |
| Inflammation, Chronic Active | 1 | | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | 1 | | 1 | 1 | | 2 | 2 | 1 | 1 | 3 | 1 | 2 | 1 |
| Seminal Vesicle | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Atrophy | 4 | 2 | 4 | | 4 | 1 | 4 | | 4 | 1 | 4 | | 4 | 2 | 1 | 4 | 4 | 4 | 1 | 1 | | | 4 |
| Infarct | | | | | | | | | | | | | | | | | | | | | 3 | | |
| Arteriole, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Interstitial Cell, Hyperplasia | | | | | | | | | | | | | | | | | | | | | 1 | 1 | |

HEMATOPOIETIC SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bone Marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | 2 | | | | |
| Lymph Node | | | | | | | | | | | | | | | | | | | | | | + | | | |
| Pancreatic, Infiltration Cellular, Histiocyte | | | | | | | | | | | | | | | | | | | | | 3 | | | | |
| Renal, Ectasia | | | | | | | | | | | | | | | | | | | | | | 2 | | | |
| Lymph Node, Bronchial | M | M | M | + | M | M | M | M | + | M | + | M | + | + | M | M | M | M | + | M | + | M | M | + | M |
| Lymph Node, Mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| Lymph Node, Mediastinal | + | M | M | + | + | + | + | + | + | + | + | M | + | + | + | M | + | + | + | + | + | + | + | + | |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
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| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(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 | | |
| 2.5 mg/m3 | 7 | 7 | 6 | 7 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 7 | 6 | 6 | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 5 | 5 | 6 | 0 | |
| | 1 | 0 | 6 | 2 | 2 | 8 | 2 | 5 | 2 | 8 | 3 | 0 | 0 | 2 | 4 | 2 | 3 | 8 | 3 | 8 | 3 | 2 | 8 | 4 | 5 | 0 | |
| | 9 | 5 | 7 | 9 | 9 | 3 | 9 | 2 | 1 | 8 | 0 | 9 | 3 | 8 | 6 | 9 | 0 | 8 | 0 | 5 | 8 | 5 | 2 | 8 | 0 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 0 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 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 | 0 | | |

Hyperplasia, Lymphoid

2

Lymph Node, Mesenteric

+ + + + + + + + + + + + + + + + + M + + + + +

Spleen

+ +

Fibrosis

2

Necrosis

1

Stromal Hyperplasia

4

Thymus

+ + + + + + + + + + + + + + + M + + M + + + + +

INTEGUMENTARY SYSTEM

Mammary Gland

+ M + M M + M + M + + M M M M + + + + M + + M + +

Galactoceles

4

Hyperplasia

Skin

+ +

Hyperplasia, Squamous

4

Inflammation

3

2

3

3

3

2

MUSCULOSKELETAL SYSTEM

Bone

+ +

Cranium, Fracture

X

NERVOUS SYSTEM

Brain

+ +

Compression

2

2

2

2

2

1

2

1

2

2

Hemorrhage

2

3

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

+ .. Tissue examined microscopically

M .. Missing tissue

1-4 .. Lesion qualified as:

X .. Lesion present

A .. Autolysis precludes evaluation

1) Minimal 3) Moderate

I .. Insufficient tissue

BLANK .. Not examined microscopically

2) Mild 4) Marked

Experiment Number: 60311 - 05
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 Cobalt
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 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS |
|-------------------------------|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------|
| | 06 | 05 | 07 | 06 | 07 | 05 | 07 | 07 | 07 | 07 | 06 | 06 | 06 | 04 | 05 | 07 | 06 | 07 | 07 | 06 | 06 | 07 | 07 | 07 | |
| 2.5 mg/m3 | 09 | 08 | 02 | 08 | 02 | 09 | 01 | 02 | 03 | 03 | 01 | 08 | 05 | 07 | 03 | 02 | 05 | 03 | 01 | 07 | 01 | 00 | 02 | 00 | 03 |
| | 08 | 03 | 09 | 09 | 09 | 08 | 06 | 09 | 00 | 00 | 08 | 00 | 02 | 02 | 05 | 09 | 04 | 00 | 06 | 08 | 01 | 04 | 09 | 05 | 00 |
| | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 |
| | 02 | 02 | 02 | 02 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 04 | 05 | 00 |
| | 06 | 07 | 08 | 09 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 00 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----|-----|
| Regeneration | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 |
| Mesentery | | | | | | | | | | | | | | | | | | | | | | | | | 9 | |
| Infiltration Cellular | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 |
| Fat, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 8 | 1.1 |
| Pancreas | | | | | | | | | | | | | | | | | | | | | | | | | 49 | |
| Acinus, Atrophy | | | | | | | | | | | | | | | | | | | | | | | | | 28 | 1.4 |
| Salivary Glands | | | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Stomach, Forestomach | | | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | 13 | 1.9 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.5 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | | 10 | 2.8 |
| Stomach, Glandular | | | | | | | | | | | | | | | | | | | | | | | | | 49 | |
| Erosion | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.0 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 3.0 |

CARDIOVASCULAR SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----|-----|
| Heart | | | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Cardiomyopathy | | | | | | | | | | | | | | | | | | | | | | | | | 46 | 1.6 |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.0 |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 1.5 |
| Atrium, Congestion | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 |

ENDOCRINE 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: 60311 - 05
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 Cobalt
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 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | | |
|-------------------------------|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------|----|----|----|----|----|
| | 06 | 05 | 07 | 06 | 07 | 05 | 07 | 07 | 07 | 07 | 06 | 06 | 06 | 04 | 05 | 07 | 06 | 07 | 06 | 06 | | 07 | 07 | 07 | 07 | |
| 2.5 mg/m3 | 08 | 08 | 02 | 08 | 02 | 09 | 01 | 02 | 03 | 03 | 01 | 08 | 05 | 07 | 03 | 02 | 05 | 03 | 01 | 07 | 06 | 01 | 00 | 02 | 00 | 03 |
| ANIMAL ID | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 |
| | 22 | 22 | 22 | 22 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 |
| | 67 | 78 | 89 | 90 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|-----|-----|
| Adrenal Cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Accessory Adrenal Cortical Nodule | | 1 | | | | | | | | | | | | | | | | | | | | | | | | 2 | 1.0 | |
| Hyperplasia | | | | | 1 | | 1 | | 1 | 1 | | | | 1 | 2 | | 2 | 1 | | | 2 | 2 | | 1 | | 23 | 1.5 | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 |
| Adrenal Medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Hyperplasia | | | | | | | | | | | | | | 3 | | 4 | | | | | | | 2 | | | | 9 | 3.0 |
| Islets, Pancreatic | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 | | |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 4.0 |
| Parathyroid Gland | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 47 | | |
| Pituitary Gland | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | | |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | 1 | 3.0 |
| Pars Distalis, Hyperplasia | | | | 1 | | 3 | | 1 | 2 | 4 | | | | | | | 4 | 1 | | | | | | | | | 14 | 2.4 |
| Thyroid Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| C-cell, Hyperplasia | | 3 | | | | | | | | | | | | | | | | | | | | | | | | | 5 | 1.8 |

GENERAL BODY SYSTEM

NONE

GENITAL SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|-----|
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Preputial Gland | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | | |
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | 3 | | | | 1 | 3.0 |

* .. 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:
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| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | |
|---|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------|----|----|----|--------|
| | 06 | 05 | 07 | 06 | 07 | 05 | 07 | 07 | 07 | 07 | 06 | 06 | 06 | 04 | 05 | 07 | 06 | 07 | 07 | 06 | | 07 | 07 | 07 | 07 |
| 2.5 mg/m3 | 09 | 08 | 02 | 08 | 02 | 09 | 01 | 02 | 03 | 03 | 01 | 08 | 05 | 07 | 03 | 02 | 05 | 03 | 01 | 07 | 01 | 00 | 02 | 00 | 03 |
| ANIMAL ID | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 |
| | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 |
| | 22 | 22 | 22 | 22 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 |
| | 66 | 77 | 88 | 99 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 00 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | 4 | 3 2.0 |
| Prostate | + | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 1.0 |
| Inflammation, Chronic Active | 1 | 2 | | 1 | 3 | 1 | 2 | 1 | | 2 | 3 | 2 | 2 | 1 | 2 | 4 | | | 1 | 3 | | 1 | 2 | 2 | 2 |
| | | | | | | | | | | | | | | | | | | | | | | | | 42 | 1.6 |
| Seminal Vesicle | + | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Testes | + | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Atrophy | 3 | 1 | 4 | | 4 | | 4 | 3 | 2 | 4 | 3 | 2 | | | | 3 | | 4 | 4 | 2 | | 4 | 3 | 3 | 2 |
| Infarct | | | | | | | | | | | | | | | | | | | | | | | | | 36 3.0 |
| Arteriole, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 2 3.5 |
| Interstitial Cell, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 2.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | 2 | 12 1.3 |
| HEMATOPOIETIC SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone Marrow | + | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Lymph Node | | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| Pancreatic, Infiltration Cellular, Histiocyte | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Renal, Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Lymph Node, Bronchial | + | M | M | + | M | M | + | + | M | M | + | + | + | M | + | + | M | M | M | + | + | + | M | + | M |
| | | | | | | | | | | | | | | | | | | | | | | | | 21 | |
| Lymph Node, Mandibular | + | | | | | | | | | | | | | | | | | | | | | | | 50 | |
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Lymph Node, Mediastinal | + | | | | | | | | | | | | | | | | | | | | | | | 46 | |

* .. 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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| FISCHER 344-TACONIC RATS MALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|--------|
| | 0698 | 0583 | 0729 | 0689 | 0729 | 0598 | 0776 | 0777 | 0777 | 0777 | 0666 | 0666 | 0442 | 0557 | 0725 | 0664 | 0773 | 0776 | 0666 | 0671 | 0777 | 0777 | 0777 | 0777 | | |
| ANIMAL ID | 00426 | 00447 | 00448 | 00449 | 00450 | 00451 | 00452 | 00453 | 00454 | 00455 | 00456 | 00457 | 00458 | 00459 | 00460 | 00461 | 00462 | 00463 | 00464 | 00465 | 00466 | 00467 | 00468 | 00469 | | |
| Hyperplasia, Lymphoid | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| Lymph Node, Mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Fibrosis | 3 | | | | 3 | | 1 | | | | | | | | | | 2 | | | 1 | | 3 | | | 7 2.1 | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | |
| Stromal Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 4.0 | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | 47 | | |
| INTEGUMENTARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary Gland | M | + | M | + | M | + | + | + | M | + | + | + | M | + | + | + | + | M | + | + | M | + | M | + | M | 30 |
| Galactocoele | | | | | | | | | | | | | | | | | | | | | | | | | | 1 4.0 |
| Hyperplasia | | | | | | | | | | | | | 3 | | | | | | | | | | | | | 1 3.0 |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | 5 3.0 | |
| Inflammation | 3 | | | | | 2 | | | | | | | | | | | | | 3 | 3 | | | | 3 | 9 2.7 | |
| MUSCULOSKELETAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Cranium, Fracture | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| NERVOUS SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Compression | | 2 | | | 1 | | | | | | | | 1 | | 2 | | | 1 | | | | 2 | 3 | | 2 | 18 1.8 |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | 1 | 2 | | | 4 2.0 |

* .. 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

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 2) Mild 4) Marked

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Cobalt

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| | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------|
| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | * TOTALS |
| | 0698 | 0583 | 0729 | 0689 | 0729 | 0578 | 0776 | 0777 | 0777 | 0777 | 0666 | 0666 | 0444 | 0555 | 0777 | 0666 | 0777 | 0777 | 0666 | 0666 | 0777 | 0777 | | |
| | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | 0004 | |
| 2.5 mg/m3 | 026 | 007 | 008 | 009 | 009 | 008 | 006 | 009 | 000 | 000 | 008 | 000 | 002 | 002 | 005 | 009 | 004 | 000 | 006 | 008 | 001 | 004 | 009 | |

RESPIRATORY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------|--------|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Autolysis | | | | | | | | | | | X | | | | | | | | | | | | | 1 | |
| Foreign Body | | | | | | | | | | | | | | | | | | | | | | | | 2 | |
| Inflammation | | | 1 | | 1 | | 1 | | | | 1 | | | | | 1 | | 2 | | | 1 | | | 18 1.1 | |
| Metaplasia, Squamous | | | | | | | | | | | | | | | | 1 | | | | | | | | 1 1.0 | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 | |
| Inflammation, Chronic Active | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 50 2.9 | |
| Alveolar Epithelium, Hyperplasia | 4 | 2 | 4 | 3 | 4 | 1 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 3 | 3 | 2 | 4 | 4 | | 3 | 4 | 3 | 3 | 49 3.3 |
| Alveolus, Proteinosis | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 49 2.9 |
| Bronchiole, Epithelium, Hyperplasia | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 4 | 3 | 3 | | 3 | 1 | 3 | 3 | 2 | 3 | 3 | | 3 | 2 | 3 | 3 | 47 2.7 |
| Mediastinum, Inflammation, Suppurative | | | | | | 2 | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Nose | + | + | + | I | + | + | + | + | + | + | A | + | A | + | + | + | + | + | I | + | + | + | + | 45 | |
| Foreign Body | | | | | | | X | | | | | | | | | | | | | X | | | | 4 | |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 | |
| Inflammation, Suppurative | | | 3 | | 3 | | 4 | 2 | 2 | 1 | 2 | | | | 3 | 1 | 1 | 3 | | 3 | | 2 | 1 | 24 2.2 | |
| Inflammation, Chronic Active | 2 | 1 | 2 | | 3 | 1 | 3 | 1 | 2 | 1 | 2 | | 1 | | 1 | 3 | 2 | 2 | 3 | | 3 | | 2 | 2 | 40 1.7 |
| Thrombosis | | | | | | 4 | | | | | | | | | | | 2 | | | | | | | | 4 2.8 |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Olfactory Epithelium, Atrophy | | | 1 | 1 | | 1 | 1 | | 2 | 1 | 1 | 1 | | 1 | | 1 | 1 | 1 | | | | | 1 | 1 | 34 1.0 |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | 2 | | 1 | | | | | | | 2 1.5 |
| Olfactory Epithelium, Metaplasia, Respiratory | 1 | 1 | 1 | | 2 | | 3 | 3 | | 1 | | | 1 | | | 2 | | 1 | 1 | | 2 | | 1 | | 37 1.5 |
| Olfactory Epithelium, Necrosis | | | | | | | 2 | | | | | | | | | | | | | | | | | | 5 1.6 |
| Respiratory Epithelium, Hyperplasia | 2 | 1 | 2 | | 3 | 1 | 4 | 2 | 3 | 1 | 1 | | 1 | | 1 | 3 | 1 | 2 | 4 | | 4 | 1 | 2 | 1 | 45 1.7 |
| Respiratory Epithelium, Metaplasia, Squamous | 2 | | 1 | | | | 2 | 1 | | | 1 | | | | | | | | | | 1 | | 1 | | 11 1.2 |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | | | |
|--|-------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--------|
| | 06
98 | 05
83 | 07
29 | 06
89 | 07
29 | 05
98 | 07
16 | 07
72 | 07
73 | 07
30 | 07
30 | 06
80 | 06
00 | 06
62 | 04
22 | 05
55 | 07
32 | 06
54 | 07
31 | 06
68 | | 06
61 | 07
04 | 07
29 | 07
05 | 07
03 | |
| ANIMAL ID | 00426 | 00442 | 00442 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | 00444 | |
| Respiratory Epithelium, Necrosis | | | 1 | | | 2 | | | | | | | | | | | | | 1 | | | | | | | | 5 1.4 |
| Turbinate, Atrophy | 1 | 1 | 1 | | 1 | | 1 | 1 | | 1 | 1 | | 1 | | 1 | 1 | 1 | 1 | | 1 | | 1 | | 1 | | | 35 1.0 |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| SPECIAL SENSES SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eye | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Cataract | | | | | 1 | | 2 | | 1 | | | | | | | | | | | 4 | 4 | 2 | | | | | 9 2.2 |
| Metaplasia, Osseous | | | 2 | | 1 | 2 | 1 | 1 | 2 | | | 1 | 1 | | | 1 | 1 | 2 | 1 | 1 | | 1 | 2 | 1 | | | 33 1.2 |
| Harderian Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| URINARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Accumulation, Hyaline Droplet | 4 | | | | | | | | | | | | | | | | | | 3 | | | | | | | | 4 2.8 |
| Congestion | | | | | | | | | | | | | | | | | | | | 1 | | | | | | | 1 1.0 |
| Nephropathy | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | | 50 2.9 |
| Pelvis, Inflammation, Suppurative | | | | | | | | | | | | | | | | 2 | | | | | | | | | | | 1 2.0 |
| Urinary Bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation | | | | | | | | | | | | | | | | | | | | 3 | | 3 | | | | | 2 3.0 |
| Transitional Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) | | | | |
|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|----------------|----------------|----------------|----------------|
| | 07
30 | 06
91 | 06
28 | 05
16 | 05
52 | 06
46 | 07
30 | 07
71 | 06
67 | 06
68 | 07
72 | 07
73 | 07
72 | 07
72 | 07
72 | 07
72 | 05
52 | 06
68 | 07
71 | 06
66 | | | 06
66 | 07
72 | 07
72 | 04
72 |
| 5.0 mg/m3 | 00
60
01 | 00
66
00 | 00
66
00 | 00
66
00 | 00
66
00 | 00
66
00 | 00
66
00 | 00
66
00 | 00
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00 | 00
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66
00 | 00
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00 | 00
66
00 | 00
66
00 | 00
66
00 | 00
66
00 | 00
66
00 |

ALIMENTARY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Esophagus | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Duodenum
Necrosis | + | + | + | + | + | + | + | + | + | + | + | + | 3 | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Jejunum | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Atrophy | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Basophilic Focus | X | | | X | | | X | | X | X | X | X | | | | | | | | | | | | | X | X |
| Clear Cell Focus | | | | | | | | | | | | | | | | X | X | X | X | | X | | | | | |
| Degeneration, Cystic | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eosinophilic Focus | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fatty Change | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatodiaphragmatic Nodule | X | | | | | | X | | | X | | | | | | | | | | | | | | | | X |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mixed Cell Focus | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mesentery | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Artery, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | |

* .. 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
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Experiment Number: 60311 - 05
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 Cobalt
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 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) | | |
|-------------------------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|--------------------|-------|-------|
| | 07030 | 06911 | 06628 | 05516 | 05544 | 06731 | 07717 | 07766 | 06677 | 06699 | 07721 | 07722 | 07722 | 07722 | 07722 | 05577 | 06688 | 07711 | 06699 | 06699 | | | 07722 | 07722 |
| 5.0 mg/m3 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 | 000 |
| | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 | 660 |
| | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 | 123 |

Fat, Necrosis

1

Pancreas

+ +

Acinus, Atrophy

1 1 1 1 2 2 2 1 1 2 2 2 1 2 2 1 2 2 1 2 2 2 2 2

Artery, Mineralization

2 2

Salivary Glands

+ +

Degeneration

Stomach, Forestomach

+ +

Hyperplasia, Squamous

2 2

Inflammation, Chronic Active

1 1

Ulcer

2 2

Stomach, Glandular

+ +

Inflammation, Chronic Active

1 1

Ulcer

3 3

CARDIOVASCULAR SYSTEM

Heart

+ +

Cardiomyopathy

1 1 2 1 2 1 2 1 1 2 1 2 2 1 2 2 1 2 1 2 2 2 2 2

Artery, Inflammation, Chronic Active

2 2

ENDOCRINE SYSTEM

Adrenal Cortex

+ +

Accessory Adrenal Cortical Nodule

1 1

Hyperplasia

1 1

Adrenal Medulla

+ +

* .. 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

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Experiment Number: 60311 - 05
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 Cobalt
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 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) |
|-------------------------------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|--------------------|
| | 0730 | 0691 | 0628 | 0516 | 0554 | 0662 | 0777 | 0777 | 0666 | 0666 | 0777 | 0777 | 0777 | 0777 | 0777 | 0777 | 0555 | 0666 | 0777 | 0666 | 0666 | 0777 | 0777 | 0447 | 0772 | | |
| 5.0 mg/m3 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seminal Vesicle
Inflammation, Chronic Active | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Testes
Atrophy | 4 | 2 | 1 | 1 | | | 4 | 4 | 1 | 1 | 4 | | 4 | 1 | 2 | 4 | 2 | 1 | 3 | 1 | 2 | 3 | 1 | | 4 |
| Infarct | | | | | | 4 | 2 | | | | | 2 | 3 | | | | | | | 2 | | 2 | | | 4 |
| Interstitial Cell, Hyperplasia | | 2 | | 1 | | | | | | 1 | | | | 1 | | | | | | 1 | | 3 | | | |

HEMATOPOIETIC SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bone Marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph Node
Pancreatic, Ectasia | | | + | | + | | | | | | | + | | | | | | + | | | | | + | | |
| Renal, Ectasia | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Renal, Hemorrhage | | | | | | | | | | | | | | | | | 1 | | | | | | | | |
| Lymph Node, Bronchial | + | M | + | M | M | M | M | M | + | + | M | M | M | M | M | + | + | + | M | + | + | M | M | M | |
| Lymph Node, Mandibular
Ectasia | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hyperplasia | | | | | | | | 2 | | | | | | | | | | | | | | | | 2 | |
| Lymph Node, Mediastinal | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lymph Node, Mesenteric
Infiltration Cellular, Histiocyte | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen
Fibrosis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hematopoietic Cell Proliferation | | | | | | | 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
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 BLANK .. Not examined microscopically
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Experiment Number: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

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 Cobalt
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 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) | | | |
|-------------------------------|-------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----------|--------------------|----|----|----|
| | 07 | 06 | 06 | 05 | 05 | 06 | 07 | 07 | 06 | 06 | 07 | 07 | 07 | 07 | 07 | 07 | 05 | 06 | 07 | 06 | | | 06 | 07 | 07 |
| 5.0 mg/m3 | 3 | 9 | 2 | 1 | 5 | 4 | 3 | 1 | 7 | 9 | 8 | 3 | 3 | 2 | 2 | 2 | 2 | 7 | 8 | 1 | 9 | 1 | 2 | 7 | 2 |
| | 0 | 1 | 8 | 6 | 2 | 6 | 0 | 7 | 9 | 8 | 3 | 3 | 2 | 2 | 9 | 9 | 2 | 9 | 7 | 1 | 9 | 1 | 9 | 0 | 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 |
| | 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 | 1 | 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 | |

Necrosis

2

Thymus

+ + + + + M + + + M + + + + + M + + + + + + + +

INTEGUMENTARY SYSTEM

Mammary Gland

+ + + + M + + + + M + + M + M M + M M + + + + +

Skin

+ +

Cyst Epithelial Inclusion
 Hyperplasia, Squamous
 Inflammation

3

3

MUSCULOSKELETAL SYSTEM

Bone

+ +

Maxilla, Inflammation, Chronic Active

Skeletal Muscle

+ +

NERVOUS SYSTEM

Brain

+ +

Compression

3

Edema

2

2

3

Hemorrhage

2

Infiltration Cellular, Mononuclear Cell

1

RESPIRATORY SYSTEM

Larynx

+ +

* .. 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:
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 2) Mild 4) Marked

Experiment Number: 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL

Cobalt

CAS Number: 7440-48-4

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First Dose M/F: 05/08/06 / 05/08/06

Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) | | | | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------------|------------------|------------------|------------------|---|
| | 0
7
3
0 | 0
6
9
1 | 0
6
2
8 | 0
5
1
6 | 0
5
5
2 | 0
6
4
6 | 0
7
3
0 | 0
7
1
7 | 0
6
7
9 | 0
6
9
8 | 0
7
2
3 | 0
7
1
3 | 0
7
2
2 | 0
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2 | 0
7
2
2 | 0
5
7
2 | 0
6
8
9 | 0
7
1
7 | 0
6
9
1 | 0
6
1
9 | | | 0
7
2
2 | 0
4
7
2 | 0
7
2
9 | |
| 5.0 mg/m3 | 0
6
0
1 | 0
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6
2 | 0
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6
3 | 0
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4 | 0
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5 | 0
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6 | 0
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7 | 0
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8 | 0
0
6
9 | 0
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6
1 | 0
0
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2 | 0
0
6
3 | 0
0
6
4 | 0
0
6
5 | 0
0
6
6 | 0
0
6
7 | 0
0
6
8 | 0
0
6
9 | 0
0
6
0 | 0
0
6
1 | 0
0
6
2 | 0
0
6
3 | 0
0
6
4 | 0
0
6
5 | |
| Hyperkeratosis | | | | | | | | | 2 | | | | | | | | | | | | | | | | | |
| Inflammation | 1 | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | | |
| Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Respiratory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Squamous Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Inflammation, Chronic Active | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Alveolar Epithelium, Hyperplasia | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 4 |
| Alveolus, Proteinosis | 3 | 3 | 3 | 3 | 2 | 3 | 3 | | 4 | 4 | 3 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 3 |
| Bronchiole, Epithelium, Hyperplasia | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Foreign Body | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inflammation, Suppurative | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 2 | 3 | 4 | 3 | | 4 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 |
| Inflammation, Chronic Active | 3 | 3 | 1 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 4 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 2 | 2 |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Olfactory Epithelium, Atrophy | 1 | 1 | | 1 | 1 | 1 | 2 | 1 | 1 | | | | 1 | 1 | 1 | | 1 | | 1 | | 1 | | | | 1 | 1 |
| Olfactory Epithelium, Hyperplasia | 2 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Olfactory Epithelium, Hyperplasia, Basal Cell | 1 | | 1 | | | | | | | | | | 1 | | | | 1 | | | 1 | | | 1 | | 1 | 1 |
| Olfactory Epithelium, Metaplasia, Respiratory | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 2 | 2 | 2 | 2 |
| Olfactory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Respiratory Epithelium, Hyperplasia | 2 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 1 | 3 | 2 | 2 | 1 | 1 |
| Respiratory Epithelium, Metaplasia, Squamous | 1 | 1 | | | 1 | 2 | 1 | | 1 | 2 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| Respiratory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Turbinate, Atrophy | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | | | | |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | males
(cont...) | | | |
|-------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------|--------------------|------------------|-----------------------|------------------|
| | 0
7
3
0 | 0
6
9
1 | 0
6
2
8 | 0
5
1
6 | 0
5
5
2 | 0
6
4
6 | 0
7
3
0 | 0
7
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7 | 0
6
7
9 | 0
6
9
8 | 0
7
2
3 | 0
7
1
3 | 0
7
2
2 | 0
7
2
2 | 0
7
2
9 | 0
5
7
2 | 0
6
8
9 | 0
7
1
7 | 0
6
9
1 | 0
6
1
9 | | | 0
7
2
9 | 0
4
7
0 | 0
7
2
9 |
| 5.0 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
6
0
1 | 2 |

Metaplasia, Squamous

1

SPECIAL SENSES SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Eye | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Cataract | | | | | 3 | | | | | | 2 | | 1 | | | 2 | | | 1 | | | | |
| Metaplasia, Osseous | | 1 | 1 | 1 | 1 | 1 | | 1 | | 1 | | 1 | | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | |
| Harderian Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Zymbal's Gland | | | | | | | | | | | | | | | | | | | | | | | + |

URINARY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Accumulation, Hyaline Droplet | | | | | | | | | | | | | | | | | | | | | | | |
| Cyst | | | | | | | | | | | | | | | | | | | | | | | |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Infarct | | | | | | | | | | | | | | | | | | | | | | | |
| Metaplasia, Osseous | | | | 2 | | | | | | | | | | | | | | | | | | | |
| Nephropathy | 3 | 3 | 2 | 2 | 1 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 2 | 3 | 3 |
| Artery, Inflammation, Chronic Active | | | | | | | | | | | | | | | 3 | | | | | | | | 2 |
| Urinary Bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Inflammation | | | | | | | | | | | | | | | | | | | | | | | |

* .. 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

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 Cobalt
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| FISCHER 344-TACONIC RATS MALE
5.0 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|--------|--------|
| | 0689 | 0729 | 0779 | 0775 | 0648 | 0672 | 0772 | 0772 | 0772 | 0772 | 0566 | 0666 | 0476 | 0767 | 0672 | 0722 | 0699 | 0668 | 0772 | 0566 | | 0657 | | |
| ANIMAL ID | 00626 | 00662 | 00662 | 00662 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00666 | 00666 | 00666 | 00666 | 00666 | 00666 | 00666 | 00666 | 00666 | 00666 | 00666 | | | |
| Fat, Necrosis | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Acinus, Atrophy | 1 | 1 | 1 | | | | | 1 | 1 | | | | | | 1 | 1 | 2 | 1 | | 1 | 2 | 1 | 30 1.4 | |
| Artery, Mineralization | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| Salivary Glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Degeneration | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| Stomach, Forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Hyperplasia, Squamous | | | | | 1 | 2 | 2 | | | | | | | 2 | | | | | | 1 | | 1 | 11 1.5 | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| Ulcer | | | | | | 3 | 3 | | | | | | | | | | | | | | | | 2 3.0 | |
| Stomach, Glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 | |
| CARDIOVASCULAR SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Cardiomyopathy | 1 | 2 | 2 | 2 | 1 | 1 | | 1 | 2 | 1 | 2 | | 1 | 1 | 1 | 1 | 1 | 2 | 2 | | 2 | 2 | 2 | 39 1.5 |
| Artery, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| ENDOCRINE SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal Cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Accessory Adrenal Cortical Nodule | 1 | | | | | | | | | | | | | | | | | | | | | | 3 1.0 | |
| Hyperplasia | | | 1 | 1 | | | 1 | 1 | | 2 | 1 | 1 | 1 | | | 1 | | | | 1 | 1 | 1 | 29 1.0 | |
| Adrenal Medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |

* .. 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
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5.0 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-----------------------|
| | 0689 | 0729 | 0779 | 0775 | 0648 | 0667 | 0772 | 0772 | 0773 | 0773 | 0566 | 0666 | 0664 | 0677 | 0668 | 0772 | 0772 | 0669 | 0668 | 0756 | | | 0665 | 0677 |
| ANIMAL ID | 00626 | 00662 | 00662 | 00662 | 00663 | 00663 | 00663 | 00663 | 00663 | 00664 | 00665 | 00667 | 00668 | 00669 | 00670 | 00671 | 00672 | 00673 | 00674 | 00675 | 00676 | 00677 | 00678 | 00679 |
| Hyperplasia | | | | | 4 | 4 | | | | | | | | | | | | | | | 3 | 3 | 4 | 9 2.4 |
| Islets, Pancreatic
Hyperplasia | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49
3 2.3 |
| Parathyroid Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | 46 |
| Pituitary Gland
Angiectasis
Pars Distalis, Hyperplasia | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49
1 3.0
22 2.4 |
| Thyroid Gland
C-cell, Hyperplasia
Follicle, Cyst | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | 49
9 2.0
1 |
| GENERAL BODY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | |
| Peritoneum
Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | 1
1 2.0 |
| GENITAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | |
| Epididymis | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Preputial Gland
Atrophy
Inflammation, Chronic Active | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | 48
1 3.0
3 2.0 |
| Prostate
Hyperplasia
Inflammation, Chronic Active | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50
1 1.0
28 1.6 |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
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| | 0689 | 0729 | 0779 | 0779 | 0668 | 0467 | 0667 | 0779 | 0779 | 0779 | 0779 | 0566 | 0666 | 0466 | 0779 | 0668 | 0779 | 0779 | 0666 | 0666 | | 0779 | 0566 | 0667 | 0566 | 0667 | | | | |
| ANIMAL ID | 00626 | 00667 | 00668 | 00669 | 00670 | 00671 | 00672 | 00673 | 00674 | 00675 | 00676 | 00677 | 00678 | 00679 | 00680 | 00681 | 00682 | 00683 | 00684 | 00685 | 00686 | 00687 | 00688 | 00689 | 00690 | | | | | |
| Necrosis | | | 2 | | 2 | | | | | | | 2 | | | 2 | | | | | | | | | 2 | | | 6 | 2.0 | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | 46 | | | |
| INTEGUMENTARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary Gland | + | + | M | M | + | + | M | + | + | + | M | + | M | + | M | + | M | + | + | M | M | + | M | + | M | + | M | 31 | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Cyst Epithelial Inclusion | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 | |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 | |
| Inflammation | | | | | 3 | 3 | | | | | | | | | | | | | | | | | | | | | | 4 | 3.0 | |
| MUSCULOSKELETAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Maxilla, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 | 1.0 |
| Skeletal Muscle | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | |
| NERVOUS SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Compression | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 7 | 2.3 |
| Edema | | | | | | | 2 | 2 | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 2.0 |
| Infiltration Cellular, Mononuclear Cell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 |
| RESPIRATORY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
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 X .. Lesion present
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|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|--------|
| | 0689 | 0729 | 0779 | 0775 | 0648 | 0662 | 0772 | 0772 | 0772 | 0772 | 0566 | 0666 | 0641 | 0770 | 0668 | 0772 | 0772 | 0666 | 0666 | 0756 | | 0665 | 0667 |
| 5.0 mg/m3 | ANIMAL ID | | | | | | | | | | | | | | | | | | | | | | |
| | 00626 | 00662 | 00668 | 00669 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | 00660 | |
| Hyperkeratosis | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Inflammation | | | | | | | 1 | | | | | | 1 | | | | | | | 1 | 1 | | 16 1.1 |
| Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | 2 2.0 |
| Respiratory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Squamous Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Lung | | | | | | | | | | | | | | | | | | | | | | | 50 |
| Inflammation, Chronic Active | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 50 2.9 |
| Alveolar Epithelium, Hyperplasia | 3 | 4 | 4 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 1 | 3 | 4 | 4 | 4 | | 3 | 4 | 49 3.6 |
| Alveolus, Proteinosis | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 49 3.1 |
| Bronchiole, Epithelium, Hyperplasia | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 50 3.7 |
| Nose | | | | | | | | | | | | | | | | | | | | | | | 50 |
| Foreign Body | | | | | | X | | | | | | | | | | | X | | | | | | 5 |
| Inflammation, Suppurative | 3 | | 2 | 3 | 3 | 3 | 1 | 1 | 2 | 1 | 3 | | 3 | 2 | | 3 | 4 | 3 | 3 | 2 | 3 | 3 | 46 2.6 |
| Inflammation, Chronic Active | 3 | 1 | 3 | 3 | 3 | 3 | 1 | 2 | 2 | 2 | 3 | 1 | 3 | 2 | | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 49 2.6 |
| Thrombosis | 1 | | | | | | | | | | | | | | | | | | | | | | 2 1.5 |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | 1 | | | | | | | | | 1 | | | | | | | | | | | | | 2 1.0 |
| Olfactory Epithelium, Atrophy | | | | | | | | | | | | | | | | | | | | | | | 29 1.2 |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | 7 1.1 |
| Olfactory Epithelium, Hyperplasia, Basal Cell | | | | | | | | | | | | | | | | | | | | | | | 13 1.0 |
| Olfactory Epithelium, Metaplasia, Respiratory | 3 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 50 2.2 |
| Olfactory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | 5 1.8 |
| Respiratory Epithelium, Hyperplasia | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 4 | 2 | 2 | 1 | 2 | 3 | 50 2.2 |
| Respiratory Epithelium, Metaplasia, Squamous | 1 | | | | 1 | 1 | 1 | | 2 | 1 | 2 | | 1 | 1 | | 2 | 3 | 2 | 2 | 1 | 1 | 3 | 35 1.3 |
| Respiratory Epithelium, Necrosis | 1 | | 2 | 2 | | 2 | | | | | 1 | | | | | 2 | | 2 | 2 | | | | 13 1.6 |
| Turbinate, Atrophy | | | | | | | | | | | | | | | | | | | | | | | 41 1.0 |
| Trachea | | | | | | | | | | | | | | | | | | | | | | | 50 |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | | females
(cont...) |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------------------|
| | 0732 | 0731 | 0730 | 0729 | 0728 | 0727 | 0726 | 0725 | 0724 | 0723 | 0722 | 0721 | 0720 | 0719 | 0718 | 0717 | 0716 | 0715 | 0714 | 0713 | 0712 | 0711 | 0710 | 0709 | 0708 | |
| ANIMAL ID | 0010 | 0011 | 0012 | 0013 | 0014 | 0015 | 0016 | 0017 | 0018 | 0019 | 0020 | 0021 | 0022 | 0023 | 0024 | 0025 | 0026 | 0027 | 0028 | 0029 | 0030 | 0031 | 0032 | 0033 | 0034 | |

ALIMENTARY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Colon | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | M |
| Intestine Small, Ileum | + | + | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Angiectasis | | | | 2 | | | | | | | | | | | | | | | | | | | | |
| Atrophy | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| Basophilic Focus | | X | X | | X | | X | | | | | | | | | X | | X | | | | | X | X |
| Clear Cell Focus | | X | X | | | | | | | | | | X | | X | | | | | X | | | | |
| Fatty Change | | | | | | | | | 1 | | 1 | | | | | | | | | 1 | 1 | 2 | | |
| Hepatodiaphragmatic Nodule | | | X | | X | | | | | | | | | | | | | | | | | | | |
| Inflammation, Chronic Active | | | | | | | | 2 | | | | | | | | | | | | | | | | |
| Mixed Cell Focus | | | | | | | | | | | | | | | | | | | | | | | | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 |
| Regeneration | | | | 2 | | | | | | | | | | | | | | | | | 1 | | | |
| Serosa, Thrombosis | | | | | | | | | | | | | | | 2 | | | | | | | | | |
| Mesentery | + | | | | | | | + | | | | | | | + | + | | | | + | | | | + |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

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 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
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 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) |
|--|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---|-----------|----------------------|
| | 0
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1 | 0
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3 | 0
7
3
1 | 0
6
3
4 | 0
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6 | 0
6
4
3 | 0
7
3
0 | | | |
| Fat, Necrosis | 1 | | | | | | | 1 | | | | | | | | | | 1 | | | | | | | 1 | | |
| Pancreas
Acinus, Atrophy | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | |
| Salivary Glands
Atrophy | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 2 | |
| Stomach, Forestomach
Hyperplasia, Squamous
Ulcer | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 2
2 | |
| Stomach, Glandular
Edema
Erosion | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 2
3 | |
| Tongue | | | | | | | | | | | | | | | | | | | | | | | | | | + | |
| Tooth
Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | | |

CARDIOVASCULAR SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Heart
Cardiomyopathy
Thrombosis
Artery, Inflammation, Chronic Active
Atrium, Congestion | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 2
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1 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | 3
2 |

ENDOCRINE 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

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| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) | | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---|-----------|----------------------|--|--|
| | 0
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8
3 | 0
7
3
1 | 0
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4 | 0
6
4
6 | 0
7
3
0 | | | | | |
| Adrenal Cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | | |
| Accessory Adrenal Cortical Nodule | | | | | | | | | | | | | | | | | 1 | | | | | | | | 1 | | | |
| Atrophy | | | | | 3 | | | | | | | | | | | | | | | | | | | | | 1 | | |
| Degeneration | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | |
| Hemorrhage | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | | |
| Hyperplasia | 2 | | 2 | 2 | | 1 | | | | | | 2 | | 1 | | 1 | | 2 | 2 | 2 | | | 1 | 1 | 1 | | | |
| Necrosis | | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | |
| Adrenal Medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Degeneration, Cystic | | | | | | | | | | | | | 3 | | | | | | | | | | | | | | | |
| Hyperplasia | 3 | | | | | | | | | | 3 | | | | | 1 | | | | | | 1 | | | | | | |
| Infiltration Cellular, Mononuclear Cell | | | | | | | | | | 2 | | | | | | | | | | | | | | | | | | |
| Islets, Pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Hyperplasia | | | | | | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Parathyroid Gland | + | + | + | + | + | + | + | + | M | M | M | + | + | + | + | + | + | + | + | + | + | + | M | + | + | M | | |
| Pituitary Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | |
| Pars Distalis, Hyperplasia | | 2 | | 3 | | | 2 | 4 | | 1 | | | | 3 | | | | | | | | 4 | | 1 | | 3 | | |
| Thyroid Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| C-cell, Hyperplasia | | | | | | | | | 1 | | | | | | | | 3 | | 1 | | | | 1 | | | | | |
| Follicular Cell, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

GENERAL BODY SYSTEM

Peritoneum +

GENITAL 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

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 Cobalt
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 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|-----------|----------------------|
| | 0
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3 | 0
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1 | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lymph Node, Mesenteric
Infiltration Cellular, Histiocyte | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Spleen
Hematopoietic Cell Proliferation
Infiltration Cellular, Histiocyte | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + |

INTEGUMENTARY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mammary Gland
Galactocoele
Hyperplasia | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skin
Cyst Epithelial Inclusion
Hyperkeratosis
Hyperplasia, Squamous | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

MUSCULOSKELETAL SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bone
Fracture
Femur, Hyperostosis
Maxilla, Inflammation, Chronic Active | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skeletal Muscle | | | | | | | | | | | | | | | | | | | | | | | | | |

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

| | | DAY ON TEST | | | | | | | | | | | | | | | | | | | | females
(cont...) | | | | | |
|--|-----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| FISCHER 344-TACONIC RATS
FEMALE | Control | 0
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6
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1 | | 0
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| | ANIMAL ID | 0
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5 | 0
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6 |

NERVOUS SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Compression | 1 | | | | | 2 | | | | | | | | | 2 | | | 2 | 3 | 2 | | | 2 | | |
| Infiltration Cellular, Mononuclear Cell | | | | | | | | | | | | | | | | | | | | | | | | | |

RESPIRATORY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Foreign Body | | | | | X | | | | | | | | | | | | | | | | | | | |
| Inflammation | | | 1 | 2 | 1 | 1 | | | | | 1 | 1 | 1 | 2 | | | 1 | | 1 | | 1 | | 1 | |
| Metaplasia, Squamous | | | | | 1 | 1 | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Inflammation, Chronic Active | | 1 | 1 | | | | 1 | | | | | | 1 | 1 | | | | 1 | | 1 | | | | |
| Alveolar Epithelium, Hyperplasia | | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Interstitial, Fibrosis | | | | | | | | | | | | | | | | | | | | | | | | |
| Mediastinum, Inflammation | | | | | | | | | | | | | | | | | | | | | | | | |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Foreign Body | | | | | | | | | | | | | | X | | X | | | | | | | | |
| Inflammation, Suppurative | | | | | | | | | | | | | | 1 | | 1 | | | | | | | | |
| Inflammation, Chronic Active | 1 | | | 1 | 1 | | | | | | | 1 | | 3 | | 1 | | 1 | | 1 | | | 1 | |
| Thrombosis | | | | | | | | | | | | | | | | | | | 2 | | | | | |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | | | | 3 | | | 1 | | | 1 | | 1 | | | | | 1 |
| Olfactory Epithelium, Metaplasia, Respiratory | | | | | | | | | | | | | | | 1 | | | | | 1 | | | | |
| Respiratory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | | | | 2 | | | | | | | | | | | | | |
| Respiratory Epithelium, Hyperplasia | | | | 1 | | 1 | | | | | | | | | 2 | | 1 | 1 | 1 | | | 1 | 1 | 2 |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | females
(cont...) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | 0
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4 | 0
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0 | 0
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1 | 0
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1 | 0
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1 | 0
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4 | 0
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6 | 0
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0 | |
| ANIMAL ID | 0
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6 | 0
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7 | 0
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9 | 0
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1
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2 | 0
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1
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3 | 0
0
1
0
4 | 0
0
1
0
5 |

Respiratory Epithelium, Metaplasia, Squamous
 Respiratory Epithelium, Necrosis
 Turbinate, Atrophy
 Turbinate, Hyperostosis

2

1

Trachea +

SPECIAL SENSES SYSTEM

Ear
 Inflammation, Chronic Active

Eye +
 Cataract 2 2
 Metaplasia, Osseous 1 1 1 1 1 1

Harderian Gland +
 Inflammation, Chronic Active 4 4

URINARY SYSTEM

Kidney +
 Necrosis, Focal
 Nephropathy 3 3 3 3 1 2 2 2 3 3 3 2 3 3 3 2 3 3 2 3 3 2 1 3

Urinary Bladder +

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

Experiment Number: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

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 Cobalt
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 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------|
| | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | |
| ANIMAL ID | 0016 | 0017 | 0018 | 0019 | 0020 | 0021 | 0022 | 0023 | 0024 | 0025 | 0026 | 0027 | 0028 | 0029 | 0030 | 0031 | 0032 | 0033 | 0034 | 0035 | 0036 | 0037 | 0038 | 0039 | 0040 |
| Adrenal Cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Accessory Adrenal Cortical Nodule | | | | | | 1 | | | | | | | | | | 1 | | | | | | | | | 5 1.0 |
| Atrophy | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Degeneration | | | | | | | | | | | | | | | | | | 2 | | | | | 2 | | 3 2.3 |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Hyperplasia | | | 2 | | | 1 | | 2 | | 2 | | 1 | 1 | 1 | | 2 | | | | 1 | | 2 | 3 | | 3 25 1.6 |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Adrenal Medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Degeneration, Cystic | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Hyperplasia | | | | 4 | | | 1 | | | | | 1 | 2 | | | 2 | | 1 | | | 1 | | 1 | | 12 1.8 |
| Infiltration Cellular, Mononuclear Cell | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Islets, Pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Parathyroid Gland | + | + | + | + | M | + | + | + | + | + | M | M | + | + | + | + | + | + | + | + | + | + | + | + | 42 |
| Pituitary Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Pars Distalis, Hyperplasia | 2 | 3 | | 2 | | | | | 3 | 2 | | 4 | | | | 4 | | 2 | | | | 1 | 3 | | 19 2.6 |
| Thyroid Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| C-cell, Hyperplasia | 1 | | | | | | | | | 1 | | | | | | 2 | 1 | | | | | | 1 | | 9 1.3 |
| Follicular Cell, Hyperplasia | | | 1 | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |

GENERAL BODY SYSTEM

Peritoneum 1

GENITAL 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | | |
|--|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------|------|--|
| | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | | 0731 | |
| ANIMAL ID | 0016 | 0017 | 0018 | 0019 | 0020 | 0021 | 0022 | 0023 | 0024 | 0025 | 0026 | 0027 | 0028 | 0029 | 0030 | 0031 | 0032 | 0033 | 0034 | 0035 | 0036 | 0037 | 0038 | 0039 | 0040 | 0041 | |
| Clitoral Gland
Hyperplasia
Inflammation, Suppurative | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | 2 2.5
2 1.5 |
| Ovary
Cyst
Inflammation, Chronic Active | + | + | X | + | + | X | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | 5
1 4.0 |
| Uterus
Angiectasis
Cyst
Inflammation, Suppurative
Inflammation, Chronic Active
Necrosis
Endometrium, Hyperplasia, Cystic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | 1 4.0
1
1 2.0
1 3.0
2 2.5
4 2.0 |

HEMATOPOIETIC SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|-------|-------|
| Bone Marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Lymph Node
Renal, Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | | | 4 | 1 2.0 |
| Lymph Node, Bronchial | + | + | M | + | + | M | M | M | + | + | + | M | M | M | + | + | + | M | + | + | M | M | M | + | M | 26 | | |
| Lymph Node, Mandibular
Atrophy | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 | 1 3.0 | |
| Lymph Node, Mediastinal
Atrophy | + | + | M | M | + | M | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | 42 | 1 2.0 | |

* .. 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:
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Experiment Number: 60311 - 05
 Test Type: CHRONIC
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 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | |
|--|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------------|
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| ANIMAL ID | 0
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5 | 0
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4
6 | 0
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7 | 0
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1
4
8 | 0
0
1
4
9 | |
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 3.0 |
| Lymph Node, Mesenteric
Infiltration Cellular, Histiocyte | + | | | | | | | | | | | | | | | | | | | | | | | | 50 | 1 2.0 |
| Spleen
Hematopoietic Cell Proliferation
Infiltration Cellular, Histiocyte | + | | | | | | | | | | | | | | | | | | | | | | | | 50 | 2 1.5
1 2.0 |
| Thymus | + M + + + M + | | | | | | | | | | | | | | | | | | | | | | | | 47 | |
| INTEGUMENTARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary Gland
Galactocoele
Hyperplasia | + | | | | | | | | | | | | | | | | | | | | | | | | 50 | 1 3.0
3 2.3 |
| Skin
Cyst Epithelial Inclusion
Hyperkeratosis
Hyperplasia, Squamous | + | | | | | | | | | | | | | | | | | | | | | | | | 50 | 1 1.0
1 4.0
1 3.0 |
| MUSCULOSKELETAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone
Fracture
Femur, Hyperostosis
Maxilla, Inflammation, Chronic Active | + | | | | | | | | | | | | | | | | | | | | | | | | 50 | 1 2.0
4 2.0
2 2.5 |
| Skeletal Muscle | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
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 M .. Missing tissue
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| FISCHER 344-TACONIC RATS
FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|
| | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | 0731 | | 0731 | 0731 | | |
| ANIMAL ID | 00126 | 00127 | 00128 | 00129 | 00130 | 00131 | 00132 | 00133 | 00134 | 00135 | 00136 | 00137 | 00138 | 00139 | 00140 | 00141 | 00142 | 00143 | 00144 | 00145 | 00146 | 00147 | 00148 | 00149 | 00150 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

NERVOUS SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------|
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Compression | | | 1 | | | | 2 | 2 | | | 2 | 1 | 1 | | | | | | 3 | 2 | | 1 | | | 16 1.8 |
| Infiltration Cellular, Mononuclear Cell | | | | | | | | | 2 | | | | | | | | | | | | | | | | 1 2.0 |

RESPIRATORY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Foreign Body | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Inflammation | | 1 | 1 | 1 | 2 | 1 | | | 1 | | | | | 2 | | | 1 | | | | | 2 | 1 | | 22 1.2 |
| Metaplasia, Squamous | | 1 | | | 1 | | | | | | | | | | | | | | | | | | | | 4 1.0 |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation, Chronic Active | 1 | 1 | | 1 | 1 | | 1 | 1 | | | 1 | 1 | | 1 | | | | | 1 | 1 | | | 1 | | 20 1.0 |
| Alveolar Epithelium, Hyperplasia | 1 | 1 | | | 1 | | 2 | | | | | | | 1 | | 1 | | | | | | | 1 | | 9 1.1 |
| Interstitial, Fibrosis | | | | | | | 2 | | | | | | | | | | | | | | | | | | 1 2.0 |
| Mediastinum, Inflammation | | | | | | | | | | | | | | | | | | | | | | 2 | | | 1 2.0 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Foreign Body | | | | X | | | X | | | | X | | | | | | | | | | | | | | 5 |
| Inflammation, Suppurative | | | | 1 | | | 1 | | | | 1 | | | | | | | | | | | | | 2 | 6 1.2 |
| Inflammation, Chronic Active | | 1 | 2 | 2 | 1 | | 2 | | | | 1 | 1 | | 1 | | 1 | | | 1 | 1 | 1 | | 2 | | 22 1.3 |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | 3 | | | | 1 | | | | | | | 1 | | | | | | | | | | | | | 8 1.5 |
| Olfactory Epithelium, Metaplasia, Respiratory | | | | | 1 | 1 | | | | | | 1 | | | | | | | | | | | | 1 | 6 1.0 |
| Respiratory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Respiratory Epithelium, Hyperplasia | | | | 1 | | | 1 | | | | 1 | 1 | | | | | | | 1 | | | | 2 | | 15 1.2 |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
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 I .. Insufficient tissue
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FEMALE
Control | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | |
|---|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------|---|---|----|--|
| | 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 | 1 | |
| | 7 | 7 | 6 | 7 | 7 | 7 | 7 | 7 | 7 | 3 | 5 | 7 | 7 | 7 | 7 | 7 | 7 | 6 | 7 | 7 | 6 | 6 | 6 | 7 | 7 | 3 | |
| | 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 | 3 | |
| | 3 | 3 | 9 | 3 | 3 | 3 | 2 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 7 | 3 | 3 | 3 | 6 | 9 | 3 | 3 | 1 | |
| | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 2 | 2 | 6 | 0 | 1 | 2 | 0 | 2 | 1 | 1 | 4 | 0 | 1 | 1 | 3 | 8 | 1 | 1 | 6 | |
| Respiratory Epithelium, Metaplasia, Squamous | | | | 1 | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Respiratory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| Turbinate, Atrophy | | | 1 | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| Turbinate, Hyperostosis | 3 | | | | | | | | | | | | | | | | | | | | | | | | | 3 | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| SPECIAL SENSES SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ear | | | | + | | | | | | + | | | | | | | + | | + | | | | | | | 4 | |
| Inflammation, Chronic Active | | | | 3 | | | | | | 2 | | | | | | | 1 | | 2 | | | | | | | 4 | |
| Eye | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Cataract | | | 4 | | | | | | | 2 | | | | | | 3 | | | | | 4 | | 2 | 1 | | 8 | |
| Metaplasia, Osseous | | 1 | 1 | 1 | | 1 | | 1 | 1 | | | | 2 | 1 | | 2 | 1 | | | | 1 | | 1 | 1 | 1 | 24 | |
| Harderian Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Inflammation, Chronic Active | | | | | | | | | | | | | 2 | | | | | | | | | | | | | 3 | |
| URINARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Necrosis, Focal | | | | | | | | | | | | | | | | | 1 | | | | | | | | | 1 | |
| Nephropathy | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 1 | 4 | | 3 | 3 | 3 | 4 | 3 | 2 | 2 | 3 | 1 | 3 | 3 | 3 | 2 | 3 | 3 | 48 | |
| Urinary Bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |

* .. 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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Experiment Number: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
| | 0708 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | |
| ANIMAL ID | 00326 | 00327 | 00328 | 00329 | 00330 | 00331 | 00332 | 00333 | 00334 | 00335 | 00336 | 00337 | 00338 | 00339 | 00340 | 00341 | 00342 | 00343 | 00344 | 00345 | 00346 | 00347 | 00348 | 00349 | 00350 |
| | 0 | 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

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-------------|
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine Large, Cecum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine Large, Colon
Mucosa, Hyperplasia | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50
2 2.0 |
| Intestine Large, Rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine Small, Duodenum
Infiltration Cellular, Chronic Active | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50
1 1.0 |
| Intestine Small, Ileum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Intestine Small, Jejunum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Angiectasis | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Basophilic Focus | | | | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | 20 |
| Clear Cell Focus | | | | | | | | | | | | | | | | | | | | | | | | | 6 |
| Eosinophilic Focus | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Fatty Change | 3 | | | | | | 1 | | | | 1 | | | 2 | | | | | | | | 2 | 2 | 3 | 9 1.8 |
| Fibrosis | 1 | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Hepatodiaphragmatic Nodule | | | | X | | | | X | | | | | X | | | | | | | X | | | | | 11 |
| Mixed Cell Focus | | | | | | | | | | | X | | | | | | | | | | | | | | 4 |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 3 1.3 |
| Regeneration | | | | | | | | | | | 4 | | | | | | | | | | | 1 | | | 3 3.0 |

* .. 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:
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 Cobalt
 CAS Number: 7440-48-4

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| FISCHER 344-TACONIC RATS
FEMALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | | |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-----|-----|-------|
| | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | 0708 | | | | | | |
| ANIMAL ID | 00326 | 00327 | 00328 | 00329 | 00330 | 00331 | 00332 | 00333 | 00334 | 00335 | 00336 | 00337 | 00338 | 00339 | 00340 | 00341 | 00342 | 00343 | 00344 | 00345 | 00346 | 00347 | 00348 | 00349 | | | | | | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 1 2.0 | | | | |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | | |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 1.0 | | | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2 1.5 | | | |
| Endometrium, Hyperplasia, Cystic | | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.0 | | |
| HEMATOPOIETIC SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone Marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | |
| Lymph Node | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | | |
| Deep Cervical, Infiltration Cellular | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| Iliac, Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 4.0 | |
| Lymph Node, Bronchial | + | + | + | M | M | M | M | M | + | M | + | M | + | M | M | M | + | M | M | M | M | M | M | M | M | 18 | | | | |
| Lymph Node, Mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 48 | | | | |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| Lymph Node, Mediastinal | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | 43 | | | | |
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 | |
| Lymph Node, Mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | |
| Ectasia | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1 1.0 |
| Hematopoietic Cell Proliferation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 5 | 1.4 |

* .. 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
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1-4 .. Lesion qualified as:
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| FISCHER 344-TACONIC RATS
FEMALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | | |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|--------|--|
| | 0708 | 0588 | 0677 | 0766 | 0777 | 0777 | 0777 | 0777 | 0777 | 0575 | 0777 | 0777 | 0777 | 0777 | 0474 | 0777 | 0676 | 0777 | 0575 | 0777 | | 0676 | 0777 | 0883 | 0777 | |
| ANIMAL ID | 00326 | 00337 | 00338 | 00339 | 00340 | 00341 | 00342 | 00343 | 00344 | 00345 | 00346 | 00347 | 00348 | 00349 | 00350 | 00351 | 00352 | 00353 | 00354 | 00355 | 00356 | 00357 | 00358 | 00359 | | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | M | + | + | + | + | + | + | + | 46 | |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| INTEGUMENTARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Galactocoele | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 | |
| Hyperplasia | | | | | | | | | | | | | | | | 2 | | | | | | | | | 2 2.0 | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | 3 | | | | | | | | | 1 3.0 | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Cyst Epithelial Inclusion | | | | | | | | | | | | | | | | | | | | | | | 2 | | 1 2.0 | |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 3.0 | |
| Inflammation | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| Subcutaneous Tissue, Inflammation | | | | | | | | | | | | | | | | 4 | | | | | | | | | 1 4.0 | |
| MUSCULOSKELETAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Femur, Hyperostosis | | | | | | | | | | | | | | | | | | | | | | | | 3 | 2 3.0 | |
| Skeletal Muscle | | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| NERVOUS SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Compression | 2 | | 2 | | | | 3 | | | | | 2 | | | 2 | | | | | | | | 1 | 2 | 14 1.8 | |
| Hemorrhage | | | 2 | | | | | | | | | | | | | | | | | | | | | | 2 2.0 | |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
 X .. Lesion present
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| FISCHER 344-TACONIC RATS
FEMALE
1.25 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|
| | 0708 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | 0709 | | 0709 | | | |
| ANIMAL ID | 00326 | 00327 | 00328 | 00329 | 00330 | 00331 | 00332 | 00333 | 00334 | 00335 | 00336 | 00337 | 00338 | 00339 | 00340 | 00341 | 00342 | 00343 | 00344 | 00345 | 00346 | 00347 | 00348 | 00349 | 00350 |

RESPIRATORY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Foreign Body | | | X | | | | | | X | | | | | | | | | | | | | | | | | 3 |
| Inflammation | 1 | | 2 | | 2 | 1 | | 1 | 1 | 2 | | 1 | 2 | | | 1 | | 2 | 1 | 2 | | | | 1 | | 23 1.5 |
| Metaplasia, Squamous | | | | | | | | | | 1 | | | | | | | | | | | | | | | | 4 1.0 |
| Respiratory Epithelium, Hyperplasia | | | 2 | | 1 | | | | | | | 1 | | | | | | | | | | | | | | 4 1.3 |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation, Chronic Active | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 50 3.0 |
| Alveolar Epithelium, Hyperplasia | 4 | 3 | 3 | 4 | 3 | 3 | 1 | 4 | 4 | 1 | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 2 | 4 | 4 | 4 | 1 | 4 | 3 | 2 | 49 2.8 |
| Alveolar Epithelium, Metaplasia, Squamous | | | | 4 | | | | | | 3 | | | | | | | | | | | | | | | | 2 3.5 |
| Alveolus, Proteinosis | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 2 | 1 | 3 | 3 | 1 | | 50 2.7 |
| Bronchiole, Epithelium, Hyperplasia | 1 | 1 | 2 | 2 | 1 | 3 | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 1 | 3 | | 47 1.5 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Foreign Body | | | | | | | | | | | | | X | | | | | | | | | | | | | 3 |
| Inflammation, Suppurative | | | | | | | | | | | | | 1 | | | | | | 2 | | | | | | | 4 1.3 |
| Inflammation, Chronic Active | 1 | 1 | | 1 | | 1 | 1 | 1 | 1 | | | 1 | 1 | 1 | 1 | | 1 | | 1 | 3 | 1 | 1 | 1 | 1 | | 42 1.1 |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | 3 | | | | | 4 2.8 |
| Olfactory Epithelium, Accumulation, Hyaline Droplet | | | | | | | | | 1 | | | | | | | | | | | | | | | | | 2 1.0 |
| Olfactory Epithelium, Atrophy | | | | | | | | | | | 1 | | 1 | 1 | | 1 | 1 | 1 | | | | | 1 | 1 | | 22 1.1 |
| Olfactory Epithelium, Metaplasia, Respiratory | | | | 1 | 2 | | | | 1 | | | 1 | | 2 | | | 1 | 2 | 1 | | | | | 1 | | 18 1.3 |
| Olfactory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | 2 | | | | | | | 2 1.5 |
| Respiratory Epithelium, Hyperplasia | | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 43 1.0 |
| Respiratory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | 2 | | | | | | | 1 2.0 |
| Turbinate, Atrophy | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | | | 1 | 1 | 1 | | 38 1.0 |
| Turbinate, Hyperostosis | | | | | | | | | | | | | | | | | 3 | | | | | | | | | 2 2.0 |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
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| FISCHER 344-TACONIC RATS
FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) | | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|----------------------|-------|-------|-------|
| | 0730 | 0732 | 0737 | 0731 | 0739 | 0738 | 0733 | 0731 | 0733 | 0738 | 0726 | 0735 | 0737 | 0737 | 0737 | 0737 | 0730 | 0735 | 0737 | 0737 | | | 0737 | 0736 | 0736 |
| | 00501 | 00502 | 00503 | 00504 | 00505 | 00506 | 00507 | 00508 | 00509 | 00510 | 00511 | 00512 | 00513 | 00514 | 00515 | 00516 | 00517 | 00518 | 00519 | 00520 | 00521 | 00522 | 00523 | 00524 | 00525 |

ALIMENTARY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Esophagus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Cecum Hemorrhage | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Colon | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Rectum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Ileum | + | + | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Jejunum Congestion | + | + | + | + | A | + | + | A | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Jejunum Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| Intestine Small, Jejunum Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | | | 4 |
| Intestine Small, Jejunum Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| Liver | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Liver Basophilic Focus | X | X | X | X | | | | X | | | | X | X | X | X | X | | | | | | | X | | |
| Liver Clear Cell Focus | X | | | | | | X | | | | | | | | | | | | | | | X | | | |
| Liver Eosinophilic Focus | | | | | | | | | | | | | | | | | | | | | | | | | |
| Liver Fatty Change | | | | | | 2 | | | | | | 3 | | | | | | | | | | | | 3 | |
| Liver Hepatodiaphragmatic Nodule | | | | | | | X | | | | | | | | | X | X | X | | | X | | X | | |
| Liver Mixed Cell Focus | | | | X | | | | | | | | | | | | X | | | | | | | | | |
| Liver Necrosis | | | | | | | | 2 | | | | | 2 | | | | | | | | | | | | |
| Liver Regeneration | | | | | | | | | 3 | | | | | | | | | | | | | | | | |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) | | |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|----------------------|-------|---|
| | 0730 | 0732 | 0737 | 0739 | 0768 | 0767 | 0766 | 0772 | 0771 | 0766 | 0766 | 0722 | 0755 | 0777 | 0777 | 0777 | 0777 | 0766 | 0755 | 0777 | 0777 | 0777 | 0766 | 0766 | | | 0777 | |
| Bile Duct, Cyst | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00501 | | |
| Mesentery | | | | | + | | | | | | | | | | | | | | | | | | | | | | 00502 | |
| Fat, Necrosis | | | | | 1 | | | | | | | | | | | | | | | | | | | | | | 00503 | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 00504 | |
| Acinus, Atrophy | 1 | 1 | 1 | | | | 1 | | 1 | 1 | | 1 | 1 | | | | | | | 1 | | | | | | | 00505 | |
| Acinus, Hyperplasia | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 00506 | |
| Salivary Glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 00507 | |
| Atrophy | | | | | | | | | | | | | | | 1 | | | | | | | | | | | | 00508 | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | | 00509 | |
| Stomach, Forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 00510 | |
| Edema | | | | | | | | | | | | | | | | | | | | | | | | | | | 00511 | |
| Erosion | | | | | | | | | | | | | | | | | | | | | | | | | | | 00512 | |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | | | 00513 | 4 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | | 00514 | 3 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | | | | 00515 | |
| Stomach, Glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 00516 | |
| Erosion | | | | | | | | | | | | | | | | | | | | | | | | | | | 00517 | |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | | | 00518 | 1 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | | | | 00519 | |
| Tongue | | | | | | | | | | | | | | | | | | | | | | | | | | | 00520 | + |
| Tooth | | | | | | | | | | | | | | | | | | | | | | | | | | | 00521 | |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | | 00522 | |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
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 BLANK .. Not examined microscopically

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 Cobalt
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| FISCHER 344-TACONIC RATS
FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) | | | | | |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|----------------------|------|------|-------|------|------|
| | 0730 | 0732 | 0737 | 0731 | 0739 | 0738 | 0733 | 0735 | 0736 | 0731 | 0733 | 0738 | 0731 | 0737 | 0737 | 0737 | 0737 | 0736 | 0735 | 0737 | | | 0737 | 0737 | 0736 | 0736 | 0737 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00501 | | |
| Lymph Node, Mediastinal | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | | |
| Lymph Node, Mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Fibrosis | | | | 1 | | | | | | | | | | | | | 2 | | 2 | | | | 1 | | | | |
| Hematopoietic Cell Proliferation | | | | 1 | | | | | | | | | | | | | | | | | | | | 2 | | | |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | 2 | | | | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| INTEGUMENTARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Galactocele | | | | | | | | | 1 | | | | | | | 2 | | | | | | | | | | | |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 1 | | | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Inflammation | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MUSCULOSKELETAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Femur, Hyperostosis | | | | | | | | | | | | | | | | | 3 | | | | | 3 | | | | | |
| NERVOUS SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | | | |
| Compression | | | | 2 | 2 | 1 | | 2 | | 3 | 2 | 2 | | | | 4 | | | | | | | | | | | |
| Necrosis | | | | | | | | | | 3 | | | | | | | | | | | | | | | | | |

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 + .. Tissue examined microscopically
 X .. Lesion present
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| FISCHER 344-TACONIC RATS
FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) | | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------|----------------------|------------------|------------------|
| | 0
7
3
0 | 0
7
3
2 | 0
6
7
7 | 0
7
3
1 | 0
6
9
0 | 0
6
8
7 | 0
7
3
2 | 0
7
1
5 | 0
6
3
3 | 0
6
8
8 | 0
2
9
1 | 0
5
8
7 | 0
7
3
0 | 0
7
3
0 | 0
7
3
0 | 0
6
3
2 | 0
5
2
3 | 0
7
3
0 | 0
7
3
0 | 0
6
3
1 | | | 0
6
6
1 | 0
7
1
8 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00501 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00502 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00503 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00504 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00505 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00506 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00507 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00508 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00509 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00510 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00511 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00512 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00513 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00514 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00515 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00516 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00517 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00518 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00519 | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00520 | |

RESPIRATORY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Foreign Body | | X | X | | | | | | | | | | | | | | | | | | X | |
| Inflammation | | 2 | 2 | 2 | | 1 | | | | 1 | | | | | | | | | 1 | 2 | 2 | |
| Metaplasia, Squamous | | | | 1 | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Inflammation, Chronic Active | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Alveolar Epithelium, Hyperplasia | 3 | 4 | 1 | 2 | 2 | 4 | 4 | 2 | 1 | 1 | 1 | 4 | 3 | 4 | 4 | 1 | 3 | 4 | 3 | 4 | 3 | 2 |
| Alveolar Epithelium, Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | 3 |
| Alveolus, Proteinosis | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 1 |
| Bronchiole, Epithelium, Hyperplasia | 2 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 1 | | 1 | 2 | 3 | 3 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 1 |
| Nose | + | + | + | + | I | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Inflammation | | | | | | | | | | | | | | | | | | | | | | |
| Inflammation, Suppurative | 1 | | | 1 | | | | | | | | | | | | | | | | | 1 | |
| Inflammation, Chronic Active | 1 | 1 | 1 | 1 | | | 1 | 4 | 1 | | | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 2 |
| Thrombosis | | | | | | | | | 2 | | | | | | | | 1 | | | | | 1 |
| Olfactory Epithelium, Atrophy | 1 | 1 | | 1 | | 1 | 1 | 1 | | | | 1 | 1 | | 1 | | 1 | | 1 | | 1 | 1 |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | | | 1 | | | | 1 | | | | | |
| Olfactory Epithelium, Hyperplasia, Basal Cell | | | | | | | | | | | | | | | | | | | | | | |
| Olfactory Epithelium, Metaplasia, Respiratory | | | 1 | | | 2 | | | 2 | | | 1 | 1 | | | | 1 | | 1 | | | 2 |
| Respiratory Epithelium, Hyperplasia | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Respiratory Epithelium, Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | |
| Respiratory Epithelium, Necrosis | | | | | | | | | 1 | | | | | | | | | | | | | |
| Turbinate, Atrophy | | | | 1 | | 1 | 1 | | 1 | | | 1 | | | | | | 1 | | 1 | | 1 |
| Turbinate, Hyperostosis | | | | | | | | | | | | | | | | 2 | | | 1 | | | |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
 + .. Tissue examined microscopically
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FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | | | * TOTALS | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-----|-----|
| | 0591 | 0590 | 0731 | 0734 | 0589 | 0654 | 0177 | 0773 | 0771 | 0563 | 0672 | 0773 | 0772 | 0772 | 0678 | 0772 | 0773 | 0590 | 0681 | 0773 | 0771 | 0675 | 0762 | | | | |
| ANIMAL ID | 00526 | 00527 | 00528 | 00529 | 00530 | 00531 | 00532 | 00533 | 00534 | 00535 | 00536 | 00537 | 00538 | 00539 | 00540 | 00541 | 00542 | 00543 | 00544 | 00545 | 00546 | 00547 | 00548 | 00549 | | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 49 | 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 | 49 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 48 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 | 1 | 1.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 4.0 |
| | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | | |
| | | | X | | | X | | | X | | | | X | X | | X | X | X | | | X | X | | | 22 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | 3 | | |
| | | | | | | | | | | | | | | | | | | | | | X | X | | | 2 | | |
| | | | | | | | | | | | | | | | | | | | | | | 1 | | | 6 | 2.0 | |
| | | | X | | X | X | | | | | | X | X | | | | | X | | | | | | | 12 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | 2 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.0 | |
| | | 2 | | | | | | | | | | | 2 | 3 | | | | 2 | | | | | | | 5 | 2.4 | |

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FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|--------|
| | 0591 | 0590 | 0731 | 0734 | 0738 | 0735 | 0736 | 0731 | 0737 | 0737 | 0735 | 0736 | 0737 | 0737 | 0737 | 0736 | 0737 | 0737 | 0735 | 0736 | | 0737 | 0737 | 0736 | 0737 |
| ANIMAL ID | 00526 | 00557 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | |
| Bile Duct, Cyst | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Mesentery | + | + | | | | | | | | | | | | | | | | | | | | | | | 8 |
| Fat, Necrosis | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | 8 1.0 |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Acinus, Atrophy | 1 | | | | 1 | 1 | | | | | | | | | | | | | | | | | | | 27 1.2 |
| Acinus, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Salivary Glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Atrophy | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Stomach, Forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Edema | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Erosion | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | 2 3.0 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | | 2 2.5 |
| Stomach, Glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Erosion | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Tongue | | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Tooth | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 2 2.5 |

* .. 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: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012
 Time Report Requested: 14:48:12
 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|
| | 0591 | 0590 | 0731 | 0734 | 0589 | 0654 | 0717 | 0773 | 0773 | 0565 | 0673 | 0773 | 0773 | 0773 | 0676 | 0773 | 0773 | 0590 | 0668 | 0773 | | 0773 | 0665 | 0773 |
| ANIMAL ID | 00526 | 00527 | 00528 | 00529 | 00530 | 00531 | 00532 | 00533 | 00534 | 00535 | 00536 | 00537 | 00538 | 00539 | 00540 | 00541 | 00542 | 00543 | 00544 | 00545 | 00546 | 00547 | 00548 | 00549 |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 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 |
| | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 |
| | 1 | 0 | 1 | 1 | 9 | 4 | 7 | 1 | 1 | 3 | 3 | 3 | 3 | 2 | 2 | 8 | 2 | 1 | 2 | 0 | 8 | 1 | 1 | 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 | 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 |
| | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 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 |

CARDIOVASCULAR SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|----|-----|-----|
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | |
| Cardiomyopathy | 1 | 1 | 1 | | | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | | 2 | 3 | 2 | 1 | 1 | | 2 | 1 | 42 | 1.4 | |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.5 | |
| Artery, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 3 | 1 | 3.0 |

ENDOCRINE SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|---|-----|-----|-----|
| Adrenal Cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | | |
| Accessory Adrenal Cortical Nodule | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3 | 1.0 | | |
| Atrophy | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 4.0 | | |
| Degeneration | | | | | | | | | | | | | | | | | | | | | | | | | | 2 | 3 | 2.3 | |
| Hyperplasia | | | 1 | 3 | | | | | | 1 | 1 | 2 | 1 | 1 | | 2 | 2 | 2 | 1 | | 1 | | | | | | 28 | 1.5 | |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 | |
| Adrenal Medulla | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | | |
| Hyperplasia | | | 2 | | 1 | 2 | 4 | | 1 | 1 | 1 | 1 | | | | 4 | 4 | 3 | 4 | 2 | | 1 | 4 | 2 | 1 | | 27 | 2.3 | |
| Islets, Pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | | | | |
| Parathyroid Gland | + | + | + | + | M | M | + | + | + | + | M | + | + | + | + | + | + | M | + | + | M | + | + | 38 | | | | | |
| Pituitary Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | | | | | |
| Angiectasis | | | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 | |
| Pars Distalis, Hyperplasia | | | 1 | | 1 | 2 | | | | | | 1 | 3 | 4 | | | | 3 | | 1 | | | | | | | 18 | 1.9 | |
| Thyroid Gland | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | | | | | |
| C-cell, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | | | | 8 | 1.6 |

* .. 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:
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FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|----|-----|
| | 0591 | 0590 | 0731 | 0734 | 0589 | 0654 | 0177 | 0773 | 0771 | 0563 | 0675 | 0772 | 0773 | 0772 | 0678 | 0772 | 0773 | 0590 | 0681 | 0773 | | 0771 | 0665 | 0773 | | |
| ANIMAL ID | 00526 | 00527 | 00528 | 00529 | 00530 | 00531 | 00532 | 00533 | 00534 | 00535 | 00536 | 00537 | 00538 | 00539 | 00540 | 00541 | 00542 | 00543 | 00544 | 00545 | 00546 | 00547 | 00548 | 00549 | | |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | |
| | 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 | |
| | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 14 | 1.6 |
| | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 3 | 1.0 |
| | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |

RESPIRATORY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|-----|-----|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Foreign Body | | | | | X | | | | X | | X | | | | | | | | | | | | | | 6 | | |
| Inflammation | | | | | 2 | | | | 1 | | 2 | 1 | 2 | | | | | | | | | | | 1 | 14 | 1.6 | |
| Metaplasia, Squamous | | | | | 1 | | | | | | 1 | | | | | | | | | | | | | | 3 | 1.0 | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Inflammation, Chronic Active | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 50 | 2.9 | |
| Alveolar Epithelium, Hyperplasia | 2 | 1 | 4 | 2 | 2 | 3 | 1 | 4 | 4 | 1 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 4 | 4 | 3 | 4 | 3 | 3 | 2 | 4 | 50 | 2.7 |
| Alveolar Epithelium, Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 | |
| Alveolus, Proteinosis | 1 | 2 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 2 | 50 | 2.7 |
| Bronchiole, Epithelium, Hyperplasia | | 1 | 3 | 1 | | 3 | | 3 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 1 | 3 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 2 | 46 | 2.1 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | | |
| Inflammation | | | | | | | | | | | 1 | | | | | | | | | | | | | | 1 | 1.0 | |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | 1 | | | | | 4 | 1.0 | |
| Inflammation, Chronic Active | 1 | | 1 | | 1 | | | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 39 | 1.1 | |
| Thrombosis | | 1 | | | 4 | | | | | | | | | | 1 | | | | | | | | | 1 | 6 | 1.7 | |
| Olfactory Epithelium, Atrophy | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | | 1 | 1 | | 1 | 1 | | | 1 | | 1 | 1 | 34 | 1.0 | |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | 1 | | | 3 | 1.0 | |
| Olfactory Epithelium, Hyperplasia, Basal Cell | | | | | 1 | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| Olfactory Epithelium, Metaplasia, Respiratory | | 1 | 1 | | | 1 | 1 | 1 | | | 1 | | | 1 | | 1 | 1 | 1 | 1 | | 2 | | 1 | 1 | 24 | 1.2 | |
| Respiratory Epithelium, Hyperplasia | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 48 | 1.0 | |
| Respiratory Epithelium, Metaplasia, Squamous | | | | | | | | | | | | | | 1 | | | | | | | 1 | | | 1 | 3 | 1.0 | |
| Respiratory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| Turbinate, Atrophy | 1 | | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | | 1 | | | 1 | 1 | 1 | | 1 | 1 | | 1 | 1 | 27 | 1.0 | |
| Turbinate, Hyperostosis | | | | | | | | | | | | 1 | | | | 4 | | | | | | | 1 | | 5 | 1.8 | |

* .. 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

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Experiment Number: 60311 - 05
 Test Type: CHRONIC
 Route: RESPIRATORY EXPOSURE WHOLE BODY
 Species/Strain: RATS/F344/N Tac

P09: NON-NEOPLASTIC LESIONS BY INDIVIDUAL ANIMAL
 Cobalt
 CAS Number: 7440-48-4

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 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
2.5 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|------|-----|
| | 0591 | 0590 | 0731 | 0734 | 0589 | 0654 | 0177 | 0773 | 0771 | 0593 | 0665 | 0772 | 0773 | 0773 | 0773 | 0672 | 0773 | 0590 | 0668 | 0771 | | 0771 | 0665 | 0773 | 0672 | 0590 | |
| ANIMAL ID | 00526 | 00557 | 00558 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | 00555 | | |
| Trachea | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| SPECIAL SENSES SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eye | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 49 | | |
| Cataract | 3 | | | | 3 | | | | | | | 1 | 2 | | | | 2 | | | | | | 4 | 11 | 2.2 | | |
| Metaplasia, Osseous | | 1 | 1 | | | | | 1 | 1 | | 1 | 1 | 1 | 1 | | 1 | | 1 | 1 | | | 1 | | 26 | 1.0 | | |
| Harderian Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 2.0 | |
| URINARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Kidney | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |
| Mineralization | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| Nephropathy | 1 | 1 | 3 | 2 | 1 | 3 | | 3 | 3 | 1 | 2 | 2 | 3 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 47 | 2.0 |
| Renal Tubule, Necrosis | | | | 3 | | | | | | | | | | | | | | | | | | | | | 1 | 3.0 | |
| Urinary Bladder | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |

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| FISCHER 344-TACONIC RATS
FEMALE
5.0 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) | |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------|----------------------|------------------|
| | 0
7
3
1 | 0
7
3
0 | 0
7
3
1 | 0
4
7
8 | 0
7
3
0 | 0
4
7
3 | 0
6
7
0 | 0
7
2
5 | 0
7
3
2 | 0
7
3
1 | 0
7
3
1 | 0
7
3
1 | 0
6
9
1 | 0
7
5
2 | 0
5
3
0 | 0
7
3
6 | 0
6
4
2 | 0
7
3
2 | 0
4
8
9 | 0
7
3
2 | | | 0
7
3
1 |
| Inflammation | | | 2 | | 2 | | 1 | | | | | 2 | 2 | | | | 1 | | 1 | | | | |
| Metaplasia, Squamous | | 1 | | | | | 1 | | | | | | 1 | | | | 1 | | | | | | |
| Respiratory Epithelium, Hyperplasia | | 1 | | | | | | | | | | | | | | | | | | | | | |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | |
| Inflammation, Suppurative | | | | | | | 3 | | | | | | | | | | | | | | | | |
| Inflammation, Chronic Active | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | |
| Pigmentation | | | | | | | | | | | | | | | | | | | | | | | |
| Alveolar Epithelium, Hyperplasia | 4 | 4 | 4 | 4 | | 1 | 3 | 3 | 3 | 4 | 3 | 4 | 4 | 4 | 2 | 1 | 4 | 2 | 4 | 3 | 4 | 4 | 3 |
| Alveolus, Proteinosis | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 |
| Bronchiole, Epithelium, Hyperplasia | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Inflammation, Suppurative | 2 | 2 | 3 | | 3 | | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 2 | 2 | 1 | 2 | 2 | 2 |
| Inflammation, Chronic Active | 2 | 2 | 2 | 1 | 3 | 1 | 1 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 2 | 2 | 2 | 3 | 2 | 2 | 3 |
| Thrombosis | | | | | | | 1 | | | | | | | | | | | | | | | | |
| Olfactory Epithelium, Atrophy | | 2 | | 1 | | 1 | | | | 1 | 2 | 2 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | 1 | 1 | | | | | 1 | | | | 1 | | |
| Olfactory Epithelium, Hyperplasia, Basal Cell | | | 1 | | 1 | | 1 | 1 | | | | 1 | | | | | 1 | | 1 | | | | |
| Olfactory Epithelium, Metaplasia, Respiratory | 2 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | | | 2 | 3 | 2 | 3 | 2 | | 1 | 2 |
| Olfactory Epithelium, Necrosis | | | | | | | | 3 | | | | | | | | | | | | | | | |
| Respiratory Epithelium, Hyperplasia | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Respiratory Epithelium, Metaplasia, Squamous | 3 | 2 | 3 | 1 | | 2 | 1 | 2 | 1 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 1 | 2 |
| Respiratory Epithelium, Necrosis | 1 | | 3 | | 1 | | | 3 | | | 1 | 1 | | 1 | | | | | 2 | | 1 | 1 | |
| Turbinate, Atrophy | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 |
| Turbinate, Hyperostosis | | | | | | | | | | | | | | | | | | | | | | | |

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5.0 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | ANIMAL ID | females
(cont...) | | | |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | 0
7
3
1 | 0
7
3
0 | 0
7
3
1 | 0
4
7
8 | 0
7
3
0 | 0
4
7
3 | 0
6
7
0 | 0
7
2
5 | 0
7
3
2 | 0
7
3
1 | 0
7
3
1 | 0
7
3
1 | 0
6
9
1 | 0
7
1
2 | 0
5
3
0 | 0
5
0
6 | 0
7
3
2 | 0
6
4
6 | 0
7
3
2 | 0
4
8
9 | | | 0
7
3
2 | 0
7
3
1 | 0
7
3
1 |
| | 0
0
7
0
1 | 0
0
7
0
2 | 0
0
7
0
3 | 0
0
7
0
4 | 0
0
7
0
5 | 0
0
7
0
6 | 0
0
7
0
7 | 0
0
7
0
8 | 0
0
7
0
9 | 0
0
7
1
0 | 0
0
7
1
1 | 0
0
7
1
2 | 0
0
7
1
3 | 0
0
7
1
4 | 0
0
7
1
5 | 0
0
7
1
6 | 0
0
7
1
7 | 0
0
7
1
8 | 0
0
7
1
9 | 0
0
7
2
0 | 0
0
7
2
1 | 0
0
7
2
2 | 0
0
7
2
3 | 0
0
7
2
4 | 0
0
7
2
5 |

Trachea +

SPECIAL SENSES SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Ear
Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Eye | + | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cataract | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Metaplasia, Osseous | 1 | 1 | | | | | | | | | | | | | | | | | | | | | | | | |
| Harderian Gland
Inflammation, Chronic Active | + | | | | | | | | | | | | | | | | | | | | | | | | | |

URINARY SYSTEM

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|--|--|--|
| Kidney
Cyst | + | | | | | | | | | | | | | | | | | | | | | | | | | |
| Infarct | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nephropathy | 3 | 3 | 1 | 1 | 3 | 1 | 1 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 1 | 1 | 3 | 3 | 2 | | | | | | |
| Urinary Bladder | + | | | | | | | | | | | | | | | | | | | | | | | | | |

* .. 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
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Experiment Number: 60311 - 05
 Test Type: CHRONIC
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 Species/Strain: RATS/F344/N Tac

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 Cobalt
 CAS Number: 7440-48-4

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 First Dose M/F: 05/08/06 / 05/08/06
 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
5.0 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | | |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------|------|------|--------|
| | 0674 | 0673 | 0641 | 0673 | 0673 | 0659 | 0673 | 0663 | 0666 | 0666 | 0674 | 0657 | 0673 | 0667 | 0673 | 0667 | 0657 | 0676 | 0677 | 0677 | | 0677 | 0667 | 0673 |
| ANIMAL ID | 0076 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | 0077 | |
| Pancreas | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Acinus, Atrophy | | 2 | | 1 | | 1 | 2 | | 1 | | 1 | | | 2 | 1 | 1 | 2 | 1 | | 1 | 2 | 1 | 1 | 32 1.2 |
| Salivary Glands | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Stomach, Forestomach | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Edema | | | | | | | | | | | 2 | | | | | | | | | | | | | 1 2.0 |
| Hyperplasia, Squamous | | | | | | | | | | | | | | 2 | | | | | | | | | | 3 2.7 |
| Ulcer | | | | | | | | | | | | | | | | 4 | | | | | | | | 2 3.5 |
| Stomach, Glandular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 1.0 |
| Necrosis | | 1 | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Tooth | | | | | | | | | + | | | | | | | | | | | | | + | | 2 |
| Inflammation, Chronic Active | | | | | | | | | 2 | | | | | | | | | | | | | | 3 | 2 2.5 |
| CARDIOVASCULAR SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | |
| Heart | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Cardiomyopathy | | | 1 | 2 | 1 | | 1 | 2 | 1 | 1 | 2 | | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 3 | 1 | 1 | 1 | 35 1.3 |
| Pericardium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| ENDOCRINE SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | |
| Adrenal Cortex | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Accessory Adrenal Cortical Nodule | | | | | | | | | | | | | | 1 | | | | | | | | | | 4 1.0 |
| Degeneration | | | | | | | | | | | | | | | | | | | 3 | 3 | | | | 3 2.7 |
| Hyperplasia | 4 | | 1 | 3 | 3 | | 1 | 2 | | | | 3 | 4 | 2 | 1 | | 3 | | | | 1 | 3 | 1 | 28 1.9 |

* .. Total animals with tissue examined microscopically; Total animals with lesion and mean severity grade
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 I .. Insufficient tissue
 M .. Missing tissue
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 BLANK .. Not examined microscopically
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 Cobalt
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 Lab: BNW

| FISCHER 344-TACONIC RATS
FEMALE
5.0 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | | | * TOTALS | | | | |
|---|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------|----|----|-----|-----|
| | ANIMAL ID | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | 0 | 0 | | |
| Necrosis | | 2 | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.0 | |
| Adrenal Medulla
Hyperplasia | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | 10 | 2.8 |
| Islets, Pancreatic
Hyperplasia | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | 1 | 3.0 |
| Parathyroid Gland | | | M | + | + | + | + | + | + | M | + | + | + | + | + | M | + | + | + | + | + | + | + | 45 | | | |
| Pituitary Gland
Angiectasis
Cyst
Pars Distalis, Hyperplasia | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | 2 | 3.5 | |
| Thyroid Gland
Hemorrhage
C-cell, Hyperplasia | | | 3 | | 2 | | 2 | 1 | | | | | 1 | | 3 | 1 | 1 | | | | | 4 | | 50 | 19 | 1.9 | |
| | | | | | | | | | | | | | | | | | | | | | | | | | 1 | 1.0 | |
| | | | | | | | | 1 | 2 | | | | | | | | | | | | | 4 | | | 6 | 1.7 | |
| GENERAL BODY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NONE | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GENITAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Clitoral Gland
Cyst
Inflammation, Suppurative
Inflammation, Chronic Active | | | + | + | + | + | + | M | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | 46 | 1 | 2.0 |
| | | | 2 | | | | | | | | | | | | | | | | | | | | | | | 2 | 2.5 |
| Ovary | | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | | |

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 + .. Tissue examined microscopically
 X .. Lesion present
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 M .. Missing tissue
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 BLANK .. Not examined microscopically
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FEMALE
5.0 mg/m3 | DAY ON TEST | | | | | | | | | | | | | | | | | | | | * TOTALS | | |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|
| | 0674 | 0673 | 0641 | 0673 | 0673 | 0659 | 0673 | 0663 | 0663 | 0674 | 0657 | 0673 | 0667 | 0673 | 0657 | 0676 | 0677 | 0677 | 0677 | 0677 | | 0667 | 0677 |
| ANIMAL ID | 00726 | 00772 | 00777 | 00777 | 00777 | 00773 | 00773 | 00733 | 00733 | 00733 | 00733 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | |
| Cyst | | | | | | | | X | | | | X | | | | | | | | | X | | 5 |
| Uterus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Endometrium, Hyperplasia, Cystic | | | | | | | | 1 | | | | 1 | | | | | | | | | 1 | | 4 1.5 |
| HEMATOPOIETIC SYSTEM | | | | | | | | | | | | | | | | | | | | | | | |
| Bone Marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Lymph Node | | | | | | | | | | + | | | + | | | | | | | | | | 5 |
| Iliac, Ectasia | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 |
| Inguinal, Fibrosis | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Lymph Node, Bronchial | M | + | + | + | + | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | 17 |
| Lymph Node, Mandibular | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | 47 |
| Lymph Node, Mediastinal | + | + | + | + | + | + | + | + | + | M | + | + | + | M | + | + | + | + | + | + | + | + | 48 |
| Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | 1 1.0 |
| Infiltration Cellular, Histiocyte | | | | | | | | | | | | | | 2 | | | | | | | | | 1 2.0 |
| Lymph Node, Mesenteric | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrosis | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 |
| Spleen | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Fibrosis | | | | | | | 2 | | | | | | | | | | | | | 3 | | | 3 2.3 |
| Hematopoietic Cell Proliferation | | | | | | | | | | | | | | | | | | | | | | | 2 1.5 |
| Necrosis | | 1 | | | | | | | | | | | | | | | | | | | | | 2 1.0 |

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|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|--------|--|
| | 0674 | 0673 | 0641 | 0673 | 0673 | 0659 | 0673 | 0663 | 0666 | 0666 | 0674 | 0657 | 0673 | 0667 | 0667 | 0657 | 0676 | 0667 | 0677 | 0677 | | 0677 | 0667 | 0676 | 0677 | |
| ANIMAL ID | 00726 | 00772 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | | |
| Thymus | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | 47 | |
| INTEGUMENTARY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mammary Gland | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Galactoceles | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 | |
| Hyperplasia | | | | | | | | | | 2 | | | | | | | | | | | | | | | 5 1.8 | |
| Skin | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Hyperplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | | 2 2.5 | |
| Ulcer | | | | | | | | | | | | | | | | | | | | | | | | | 1 3.0 | |
| MUSCULOSKELETAL SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Femur, Hyperostosis | | | | | | | | | | 2 | | | | | | | | | | | | | | | 2 1.5 | |
| Maxilla, Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | | 1 2.0 | |
| Skeletal Muscle | + | | | | | | | | | | | | | | | | | | | | | | | | 1 | |
| NERVOUS SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brain | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Compression | | | 1 | | | | | | | 2 | | | 2 | 1 | | | 2 | | | | 3 | 2 | | | 17 2.0 | |
| Hemorrhage | | | | | | | | | | | 2 | | | | | | | | | | | | | | 3 1.7 | |
| RESPIRATORY SYSTEM | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 | |
| Foreign Body | | | | | | | | | | | | | | | | | | | | | | | | | 2 | |

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| | 0674 | 0673 | 0641 | 0673 | 0673 | 0659 | 0673 | 0663 | 0666 | 0671 | 0675 | 0677 | 0666 | 0677 | 0677 | 0657 | 0676 | 0677 | 0677 | 0677 | | 0667 | 0676 | 0677 |
| ANIMAL ID | 00726 | 00772 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | |
| Inflammation | | | | | | | | | | | | | | | | | | | | | | | | 13 |
| Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| Respiratory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Lung | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Hemorrhage | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | 50 |
| Necrosis | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Pigmentation | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Alveolar Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 49 |
| Alveolus, Proteinosis | | | | | | | | | | | | | | | | | | | | | | | | 50 |
| Bronchiole, Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 48 |
| Nose | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Inflammation, Suppurative | | | | | | | | | | | | | | | | | | | | | | | | 42 |
| Inflammation, Chronic Active | | | | | | | | | | | | | | | | | | | | | | | | 50 |
| Thrombosis | | | | | | | | | | | | | | | | | | | | | | | | 3 |
| Olfactory Epithelium, Atrophy | | | | | | | | | | | | | | | | | | | | | | | | 35 |
| Olfactory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| Olfactory Epithelium, Hyperplasia, Basal Cell | | | | | | | | | | | | | | | | | | | | | | | | 19 |
| Olfactory Epithelium, Metaplasia, Respiratory | | | | | | | | | | | | | | | | | | | | | | | | 47 |
| Olfactory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | 1 |
| Respiratory Epithelium, Hyperplasia | | | | | | | | | | | | | | | | | | | | | | | | 49 |
| Respiratory Epithelium, Metaplasia, Squamous | | | | | | | | | | | | | | | | | | | | | | | | 45 |
| Respiratory Epithelium, Necrosis | | | | | | | | | | | | | | | | | | | | | | | | 15 |
| Turbinate, Atrophy | | | | | | | | | | | | | | | | | | | | | | | | 45 |
| Turbinate, Hyperostosis | | | | | | | | | | | | | | | | | | | | | | | | 2 |

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