

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

**P04: NEOPLASMS BY INDIVIDUAL ANIMAL**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 01/18/2012  
**Time Report Requested:** 14:48:11  
**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																								* TOTALS	
	0730	0722	0722	0722	0722	0713	0708	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706	0706		
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	
Mesothelioma Malignant									X							X										2
Bilateral, Interstitial Cell, Adenoma	X		X	X	X				X	X		X				X	X	X			X		X			23
Interstitial Cell, Adenoma		X				X	X	X				X									X		X			12
<b>HEMATOPOIETIC SYSTEM</b>																										
Bone Marrow	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
Leukemia Mononuclear																							X			1
Lymph Node		+							+												+			+	+	12
Axillary, Deep Cervical, Renal, Leukemia Mononuclear																										1
Lumbar, Renal, Leukemia Mononuclear																										1
Pancreatic, Renal, Leukemia Mononuclear									X																	3
Renal, Leukemia Mononuclear		X																			X					3
Lymph Node, Bronchial	M	+	M	M	+	+	+	+	M	M	+	+	+	+	+	+	+	+	+	+	M	M	+	M	+	27
Leukemia Mononuclear						X		X													X					7
Lymph Node, Mandibular	M	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	48
Leukemia Mononuclear		X						X			X									X						9
Lymph Node, Mediastinal	+	+	+	+	M	+	+	+	+	+	+	+	+	+	+	M	+	+	+	+	+	+	+	+	+	46
Leukemia Mononuclear								X			X									X						8
Lymph Node, Mesenteric	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	M	+	+	49
Leukemia Mononuclear						X		X			X									X						7
Spleen	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
Leukemia Mononuclear		X		X		X	X	X	X	X	X									X		X	X			21

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
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FISCHER 344-TACONIC RATS MALE 1.25 mg/m3	DAY ON TEST																				males (cont...)					
	0 4 0	0 3 0	0 2 0	0 2 0	0 0 0	0 8 0	0 2 0	0 7 5	0 7 9	0 7 9	0 6 4	0 7 0	0 7 9	0 6 3	0 6 9	0 5 3	0 7 4	0 6 7	0 6 6	0 6 3		0 5 7	0 6 4	0 6 8	0 7 2	0 6 9
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 0 0	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 0 0	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	
Stomach, Glandular	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Tooth																										+
<b>CARDIOVASCULAR SYSTEM</b>																										
Blood Vessel																										+
Heart	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Alveolar/Bronchiolar Carcinoma, Metastatic, Lung																										
Leukemia Mononuclear	X					X	X					X														
Schwannoma Malignant																										
<b>ENDOCRINE SYSTEM</b>																										
Adrenal Cortex	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Leukemia Mononuclear	X	X				X	X					X	X							X						
Adrenal Medulla	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Leukemia Mononuclear	X	X				X	X					X	X							X						
Pheochromocytoma Benign			X									X	X							X	X					
Pheochromocytoma Malignant												X														
Bilateral, Pheochromocytoma Benign							X	X		X	X			X	X								X			
Islets, Pancreatic	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Adenoma																										X
Carcinoma								X																		
Parathyroid Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	M	+	+	+	+	+	+	+	+	+	+	M

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FISCHER 344-TACONIC RATS MALE	DAY ON TEST																									males (cont...)
	0540	0730	0772	0622	0708	0678	0772	0672	0772	0772	0672	0772	0672	0772	0672	0573	0776	0676	0676	0676	0577	0678	0678	0779		
1.25 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		
ANIMAL ID	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	

Pituitary Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Leukemia Mononuclear							X				X								X	X				
Pars Distalis, Adenoma			X	X		X	X	X	X				X	X	X	X		X			X	X	X	
Pars Intermedia, Adenoma								X																
Thyroid Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
C-cell, Adenoma							X	X															X	
C-cell, Carcinoma										X														
Follicular Cell, Carcinoma																								

**GENERAL BODY SYSTEM**

NONE

**GENITAL SYSTEM**

Epididymis	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Mesothelioma Malignant																			X		X			
Penis																								
Preputial Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Adenoma													X											
Prostate	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Leukemia Mononuclear																								
Seminal Vesicle	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Leukemia Mononuclear																								
Testes	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

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

Thymus + + + + + + + + + M + + + + + + + + + + + + + + +  
 Leukemia Mononuclear X

**INTEGUMENTARY SYSTEM**

Mammary Gland + + + + M M + + M M M + + + + + + + M + + + + M  
 Fibroadenoma  
 Skin + + + + + + + + + + + + + + + + + + + X + + + + +  
 Keratoacanthoma X  
 Squamous Cell Papilloma X  
 Lip, Squamous Cell Papilloma  
 Pinna, Neural Crest Tumor X  
 Subcutaneous Tissue, Fibroma X  
 Subcutaneous Tissue, Lipoma

**MUSCULOSKELETAL SYSTEM**

Bone +

**NERVOUS SYSTEM**

Brain +  
 Carcinoma, Metastatic, Zymbal'S Gland  
 Leukemia Mononuclear X  
 Oligodendroglioma Malignant

**RESPIRATORY SYSTEM**

Larynx +

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FISCHER 344-TACONIC RATS MALE 1.25 mg/m3	DAY ON TEST																				ANIMAL ID	males (cont...)	
	0540	0730	0772	0622	0708	0663	0778	0675	0779	0779	0664	0770	0779	0669	0664	0573	0767	0666	0666	0663			0577
Lung	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Alveolar/Bronchiolar Adenoma							X							X	X							X	
Alveolar/Bronchiolar Adenoma, Multiple											X												X
Alveolar/Bronchiolar Carcinoma					X									X									
Alveolar/Bronchiolar Carcinoma, Multiple		X																					
Carcinoma, Metastatic, Zymbal'S Gland					X																		
Cystic Keratinizing Epithelioma					X																		
Leukemia Mononuclear	X	X			X	X			X	X	X	X	X				X		X	X	X		
Mediastinum, Alveolar/Bronchiolar Carcinoma, Metastatic, Lung																							
Nose	+	+	+	+	+	+	I	+	+	+	A	+	+	+	+	+	+	+	+	+	+	+	
Leukemia Mononuclear	X				X																		
Trachea	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
<b>SPECIAL SENSES SYSTEM</b>																							
Ear																							+
Eye	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Harderian Gland	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Zymbal's Gland Carcinoma					+									+									X
<b>URINARY SYSTEM</b>																							
Kidney	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Leukemia Mononuclear													X										

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FISCHER 344-TACONIC RATS MALE	DAY ON TEST																								ANIMAL ID	males (cont...)
	0540	0730	0722	0624	0708	0673	0727	0662	0775	0722	0722	0683	0722	0722	0694	0663	0573	0764	0667	0667	0663	0577	0668	0674		
1.25 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	
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	

Renal Tubule, Adenoma

Urinary Bladder

+ +

**SYSTEMIC LESIONS**

Multiple Organ

Leukemia Mononuclear

Mesothelioma Malignant

+  
 X  
 X

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| FISCHER 344-TACONIC RATS MALE<br>1.25 mg/m3 | DAY ON TEST |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | * TOTALS |  |  |
|---|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|--|--|
|   | 0729        | 0729   | 0729   | 0730   | 0730   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   | 0731   |          |  |  |
| ANIMAL ID                                   | 002266      | 002267 | 002268 | 002269 | 002270 | 002271 | 002272 | 002273 | 002274 | 002275 | 002276 | 002277 | 002278 | 002279 | 002280 | 002281 | 002282 | 002283 | 002284 | 002285 | 002286 | 002287 | 002288 | 002289 | 002290   |  |  |
| Pituitary Gland                             | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50       |  |  |
| Leukemia Mononuclear                        |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 4        |  |  |
| Pars Distalis, Adenoma                      |             |        | X      | X      |        | X      | X      | X      |        | X      | X      |        | X      | X      | X      | X      | X      | X      | X      |        | X      | X      |        |        | 32       |  |  |
| Pars Intermedia, Adenoma                    |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 1        |  |  |
| Thyroid Gland                               | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50       |  |  |
| C-cell, Adenoma                             |             | X      | X      | X      |        |        |        |        |        |        |        | X      |        |        |        |        | X      |        |        |        |        |        |        |        | 8        |  |  |
| C-cell, Carcinoma                           | X           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 2        |  |  |
| Follicular Cell, Carcinoma                  |             |        |        |        |        |        |        |        |        | X      |        |        |        |        |        |        |        |        |        |        | X      |        |        |        | 2        |  |  |
| <b>GENERAL BODY SYSTEM</b>                  |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |  |  |
| NONE  |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |  |  |
| <b>GENITAL SYSTEM</b>                       |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |  |  |
| Epididymis                                  | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50       |  |  |
| Mesothelioma Malignant                      |             |        |        |        |        |        |        |        |        |        |        |        | X      |        |        |        |        |        |        |        |        |        |        |        | 3        |  |  |
| Penis                                       |             |        |        |        |        |        |        |        |        |        |        |        | +      |        |        |        |        |        |        |        |        |        |        |        | 1        |  |  |
| Preputial Gland                             | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50       |  |  |
| Adenoma                                     |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 1        |  |  |
| Prostate                                    | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50       |  |  |
| Leukemia Mononuclear                        |             | X      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 1        |  |  |
| Seminal Vesicle                             | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50       |  |  |
| Leukemia Mononuclear                        |             | X      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 1        |  |  |
| Testes                                      | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50       |  |  |

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| FISCHER 344-TACONIC RATS MALE<br>1.25 mg/m3 | DAY ON TEST |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | * TOTALS |
|---|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|
|   | 0729        | 0729   | 0729   | 0730   | 0730   | 0731   | 0731   | 0732   | 0732   | 0733   | 0733   | 0734   | 0734   | 0735   | 0735   | 0736   | 0736   | 0737   | 0737   | 0738   | 0738   | 0739   | 0739   | 0740   | 0740   |          |
| 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   |
|   | 6           | 7      | 8      | 9      | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 0      |          |

|                                       |   |   |   |   |   |   |  |   |   |  |  |   |   |   |   |  |  |   |   |  |   |   |   |  |  |  |    |
|---------------------------------------|---|---|---|---|---|---|--|---|---|--|--|---|---|---|---|--|--|---|---|--|---|---|---|--|--|--|----|
| Mesothelioma Malignant                |   |   |   |   |   |   |  |   |   |  |  |   | X |   |   |  |  |   |   |  |   |   |   |  |  |  | 3  |
| Bilateral, Interstitial Cell, Adenoma |   | X | X |   | X | X |  |   |   |  |  | X | X | X | X |  |  | X |   |  | X |   |   |  |  |  | 21 |
| Interstitial Cell, Adenoma            | X |   |   | X |   |   |  | X | X |  |  |   |   |   | X |  |  |   | X |  |   | X | X |  |  |  | 18 |

### HEMATOPOIETIC SYSTEM

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |    |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|----|
| Bone Marrow                             | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | +  | 50 |
| Leukemia Mononuclear                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X  | 2  |
| Lymph Node                              |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 9  |
| Lumbar, Leukemia Mononuclear            |   |   |   |   | + | + |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | +  | 1  |
| Pancreatic, Leukemia Mononuclear        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 2  |
| Pancreatic, Renal, Leukemia Mononuclear |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |    | 1  |
| Renal, Leukemia Mononuclear             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 1  |
| Lymph Node, Bronchial                   | + | M | + | M | M | + | M | + | + | + | M | M | M | + | + | M | M | + | M | + | M | + | + | + | + | +  | 25 |
| Leukemia Mononuclear                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X  | 3  |
| Lymph Node, Mandibular                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | +  | 49 |
| Carcinoma, Metastatic, Zymbal'S Gland   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    | 1  |
| Leukemia Mononuclear                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X | X  | 7  |
| Lymph Node, Mediastinal                 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | +  | 48 |
| Leukemia Mononuclear                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   | X  | 6  |
| Lymph Node, Mesenteric                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | +  | 50 |
| Leukemia Mononuclear                    |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X | 4  |    |
| Spleen                                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | +  | 50 |
| Leukemia Mononuclear                    | X | X |   | X |   |   |   | X |   |   |   |   | X |   |   |   |   |   | X |   | X |   | X |   | X | 25 |    |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         | * TOTALS |
|-------------------------------|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
|                               | 07          | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      | 07      |          |
| 1.25 mg/m3                    | 29          | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      | 29      |          |
| ANIMAL ID                     | 0022226     | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 |          |

|                                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |
|--------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|
| Thymus<br>Leukemia Mononuclear | + | + | + | + | M | + | + | M | + | + | M | + | + | + | + | + | + | + | M | + | + | + | + | M | + | 44<br>2 |
|--------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|

**INTEGUMENTARY SYSTEM**

|                               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |
|-------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|
| Mammary Gland<br>Fibroadenoma | + | M | M | + | M | + | + | + | + | M | + | + | + | + | M | + | M | M | M | M | + | + | M | + | 32<br>1 |
| Skin                          | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50      |
| Keratoacanthoma               | X |   |   |   | X |   |   |   | X |   |   |   |   |   |   |   |   |   |   | X |   |   |   |   | 6       |
| Squamous Cell Papilloma       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1       |
| Lip, Squamous Cell Papilloma  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1       |
| Pinna, Neural Crest Tumor     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1       |
| Subcutaneous Tissue, Fibroma  |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 3       |
| Subcutaneous Tissue, Lipoma   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   | 1       |

**MUSCULOSKELETAL SYSTEM**

|      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| Bone | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|

**NERVOUS SYSTEM**

|                                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|---------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| Brain                                 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Carcinoma, Metastatic, Zymbal'S Gland |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1  |
| Leukemia Mononuclear                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1  |
| Oligodendroglioma Malignant           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 2  |

**RESPIRATORY SYSTEM**

|        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE<br>1.25 mg/m3                   | DAY ON TEST |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | * TOTALS |
|---|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|
|   | 0729        | 0729   | 0729   | 0730   | 0730   | 0731   | 0731   | 0732   | 0732   | 0733   | 0733   | 0734   | 0734   | 0735   | 0735   | 0736   | 0736   | 0737   | 0737   | 0738   | 0738   | 0739   | 0739   |        |          |
| ANIMAL ID   | 002226      | 002227 | 002228 | 002229 | 002230 | 002231 | 002232 | 002233 | 002234 | 002235 | 002236 | 002237 | 002238 | 002239 | 002240 | 002241 | 002242 | 002243 | 002244 | 002245 | 002246 | 002247 | 002248 | 002249 |          |
| Lung  | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50     |          |
| Alveolar/Bronchiolar Adenoma                                  |             |        |        |        |        |        |        |        |        |        | X      |        |        |        |        |        |        | X      | X      |        |        |        |        | 7      |          |
| Alveolar/Bronchiolar Adenoma, Multiple                        |             |        |        | X      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 3      |          |
| Alveolar/Bronchiolar Carcinoma                                |             |        | X      |        | X      | X      |        |        | X      | X      |        |        | X      | X      |        |        |        |        |        |        |        | X      |        | 10     |          |
| Alveolar/Bronchiolar Carcinoma, Multiple                      | X           |        |        |        |        |        |        | X      |        |        |        |        |        | X      |        |        |        |        |        | X      | X      |        |        | 6      |          |
| Carcinoma, Metastatic, Zymbal'S Gland                         |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 1      |          |
| Cystic Keratinizing Epithelioma                               | X           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 1      |          |
| Leukemia Mononuclear  |             | X      |        | X      |        |        |        |        |        |        |        |        |        |        |        |        | X      | X      |        |        |        |        | X      | 18     |          |
| Mediastinum, Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |        |        |        |        |        |        |        |        |        |        |        |        | X      |        |        |        |        |        |        | X      |        |        | 2      |          |
| Nose  | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 47     |          |
| Leukemia Mononuclear  |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | X      | 3      |          |
| Trachea   | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50     |          |
| <b>SPECIAL SENSES SYSTEM</b>                                  |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |
| Ear   |             |        |        |        | +      |        |        |        |        |        |        | +      |        |        |        |        |        |        | +      |        |        |        | +      | 5      |          |
| Eye   | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50     |          |
| Harderian Gland   | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50     |          |
| Zymbal's Gland Carcinoma                                      |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 3      |          |
|   |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | 3      |          |
| <b>URINARY SYSTEM</b>   |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |
| Kidney  | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | 50     |          |
| Leukemia Mononuclear  |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | X      | 2      |          |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. 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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |            |       | males<br>(cont...) |
|-------------------------------|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------|--------------------|
|                               | 07030       | 06911      | 06628      | 05516      | 05542      | 06630      | 07717      | 07717      | 06666      | 06666      | 07717      | 07717      | 07722      | 07722      | 07722      | 07722      | 05577      | 06688      | 07711      | 06699      | 06699      | 07722      | 07722      | 04477      | 07722 |                    |
| 5.0 mg/m3                     | 00060       | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066      | 00066 |                    |
| ANIMAL ID                     | 1234567890  | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 | 1234567890 |       |                    |

Leukemia Mononuclear

X

Salivary Glands

+ +

Stomach, Forestomach

+ +

Stomach, Glandular

+ +

**CARDIOVASCULAR SYSTEM**

Heart

+ +

Alveolar/Bronchiolar Carcinoma, Metastatic  
 Alveolar/Bronchiolar Carcinoma, Metastatic,  
 Lung

X

Leukemia Mononuclear  
 Pheochromocytoma Malignant, Metastatic,  
 Adrenal Medulla

X

X

X

Schwannoma Malignant

**ENDOCRINE SYSTEM**

Adrenal Cortex

+ +

Leukemia Mononuclear

X

X

Mesothelioma Malignant

X

Adrenal Medulla

+ +

Leukemia Mononuclear

X

X

Pheochromocytoma Benign

X

X

X

X

X

Pheochromocytoma Malignant

X

X

X

Bilateral, Pheochromocytoma Benign

X

X

X

X

X

X

X

X

X

X

X

Bilateral, Pheochromocytoma Malignant

X

X

X

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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





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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE | DAY ON TEST |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ANIMAL ID | males<br>(cont...) |
|-------------------------------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|--------------------|
|                               | 0730        | 0691 | 0628 | 0556 | 0554 | 0663 | 0777 | 0776 | 0666 | 0667 | 0777 | 0777 | 0777 | 0777 | 0777 | 0777 | 0552 | 0668 | 0771 | 0669 | 0661 | 0661 | 0772 | 0772 | 0470 |           |                    |
| 5.0 mg/m3                     | 0060        | 0066 | 0068 | 0066 | 0065 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060 | 0060      |                    |

|  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Leukemia Mononuclear                             | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Spleen   | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia Mononuclear                             |   |   | X | X | X | X |   | X | X |   | X |   |   |   |   | X |   |   |   | X |   |   |   | X |   |   |
| Thymus   | + | + | + | + | + | M | + | + | + | M | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Leukemia Mononuclear                             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**INTEGUMENTARY SYSTEM**

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mammary Gland                             | + | + | + | + | M | + | + | + | + | M | + | + | M | + | M | M | M | + | M | M | + | + | + | + | + | + |   |
| Fibroadenoma                              |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |
| Skin                                      | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Basal Cell Adenoma                        |   |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Keratoacanthoma                           | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Trichoepithelioma                         |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |
| Subcutaneous Tissue, Fibrous Histiocytoma |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**MUSCULOSKELETAL SYSTEM**

|  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bone   | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Skeletal Muscle                                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | + |   |   |   |   |   |   |   |   |   | + |   |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |
| Carcinoma, Metastatic, Kidney                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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









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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE<br>5.0 mg/m3              | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | * TOTALS |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
|   | 0689        | 0799  | 0799  | 0799  | 0678  | 0467  | 0662  | 0772  | 0772  | 0772  | 0772  | 0566  | 0666  | 0666  | 0477  | 0678  | 0772  | 0772  | 0666  | 0666  | 0756  | 0666  | 0566  | 0657  |          |
| ANIMAL ID   | 00626       | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 | 00662 |          |
| Leukemia Mononuclear                                    |             |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 2     |          |
| Salivary Glands   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Stomach, Forestomach                                    | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Stomach, Glandular                                      | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| <b>CARDIOVASCULAR SYSTEM</b>                            |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |
| Heart   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Alveolar/Bronchiolar Carcinoma, Metastatic              |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       | 2     |          |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung        |             |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       | 1     |          |
| Leukemia Mononuclear                                    |             |       |       |       | X     |       |       |       |       |       |       | X     | X     |       | X     |       |       |       |       |       |       | X     |       | 7     |          |
| Pheochromocytoma Malignant, Metastatic, Adrenal Medulla |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |          |
| Schwannoma Malignant                                    |             |       | X     |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       | 2     |          |
| <b>ENDOCRINE SYSTEM</b>                                 |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |
| Adrenal Cortex  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Leukemia Mononuclear                                    |             |       |       |       | X     |       |       |       |       |       |       | X     | X     |       | X     | X     |       |       |       |       |       | X     | X     | 9     |          |
| Mesothelioma Malignant                                  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |          |
| Adrenal Medulla   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Leukemia Mononuclear                                    |             |       |       |       | X     |       |       |       |       |       |       | X     | X     |       | X     | X     |       |       |       |       |       |       | X     | X     | 9        |
| Pheochromocytoma Benign                                 | X           | X     | X     |       |       |       |       |       | X     | X     |       |       |       |       | X     |       |       |       | X     |       |       |       | X     | 13    |          |
| Pheochromocytoma Malignant                              | X           | X     | X     |       |       |       |       | X     | X     |       |       |       |       |       | X     |       |       |       |       |       |       |       |       | 9     |          |
| Bilateral, Pheochromocytoma Benign                      |             |       |       | X     |       |       | X     | X     |       | X     |       |       | X     | X     |       |       |       |       |       | X     |       | X     |       | 21    |          |
| Bilateral, Pheochromocytoma Malignant                   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     | X     | X     | X     |       |       |       | 7     |          |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
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Experiment Number: 60311 - 05  
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P04: NEOPLASMS 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<br>5.0 mg/m3       | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | * TOTALS |    |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|----|
|  | 0689        | 0729  | 0779  | 0779  | 0660  | 0468  | 0662  | 0779  | 0779  | 0779  | 0779  | 0566  | 0666  | 0466  | 0779  | 0668  | 0779  | 0779  | 0666  | 0668  | 0779  | 0566  | 0666  | 0566  |          |    |
| ANIMAL ID  | 00626       | 00662 | 00662 | 00662 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 | 00663 |          |    |
| Leukemia Mononuclear                             |             |       | X     |       | X     |       |       |       |       |       |       | X     | X     |       |       |       |       |       |       |       |       |       |       |       | 5        |    |
| Spleen   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50       |    |
| Leukemia Mononuclear                             |             |       | X     |       | X     | X     |       |       |       | X     |       | X     | X     |       | X     | X     | X     |       |       | X     |       |       | X     | X     | 22       |    |
| Thymus   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | 46       |    |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       | X     |       |       |       | 2     |          |    |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       |       | X     |       |       | X     |       |       |       |       |       |       |       |       | 2     |          |    |
| <b>INTEGUMENTARY SYSTEM</b>                      |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |    |
| Mammary Gland                                    | +           | +     | M     | M     | +     | +     | M     | +     | +     | +     | M     | +     | M     | +     | M     | +     | M     | +     | +     | M     | M     | +     | M     | +     | M        | 31 |
| Fibroadenoma                                     |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1        |    |
| Skin   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50       |    |
| Basal Cell Adenoma                               | X           |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 3        |    |
| Keratoacanthoma                                  |             |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 2        |    |
| Trichoepithelioma                                |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1        |    |
| Subcutaneous Tissue, Fibrous Histiocytoma        |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       | 2        |    |
| <b>MUSCULOSKELETAL SYSTEM</b>                    |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |    |
| Bone   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50       |    |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       | 1        |    |
| Skeletal Muscle                                  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | +     | +     |       | 4        |    |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       | 2        |    |
| Carcinoma, Metastatic, Kidney                    |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1        |    |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS MALE                                 | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | * TOTALS |       |       |      |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|------|
|   | 0689        | 0729  | 0779  | 0775  | 0647  | 0665  | 0772  | 0772  | 0770  | 0770  | 0566  | 0666  | 0641  | 0772  | 0668  | 0772  | 0772  | 0669  | 0668  | 0756  |          | 0665  | 0657  | 0657 |
| 5.0 mg/m3   | ANIMAL ID   |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |      |
|   | 00626       | 00622 | 00622 | 00622 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633 | 00633    | 00633 | 00633 |      |
| Fibrous Histiocytoma, Metastatic, Skin                        |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       | X     | 1    |
| <b>NERVOUS SYSTEM</b>   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |      |
| Brain   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50   |
| <b>RESPIRATORY SYSTEM</b>                                     |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |      |
| Larynx  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50   |
| Lung  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50   |
| Alveolar/Bronchiolar Adenoma                                  |             |       |       |       | X     | X     |       |       |       |       | X     |       |       |       |       |       | X     |       |       |       |          |       |       | 8    |
| Alveolar/Bronchiolar Adenoma, Multiple                        |             |       | X     |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       | X     |          |       |       | 6    |
| Alveolar/Bronchiolar Carcinoma                                |             |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |          | X     | X     | 6    |
| Alveolar/Bronchiolar Carcinoma, Multiple                      | X           | X     |       | X     |       |       | X     | X     | X     | X     | X     |       |       | X     |       |       | X     | X     | X     | X     | X        | X     |       | 30   |
| Carcinoma, Metastatic, Kidney                                 |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Carcinoma, Metastatic, Zymbal'S Gland                         |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Cystic Keratinizing Epithelioma                               |             |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Leukemia Mononuclear  |             |       |       | X     |       |       |       |       |       |       | X     | X     |       | X     | X     |       |       | X     |       |       |          | X     | X     | 13   |
| Pheochromocytoma Malignant, Metastatic, Adrenal Medulla       |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Mediastinum, Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       | X     |          |       |       | 3    |
| Mediastinum, Carcinoma, Metastatic, Kidney                    |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Mediastinum, Carcinoma, Metastatic, Uncertain Primary Site    |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |          |       |       | 1    |
| Mediastinum, Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |          |       |       | 1    |
| Nose  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50   |
| Leukemia Mononuclear  |             |       |       | X     |       |       |       |       |       |       |       | X     | X     |       | X     |       |       |       |       |       |          |       |       | 6    |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
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 Cobalt  
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 Lab: BNW

| FISCHER 344-TACONIC RATS MALE<br>5.0 mg/m3       | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  | * TOTALS |
|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|----------|
|  | 0689        | 0729  | 0779  | 0775  | 0648  | 0667  | 0772  | 0772  | 0773  | 0773  | 0566  | 0666  | 0664  | 0776  | 0668  | 0772  | 0779  | 0666  | 0668  | 0772  | 0775  | 0666  | 0667  |  |          |
| ANIMAL ID  | 00626       | 00662 | 00662 | 00662 | 00663 | 00663 | 00663 | 00663 | 00663 | 00664 | 00665 | 00667 | 00668 | 00669 | 00670 | 00671 | 00672 | 00673 | 00674 | 00675 | 00678 | 00679 | 00680 |  |          |
| Trachea  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |  |          |
| <b>SPECIAL SENSES SYSTEM</b>                     |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |          |
| Eye  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |  |          |
| Harderian Gland                                  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |  |          |
| Zymbal's Gland                                   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |  |          |
| Carcinoma  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |  |          |
| <b>URINARY SYSTEM</b>                            |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |          |
| Kidney   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |  |          |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |  |          |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       |       | X     | X     |       |       |       |       |       |       |       |       |       | 4     |  |          |
| Renal Tubule, Adenoma                            |             |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       | 2     |  |          |
| Renal Tubule, Adenoma, Multiple                  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       | 1     |  |          |
| Renal Tubule, Carcinoma                          |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       | 2     |  |          |
| Urinary Bladder                                  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |  |          |
| <b>SYSTEMIC LESIONS</b>                          |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |  |          |
| Multiple Organ                                   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |  |          |
| Leukemia Mononuclear                             |             |       | X     | X     | X     |       |       |       | X     | X     | X     | X     | X     | X     |       |       | X     |       |       | X     | X     |       | 22    |  |          |
| Mesothelioma Malignant                           |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |  |          |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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

**P04: NEOPLASMS BY INDIVIDUAL ANIMAL**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 01/18/2012  
**Time Report Requested:** 14:48:11  
**First Dose M/F:** 05/08/06 / 05/08/06  
**Lab:** BNW

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\*\*\* END OF MALE DATA \*\*\*

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\* .. Total animals with tissue examined microscopically; Total animals with tumor  
+ .. 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  
 Route: RESPIRATORY EXPOSURE WHOLE BODY  
 Species/Strain: RATS/F344/N Tac

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
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 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>Control | DAY ON TEST      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | ANIMAL ID | females<br>(cont...) |                       |                  |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------|----------------------|-----------------------|------------------|
|   | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>6<br>5<br>4 | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>5<br>1<br>1 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>6<br>3<br>1 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>2 | 0<br>2<br>3<br>4 | 0<br>7<br>3<br>0 | 0<br>5<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>6<br>8<br>3 | 0<br>7<br>3<br>1 |           |                      | 0<br>6<br>7<br>4      | 0<br>6<br>4<br>6 |
|   | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0         | 0                    | 0<br>0<br>1<br>0<br>1 |                  |

|  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Pancreas<br>Acinus, Carcinoma, Metastatic, Islets,<br>Pancreatic | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
| Salivary Glands<br>Fibrous Histiocytoma, Metastatic, Skin        | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
| Stomach, Forestomach<br>Squamous Cell Papilloma                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
| Stomach, Glandular   | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
| Tongue<br>Squamous Cell Papilloma                                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
| Tooth  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |

**CARDIOVASCULAR SYSTEM**

|  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Heart<br>Carcinoma, Metastatic, Islets, Pancreatic<br>Fibrous Histiocytoma, Metastatic, Skin<br>Leukemia Mononuclear | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|

**ENDOCRINE SYSTEM**

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Adrenal Cortex<br>Carcinoma, Metastatic, Islets, Pancreatic<br>Leukemia Mononuclear | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. 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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>Control     | DAY ON TEST      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  | ANIMAL ID | females<br>(cont...) |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|--|-----------|----------------------|
|   | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>6<br>5<br>4 | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>5<br>1<br>1 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>6<br>3<br>1 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>2 | 0<br>2<br>3<br>4 | 0<br>7<br>5<br>0 | 0<br>7<br>3<br>1 | 0<br>6<br>8<br>3 | 0<br>7<br>3<br>1 | 0<br>6<br>7<br>4 | 0<br>6<br>6<br>6 | 0<br>7<br>4<br>3 | 0<br>6<br>3<br>0 |  |           |                      |
| Adrenal Medulla                                   | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                |  |           |                      |
| Leukemia Mononuclear                              |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | X                |                  |                  |                  |                  |  |           |                      |
| Pheochromocytoma Benign                           |                  | X                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | X                |                  |                  |                  |  |           |                      |
| Bilateral, Fibrous Histiocytoma, Metastatic, Skin |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| Bilateral, Pheochromocytoma Benign                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| Islets, Pancreatic                                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                |  |           |                      |
| Carcinoma   |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | X                |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| Parathyroid Gland                                 | +                | +                | +                | +                | +                | +                | +                | +                | M                | M                | M                | +                | +                | +                | +                | +                | +                | +                | +                | +                | M                | +                | +                | M                |  |           |                      |
| Pituitary Gland                                   | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                |  |           |                      |
| Pars Distalis, Adenoma                            | X                |                  | X                |                  | X                | X                |                  |                  | X                |                  | X                | X                |                  | X                | X                |                  | X                | X                | X                |                  | X                | X                | X                |                  |  |           |                      |
| Thyroid Gland                                     | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                |  |           |                      |
| Bilateral, C-cell, Adenoma                        |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| C-cell, Adenoma                                   |                  |                  | X                |                  |                  | X                |                  |                  |                  | X                | X                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| C-cell, Carcinoma                                 | X                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| Follicular Cell, Carcinoma                        |                  |                  |                  |                  |                  |                  |                  |                  |                  | X                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| <b>GENERAL BODY SYSTEM</b>                        |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| Peritoneum  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | +                |  |           |                      |
| Carcinoma, Metastatic, Islets, Pancreatic         |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  | X                |  |           |                      |
| <b>GENITAL SYSTEM</b>                             |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |
| Clitoral Gland                                    | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                |  |           |                      |
| Adenoma   |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |  |           |                      |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
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Experiment Number: 60311 - 05  
 Test Type: CHRONIC  
 Route: RESPIRATORY EXPOSURE WHOLE BODY  
 Species/Strain: RATS/F344/N Tac

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

|  |                | DAY ON TEST |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | females<br>(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 |                      |
| <b>FISCHER 344-TACONIC RATS<br/>FEMALE</b> |                | 7           | 7 | 7 | 7 | 6 | 7 | 7 | 7 | 5 | 7 | 7 | 6 | 7 | 7 | 7 | 2 | 7 | 5 | 7 | 6 | 7 | 7 | 6 | 6 | 7                    |
|  | <b>Control</b> | 3           | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 | 5 | 3 | 8 | 3 | 3 | 7 | 4 | 3                    |
|  |                | 2           | 1 | 0 | 1 | 4 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 1 | 2 | 2 | 4 | 0 | 0 | 1 | 3 | 1 | 1 | 4 | 6 | 0                    |
|  |                | 0           | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0                    |
|  |                | 0           | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0                    |
|  |                | 1           | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1                    |
|  |                | 0           | 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                    |

Subcutaneous Tissue, Fibrous Histiocytoma  
 Subcutaneous Tissue, Lipoma X  
 Subcutaneous Tissue, Schwannoma Malignant

**MUSCULOSKELETAL SYSTEM**

Bone +  
 Skeletal Muscle +  
 Carcinoma, Metastatic, Islets, Pancreatic X

**NERVOUS SYSTEM**

Brain +

**RESPIRATORY SYSTEM**

Larynx +  
 Lung +  
 Alveolar/Bronchiolar Adenoma X  
 Carcinoma, Metastatic, Islets, Pancreatic X  
 Fibrous Histiocytoma, Metastatic, Skin  
 Leukemia Mononuclear X X X X  
 Mediastinum, Fibrous Histiocytoma, Metastatic, Skin  
 Nose +  
 Leukemia Mononuclear X

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. 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  
 Route: RESPIRATORY EXPOSURE WHOLE BODY  
 Species/Strain: RATS/F344/N Tac

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
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 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>Control | DAY ON TEST           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | females<br>(cont...) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------|
|   | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>6<br>5<br>4      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>5<br>1<br>1      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>6<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>2<br>3<br>4      | 0<br>7<br>3<br>0      | 0<br>5<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>6<br>8<br>3      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>7<br>4      | 0<br>6<br>4<br>6      | 0<br>7<br>3<br>0      |                      |
| ANIMAL ID                                     | 0<br>0<br>1<br>0<br>1 | 0<br>0<br>1<br>0<br>2 | 0<br>0<br>1<br>0<br>3 | 0<br>0<br>1<br>0<br>4 | 0<br>0<br>1<br>0<br>5 | 0<br>0<br>1<br>0<br>6 | 0<br>0<br>1<br>0<br>7 | 0<br>0<br>1<br>0<br>8 | 0<br>0<br>1<br>0<br>9 | 0<br>0<br>1<br>0<br>0 | 0<br>0<br>1<br>0<br>1 | 0<br>0<br>1<br>0<br>2 | 0<br>0<br>1<br>0<br>3 | 0<br>0<br>1<br>0<br>4 | 0<br>0<br>1<br>0<br>5 | 0<br>0<br>1<br>0<br>6 | 0<br>0<br>1<br>0<br>7 | 0<br>0<br>1<br>0<br>8 | 0<br>0<br>1<br>0<br>9 | 0<br>0<br>1<br>2<br>0 | 0<br>0<br>1<br>2<br>1 | 0<br>0<br>1<br>2<br>2 | 0<br>0<br>1<br>2<br>3 | 0<br>0<br>1<br>2<br>4 | 0<br>0<br>1<br>2<br>5 |                      |
| Trachea                                       | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |                      |
| <b>SPECIAL SENSES SYSTEM</b>                  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                      |
| Ear   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                      |
| Eye   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |                      |
| Harderian Gland                               | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |                      |
| <b>URINARY SYSTEM</b>                         |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                      |
| Kidney  | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |                      |
| Leukemia Mononuclear                          |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                      |
| Urinary Bladder                               | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |                      |
| Carcinoma, Metastatic, Islets, Pancreatic     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                      |
| <b>SYSTEMIC LESIONS</b>                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                      |
| Multiple Organ                                | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |                      |
| Leukemia Mononuclear                          |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       | X                     | X                     |                       |                       |                       |                       |                       | X                     | X                     |                       |                       |                       | X                     |                      |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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





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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>Control  | DAY ON TEST           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | * TOTALS              |                       |                       |                       |                       |                   |  |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-------------------|--|
|  | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>9<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>2<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>3<br>1<br>6      | 0<br>5<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>6<br>7<br>4      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>6<br>6<br>3      |                       | 0<br>6<br>9<br>8      | 0<br>7<br>3<br>1      |                       |                       |                   |  |
| ANIMAL ID  | 0<br>0<br>1<br>2<br>6 | 0<br>0<br>1<br>2<br>7 | 0<br>0<br>1<br>2<br>8 | 0<br>0<br>1<br>3<br>9 | 0<br>0<br>1<br>3<br>0 | 0<br>0<br>1<br>3<br>1 | 0<br>0<br>1<br>3<br>2 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>4 | 0<br>0<br>1<br>3<br>5 | 0<br>0<br>1<br>3<br>6 | 0<br>0<br>1<br>3<br>7 | 0<br>0<br>1<br>3<br>8 | 0<br>0<br>1<br>4<br>9 | 0<br>0<br>1<br>4<br>0 | 0<br>0<br>1<br>4<br>1 | 0<br>0<br>1<br>4<br>2 | 0<br>0<br>1<br>4<br>3 | 0<br>0<br>1<br>4<br>4 | 0<br>0<br>1<br>4<br>5 | 0<br>0<br>1<br>4<br>6 | 0<br>0<br>1<br>4<br>7 | 0<br>0<br>1<br>4<br>8 | 0<br>0<br>1<br>4<br>9 |                   |  |
| Pancreas<br>Acinus, Carcinoma, Metastatic, Islets,<br>Pancreatic   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50<br>1           |  |
| Salivary Glands<br>Fibrous Histiocytoma, Metastatic, Skin  | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | X                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50<br>1           |  |
| Stomach, Forestomach<br>Squamous Cell Papilloma  | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50<br>1           |  |
| Stomach, Glandular   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50                |  |
| Tongue<br>Squamous Cell Papilloma  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1<br>1            |  |
| Tooth  |                       |                       |                       |                       |                       |                       |                       |                       | +                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                 |  |
| <b>CARDIOVASCULAR SYSTEM</b>   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                   |  |
| Heart<br>Carcinoma, Metastatic, Islets, Pancreatic<br>Fibrous Histiocytoma, Metastatic, Skin<br>Leukemia Mononuclear | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50<br>1<br>1<br>1 |  |
| <b>ENDOCRINE SYSTEM</b>  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                   |  |
| Adrenal Cortex<br>Carcinoma, Metastatic, Islets, Pancreatic<br>Leukemia Mononuclear                                  | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50<br>1<br>5      |  |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

M .. Missing tissue  
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Experiment Number: 60311 - 05  
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P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
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 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>Control     | DAY ON TEST           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | * TOTALS              |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>9<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>2<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>3<br>1<br>6      | 0<br>5<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>3      | 0<br>7<br>3<br>3      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>6<br>7<br>4      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>6<br>3      | 0<br>6<br>9<br>8      | 0<br>7<br>3<br>1      |                       |                       |                       |
| ANIMAL ID   | 0<br>0<br>1<br>2<br>6 | 0<br>0<br>1<br>7<br>7 | 0<br>0<br>1<br>2<br>8 | 0<br>0<br>1<br>2<br>9 | 0<br>0<br>1<br>3<br>0 | 0<br>0<br>1<br>3<br>1 | 0<br>0<br>1<br>3<br>2 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>4 | 0<br>0<br>1<br>3<br>5 | 0<br>0<br>1<br>3<br>6 | 0<br>0<br>1<br>3<br>7 | 0<br>0<br>1<br>3<br>8 | 0<br>0<br>1<br>3<br>9 | 0<br>0<br>1<br>4<br>0 | 0<br>0<br>1<br>4<br>1 | 0<br>0<br>1<br>4<br>2 | 0<br>0<br>1<br>4<br>3 | 0<br>0<br>1<br>4<br>4 | 0<br>0<br>1<br>4<br>4 | 0<br>0<br>1<br>4<br>5 | 0<br>0<br>1<br>4<br>6 | 0<br>0<br>1<br>4<br>7 | 0<br>0<br>1<br>4<br>8 | 0<br>0<br>1<br>4<br>9 | 0<br>0<br>1<br>5<br>0 |
| Adrenal Medulla                                   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50                    |                       |
| Leukemia Mononuclear                              |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       | X                     | X                     |                       |                       | 5                     |                       |
| Pheochromocytoma Benign                           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 4                     |                       |
| Bilateral, Fibrous Histiocytoma, Metastatic, Skin |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |                       |
| Bilateral, Pheochromocytoma Benign                |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       | 2                     |                       |
| Islets, Pancreatic                                | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50                    |                       |
| Carcinoma   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |                       |
| Parathyroid Gland                                 | +                     | +                     | +                     | +                     | M                     | +                     | +                     | +                     | +                     | +                     | M                     | M                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 42                    |                       |                       |
| Pituitary Gland                                   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50                    |                       |                       |
| Pars Distalis, Adenoma                            |                       |                       | X                     |                       | X                     | X                     | X                     | X                     |                       |                       | X                     |                       | X                     |                       | X                     | X                     |                       | X                     |                       | X                     | X                     |                       | X                     | X                     | 29                    |                       |                       |
| Thyroid Gland                                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 50                    |                       |                       |
| Bilateral, C-cell, Adenoma                        |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |                       |                       |
| C-cell, Adenoma                                   |                       | X                     |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       | 7                     |                       |                       |
| C-cell, Carcinoma                                 |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |                       |                       |
| Follicular Cell, Carcinoma                        |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |                       |                       |
| <b>GENERAL BODY SYSTEM</b>                        |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| Peritoneum  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |                       |
| Carcinoma, Metastatic, Islets, Pancreatic         |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |                       |
| <b>GENITAL SYSTEM</b>                             |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| Clitoral Gland                                    | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | 49                    |                       |                       |
| Adenoma   |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       | 2                     |                       |                       |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
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 Cobalt  
 CAS Number: 7440-48-4

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 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>Control            | DAY ON TEST                                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | * TOTALS              |
|--|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 0<br>7<br>3<br>1                                  | 0<br>7<br>3<br>1      | 0<br>6<br>9<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>2<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>3<br>1<br>6      | 0<br>5<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>7<br>4      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>3      | 0<br>6<br>6<br>8      | 0<br>6<br>9<br>3      | 0<br>7<br>3<br>1      |                       |
| ANIMAL ID  | 0<br>0<br>1<br>2<br>6                             | 0<br>0<br>1<br>2<br>7 | 0<br>0<br>1<br>2<br>8 | 0<br>0<br>1<br>3<br>9 | 0<br>0<br>1<br>3<br>0 | 0<br>0<br>1<br>3<br>1 | 0<br>0<br>1<br>3<br>2 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>4 | 0<br>0<br>1<br>3<br>5 | 0<br>0<br>1<br>3<br>6 | 0<br>0<br>1<br>3<br>7 | 0<br>0<br>1<br>3<br>8 | 0<br>0<br>1<br>4<br>9 | 0<br>0<br>1<br>4<br>0 | 0<br>0<br>1<br>4<br>1 | 0<br>0<br>1<br>4<br>2 | 0<br>0<br>1<br>4<br>3 | 0<br>0<br>1<br>4<br>4 | 0<br>0<br>1<br>4<br>5 | 0<br>0<br>1<br>4<br>6 | 0<br>0<br>1<br>4<br>7 | 0<br>0<br>1<br>4<br>8 | 0<br>0<br>1<br>4<br>9 |
| Carcinoma  | X   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 4                     |
| Ovary  | +   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 50                    |
| Carcinoma, Metastatic, Islets, Pancreatic                |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Leukemia Mononuclear                                     |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Uterus   | +   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 50                    |
| Carcinoma, Metastatic, Islets, Pancreatic                |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Hemangiosarcoma  |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Leiomyoma  | X   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Leukemia Mononuclear                                     |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Polyp Stromal  | X X X X X   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 10                    |
| <b>HEMATOPOIETIC SYSTEM</b>                              |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |
| Bone Marrow  | +   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 50                    |
| Lymph Node   |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 4                     |
| Deep Cervical, Fibrous Histiocytoma, Metastatic, Skin    | X   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Lumbar, Renal, Carcinoma, Metastatic, Islets, Pancreatic |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Pancreatic, Renal, Leukemia Mononuclear                  |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Lymph Node, Bronchial                                    | + + M + + M M M + + + M M M + + + M + + M M M + M |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 26                    |
| Fibrous Histiocytoma, Metastatic, Skin                   | X   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Leukemia Mononuclear                                     |   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |
| Lymph Node, Mandibular                                   | + + + + + M + + + + + + + + + + + + + + + + + +   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 48                    |
| Fibrous Histiocytoma, Metastatic, Skin                   | X   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | 1                     |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
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Experiment Number: 60311 - 05  
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 Species/Strain: RATS/F344/N Tac

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>Control | DAY ON TEST           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | * TOTALS              |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|   | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>9<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>2<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>2      | 0<br>3<br>1<br>6      | 0<br>5<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>3      | 0<br>7<br>3<br>3      | 0<br>7<br>3<br>3      | 0<br>7<br>3<br>3      | 0<br>6<br>7<br>4      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>6<br>3      | 0<br>6<br>9<br>8      |                       | 0<br>7<br>3<br>1      |                       |
| ANIMAL ID                                     | 0<br>0<br>1<br>2<br>6 | 0<br>0<br>1<br>2<br>7 | 0<br>0<br>1<br>2<br>8 | 0<br>0<br>1<br>2<br>9 | 0<br>0<br>1<br>3<br>0 | 0<br>0<br>1<br>3<br>1 | 0<br>0<br>1<br>3<br>2 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>3 | 0<br>0<br>1<br>3<br>4 | 0<br>0<br>1<br>3<br>5 | 0<br>0<br>1<br>3<br>6 | 0<br>0<br>1<br>3<br>7 | 0<br>0<br>1<br>3<br>8 | 0<br>0<br>1<br>4<br>9 | 0<br>0<br>1<br>4<br>0 | 0<br>0<br>1<br>4<br>1 | 0<br>0<br>1<br>4<br>2 | 0<br>0<br>1<br>4<br>3 | 0<br>0<br>1<br>4<br>4 | 0<br>0<br>1<br>4<br>5 | 0<br>0<br>1<br>4<br>6 | 0<br>0<br>1<br>4<br>7 | 0<br>0<br>1<br>4<br>8 | 0<br>0<br>1<br>4<br>9 | 0<br>0<br>1<br>5<br>0 |

|   |   |   |
|---|---|---|
| Subcutaneous Tissue, Fibrous Histiocytoma | X | 1 |
| Subcutaneous Tissue, Lipoma               |   | 1 |
| Subcutaneous Tissue, Schwannoma Malignant | X | 1 |

**MUSCULOSKELETAL SYSTEM**

|   |   |    |
|---|---|----|
| Bone                                      | + | 50 |
| Skeletal Muscle                           |   | 1  |
| Carcinoma, Metastatic, Islets, Pancreatic |   | 1  |

**NERVOUS SYSTEM**

|       |   |    |
|-------|---|----|
| Brain | + | 50 |
|-------|---|----|

**RESPIRATORY SYSTEM**

|   |   |    |
|---|---|----|
| Larynx  | + | 50 |
| Lung  | + | 50 |
| Alveolar/Bronchiolar Adenoma                        |   | 2  |
| Carcinoma, Metastatic, Islets, Pancreatic           |   | 1  |
| Fibrous Histiocytoma, Metastatic, Skin              | X   | 1  |
| Leukemia Mononuclear                                | X X X X X X X X                                 | 10 |
| Mediastinum, Fibrous Histiocytoma, Metastatic, Skin | X   | 1  |
| Nose  | + | 50 |
| Leukemia Mononuclear                                |   | 1  |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

















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

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| FISCHER 344-TACONIC RATS<br>FEMALE<br>1.25 mg/m3 | DAY ON TEST |      | ANIMAL ID |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | females<br>(cont...) |      |      |
|--|-------------|------|-----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|----------------------|------|------|
|  | 0691        | 0674 | 0003      | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 | 0003 |                      | 0003 | 0003 |
| Leukemia Mononuclear                             | X           |      | X         | X    | X    | X    | X    | X    | X    |      |      |      |      |      |      | X    | X    | X    |      | X    | X    | X    | X                    | X    | X    |

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| FISCHER 344-TACONIC RATS<br>FEMALE<br>1.25 mg/m3        | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | * TOTALS |       |       |       |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|
|   | 0708        | 0598  | 0697  | 0732  | 0674  | 0772  | 0772  | 0772  | 0772  | 0772  | 0593  | 0773  | 0773  | 0773  | 0773  | 0422  | 0731  | 0673  | 0773  | 0578  |          | 0770  | 0773  | 0684  |
| ANIMAL ID   | 00326       | 00337 | 00338 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333    | 00333 | 00333 | 00333 |
| Leukemia Mononuclear                                    |             |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Stomach, Glandular                                      | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| <b>CARDIOVASCULAR SYSTEM</b>                            |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |
| Blood Vessel  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung        |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Aorta, Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Heart   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Leukemia Mononuclear                                    |             |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |          |       |       | 4     |
| <b>ENDOCRINE SYSTEM</b>                                 |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |
| Adrenal Cortex  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Leukemia Mononuclear                                    |             |       | X     |       | X     |       |       |       |       | X     |       |       |       |       | X     |       |       |       | X     |       |          |       | X     | 11    |
| Adrenal Medulla   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Leukemia Mononuclear                                    |             |       | X     |       | X     |       |       |       |       | X     |       |       |       |       | X     |       |       |       | X     |       |          |       | X     | 11    |
| Pheochromocytoma Benign                                 | X           |       |       |       |       |       | X     |       |       |       | X     |       |       |       | X     |       |       |       |       |       |          |       |       | 8     |
| Pheochromocytoma Malignant                              |             |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |          |       |       | 1     |
| Bilateral, Pheochromocytoma Benign                      |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |          |       |       | 4     |
| Bilateral, Pheochromocytoma Malignant                   |             |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Islets, Pancreatic                                      | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Parathyroid Gland                                       | M           | +     | +     | +     | +     | +     | M     | +     | +     | +     | +     | M     | +     | +     | M     | +     | +     | +     | +     | +     | +        | +     | 45    |       |

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|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|------|
|  | 0708        | 0598  | 0697  | 0732  | 0674  | 0772  | 0772  | 0772  | 0772  | 0772  | 0593  | 0733  | 0773  | 0773  | 0773  | 0422  | 0733  | 0671  | 0733  | 0773  |          | 0578  | 0770  | 0738  | 0674  | 0730 |
| ANIMAL ID  | 00326       | 00337 | 00338 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333    | 00333 | 00333 | 00333 | 00333 |      |
| Pituitary Gland                                  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | +     | 50    |      |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | X     | 3     |      |
| Pars Distalis, Adenoma                           | X           | X     |       | X     |       | X     | X     | X     |       |       |       |       | X     | X     |       | X     | X     |       | X     | X     | X        | X     |       |       | 23    |      |
| Pars Distalis, Carcinoma                         |             |       |       |       |       |       |       |       |       | X     |       |       |       | X     |       |       |       | X     |       |       |          |       |       |       | 3     |      |
| Thyroid Gland                                    | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 49    |       |      |
| C-cell, Adenoma                                  |             |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |          | X     |       | 6     |       |      |
| C-cell, Carcinoma                                |             |       |       | X     |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 2     |       |      |
| <b>GENERAL BODY SYSTEM</b>                       |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |       |      |
| Peritoneum                                       |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       | 1     |      |
| Fibrous Histiocytoma, Metastatic, Skin           |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       | 1     |      |
| <b>GENITAL SYSTEM</b>                            |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |       |      |
| Clitoral Gland                                   | +           | +     | +     | +     | +     | M     | +     | +     | +     | M     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 47    |       |      |
| Adenoma  |             |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 4     |       |      |
| Carcinoma  |             |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 5     |       |      |
| Bilateral, Adenoma                               |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |       |      |
| Ovary  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |       |      |
| Cystadenocarcinoma                               |             |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |          |       |       | 1     |       |      |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       | X     |       |       |       |       |       |       | X     |       |       |       |       |          |       | X     | 6     |       |      |
| Uterus   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |       |      |
| Carcinoma  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |       |      |
| Leiomyoma  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |       |      |
| Leukemia Mononuclear                             |             |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       | X     | 2     |       |      |

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|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
|  | 0708        | 0598  | 0697  | 0732  | 0624  | 0772  | 0772  | 0772  | 0772  | 0577  | 0777  | 0777  | 0777  | 0777  | 0474  | 0777  | 0676  | 0777  | 0575  | 0777  | 0676  | 0777  | 0676  | 0777  |          |
| ANIMAL ID  | 00326       | 00337 | 00322 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 | 00333 |          |
| Polyp Stromal                                    | X           |       | X     | X     |       |       |       |       |       |       |       |       |       | X     |       | X     |       |       |       |       |       |       | X     |       |          |
|  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 7     |          |

**HEMATOPOIETIC SYSTEM**

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |          |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------|
| Bone Marrow                                     | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50       |
| Lymph Node<br>Renal, Leukemia Mononuclear       |   |   |   |   |   |   |   |   |   |   |   |   |   | + |   |   |   |   |   |   |   |   |   | 3<br>1   |
| Lymph Node, Bronchial<br>Leukemia Mononuclear   | + | + | + | M | M | M | M | M | + | M | + | M | + | M | M | M | + | M | M | M | M | M | M | 18<br>2  |
| Lymph Node, Mandibular<br>Leukemia Mononuclear  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | M | + | 48<br>6  |
| Lymph Node, Mediastinal<br>Leukemia Mononuclear | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | M | + | + | + | + | + | + | M | 43<br>4  |
| Lymph Node, Mesenteric<br>Leukemia Mononuclear  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50<br>3  |
| Spleen<br>Leukemia Mononuclear                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50<br>29 |
| Thymus<br>Leukemia Mononuclear                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | M | + | + | + | + | + | + | 46<br>1  |

**INTEGUMENTARY SYSTEM**

|                          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |         |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|
| Mammary Gland<br>Adenoma | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50<br>2 |
|--------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---------|

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|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|
|  | 0708        | 0598  | 0697  | 0732  | 0674  | 0772  | 0772  | 0772  | 0772  | 0772  | 0578  | 0771  | 0773  | 0773  | 0422  | 0733  | 0678  | 0773  | 0773  | 0578  |          | 0770  | 0773  | 0684  |
| ANIMAL ID  | 00326       | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033 | 00033    | 00033 | 00033 | 00033 |
| Carcinoma  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X        | X     |       | 5     |
| Fibroadenoma                                     |             |       |       | X     |       |       |       |       |       | X     | X     | X     |       |       | X     | X     |       | X     |       |       |          | X     |       | 21    |
| Fibroadenoma, Multiple                           |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |          |       |       | 2     |
| Skin   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Papilloma  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          | X     |       | 1     |
| Subcutaneous Tissue, Fibroma                     |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Subcutaneous Tissue, Fibrous Histiocytoma        |             |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |          |       |       | 2     |
| <b>MUSCULOSKELETAL SYSTEM</b>                    |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |
| Bone   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Skeletal Muscle                                  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| Lipoma   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1     |
| <b>NERVOUS SYSTEM</b>                            |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |
| Brain  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Carcinoma, Metastatic, Pituitary Gland           |             |       |       |       |       |       |       |       |       |       | X     |       |       |       | X     |       |       |       |       |       | X        |       |       | 3     |
| <b>RESPIRATORY SYSTEM</b>                        |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |
| Larynx   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Lung   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50    |
| Alveolar/Bronchiolar Adenoma                     |             |       |       | X     |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |          |       |       | 6     |
| Alveolar/Bronchiolar Adenoma, Multiple           |             |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |          |       |       | 1     |
| Alveolar/Bronchiolar Carcinoma                   |             |       |       |       |       |       |       |       |       |       |       | X     | X     |       |       | X     |       |       |       |       |          | X     |       | 5     |
| Alveolar/Bronchiolar Carcinoma, Multiple         |             |       |       |       |       |       |       |       |       | X     |       |       |       |       | X     |       | X     |       |       |       |          |       |       | 4     |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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





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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>2.5 mg/m3 | DAY ON TEST |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ANIMAL ID | females<br>(cont...) |      |      |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|----------------------|------|------|
|   | 0730        | 0732 | 0737 | 0731 | 0769 | 0768 | 0773 | 0771 | 0766 | 0766 | 0721 | 0758 | 0773 | 0773 | 0773 | 0773 | 0766 | 0755 | 0773 | 0773 |           |                      | 0773 | 0766 |
|   | 0000        | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000 | 0000      | 0000                 | 0000 | 0000 |
|   | 51          | 52   | 53   | 54   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55        | 55                   | 55   | 55   |

**ALIMENTARY SYSTEM**

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Esophagus                 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Cecum    | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Colon    | + | + | + | + | + | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Rectum   | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Ileum    | + | + | + | + | A | + | + | + | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Small, Jejunum  | + | + | + | + | A | + | + | A | + | A | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Liver                     | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia Mononuclear      |   |   |   |   |   |   |   | X | X |   |   |   | X |   | X | X | X |   | X | X |   | X | X |   |
| Mesentery                 |   |   |   | + |   |   |   |   |   |   | + |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Pancreas                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia Mononuclear      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |
| Salivary Glands           | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, Forestomach      | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Stomach, Glandular        | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
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| FISCHER 344-TACONIC RATS<br>FEMALE<br>2.5 mg/m3 | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | females<br>(cont...) |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------------------|
|   | 0730        | 0732  | 0737  | 0731  | 0769  | 0768  | 0773  | 0771  | 0766  | 0766  | 0725  | 0758  | 0773  | 0773  | 0777  | 0777  | 0766  | 0755  | 0777  | 0777  | 0777  | 0777  | 0766  | 0766  |                      |
| ANIMAL ID                                       | 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                |
| Tongue Squamous Cell Carcinoma                  |             |       | +     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |                      |
| Tooth   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |                      |

**CARDIOVASCULAR SYSTEM**

|                      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|----------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Heart                | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia Mononuclear |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |
| Schwannoma Malignant |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |

**ENDOCRINE SYSTEM**

|                                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adrenal Cortex                        | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia Mononuclear                  |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   | X |   | X |   | X | X |   |   |
| Adrenal Medulla                       | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Leukemia Mononuclear                  |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   | X |   | X |   | X | X |   |   |
| Pheochromocytoma Benign               |   |   | X |   |   |   |   | X | X |   |   |   | X | X |   |   |   | X |   | X |   | X |   |   |
| Pheochromocytoma Malignant            |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Bilateral, Pheochromocytoma Benign    | X |   |   |   | X | X |   |   | X |   |   |   |   |   | X |   |   |   | X |   |   |   |   | X |
| Bilateral, Pheochromocytoma Malignant |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Islets, Pancreatic                    | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Parathyroid Gland                     | + | + | + | M | M | + | + | M | + | M | + | + | + | M | + | + | + | + | M | + | M | + | + | + |
| Pituitary Gland                       | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + | + | + | + | + |
| Leukemia Mononuclear                  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |
| Pars Distalis, Adenoma                |   |   | X |   | X | X | X | X |   | X | X | X | X |   | X |   |   | X |   | X | X |   |   | X |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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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<br>FEMALE<br>2.5 mg/m3 | DAY ON TEST |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      | ANIMAL ID | females<br>(cont...) |
|---|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----------|----------------------|
|   | 0730        | 0732 | 0737 | 0731 | 0739 | 0738 | 0733 | 0731 | 0735 | 0733 | 0738 | 0721 | 0725 | 0727 | 0727 | 0727 | 0727 | 0726 | 0725 | 0727 | 0727 | 0727 | 0726 | 0726 |           |                      |
|   | 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      |                      |
|   | 51          | 52   | 53   | 54   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55   | 55        |                      |

Pars Distalis, Carcinoma

Thyroid Gland  
 Bilateral, C-cell, Adenoma  
 C-cell, Adenoma  
 C-cell, Carcinoma  
 Follicular Cell, Adenoma

+  
 X  
 X

**GENERAL BODY SYSTEM**

NONE

**GENITAL SYSTEM**

Clitoral Gland  
 Adenoma  
 Carcinoma  
 Ovary  
 Granulosa Cell Tumor Malignant  
 Leukemia Mononuclear  
 Uterus  
 Carcinoma  
 Leukemia Mononuclear  
 Polyp Stromal

+  
 X X X  
 X  
 +  
 X X X  
 X

**HEMATOPOIETIC SYSTEM**

Bone Marrow

+ +

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
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|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|----|--|
|   | 0591        | 0590  | 0731  | 0734  | 0589  | 0654  | 0171  | 0773  | 0771  | 0593  | 0665  | 0772  | 0773  | 0773  | 0773  | 0672  | 0773  | 0773  | 0590  | 0668  | 0771  | 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 |          |    |  |
| Pars Distalis, Carcinoma                        |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X        | 1  |  |
| Thyroid Gland                                   | +           | +     | +     | +     | +     | M     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | 49 |  |
| Bilateral, C-cell, Adenoma                      |             |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |          | 2  |  |
| C-cell, Adenoma                                 |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |          | 2  |  |
| C-cell, Carcinoma                               |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |          | 1  |  |
| Follicular Cell, Adenoma                        |             |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          | 1  |  |
| <b>GENERAL BODY SYSTEM</b>                      |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |    |  |
| NONE  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |    |  |
| <b>GENITAL SYSTEM</b>                           |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |    |  |
| Clitoral Gland                                  | +           | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | +     | +     | M     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +        | 47 |  |
| Adenoma   |             |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       | X     |       |       |          | 6  |  |
| Carcinoma                                       |             |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          | 3  |  |
| Ovary   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | 50 |  |
| Granulosa Cell Tumor Malignant                  |             |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |          | 1  |  |
| Leukemia Mononuclear                            |             |       |       |       | X     | X     | X     |       |       |       |       | X     | X     |       |       |       |       |       |       |       |       | X     |       |       | X        | 8  |  |
| Uterus  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | 50 |  |
| Carcinoma                                       | X           |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          | 1  |  |
| Leukemia Mononuclear                            |             |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          | 2  |  |
| Polyp Stromal                                   |             |       |       |       | X     |       |       |       |       |       |       |       |       |       | X     | X     |       |       |       |       |       |       |       |       |          | 6  |  |
| <b>HEMATOPOIETIC SYSTEM</b>                     |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |    |  |
| Bone Marrow                                     | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | 50 |  |

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| FISCHER 344-TACONIC RATS<br>FEMALE<br>2.5 mg/m3 | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | * TOTALS |       |       |       |       |    |  |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|-------|-------|----|--|
|   | 0591        | 0590  | 0731  | 0541  | 0559  | 0614  | 0713  | 0771  | 0553  | 0665  | 0772  | 0773  | 0773  | 0773  | 0672  | 0773  | 0773  | 0590  | 0668  | 0771  |          | 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 | 00550 |    |  |
| Lymph Node                                      |             |       |       | +     | +     |       |       |       |       |       | +     |       |       |       |       |       |       |       |       |       |          |       |       |       |       | 7  |  |
| Deep Cervical, Lumbar, Leukemia Mononuclear     |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |       | 1  |  |
| Iliac, Pancreatic, Renal, Leukemia Mononuclear  |             |       |       |       |       | X     |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |       | 2  |  |
| Lumbar, Pancreatic, Renal, Leukemia Mononuclear |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |       | 1  |  |
| Renal, Leukemia Mononuclear                     |             |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |          |       |       |       |       | 2  |  |
| Lymph Node, Bronchial Leukemia Mononuclear      | +           | M     | M     | +     | +     | M     | M     | M     | M     | M     | +     | M     | +     | +     | M     | M     | M     | M     | M     | M     | M        | M     | M     | M     | M     | 22 |  |
|   |             |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       | 2     |    |  |
| Lymph Node, Mandibular Leukemia Mononuclear     | +           | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +        | +     | +     | +     | 47    |    |  |
|   |             |       |       |       | X     |       | X     |       |       |       | X     |       |       |       |       |       |       |       |       |       |          |       |       |       | 6     |    |  |
| Lymph Node, Mediastinal Leukemia Mononuclear    | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | +        | +     | +     | +     | 48    |    |  |
|   |             |       |       |       | X     |       | X     |       |       |       | X     |       |       |       |       |       |       |       |       |       |          |       |       |       | 4     |    |  |
| Lymph Node, Mesenteric Leukemia Mononuclear     | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | +     | 50    |    |  |
|   |             |       |       |       |       |       | X     |       |       |       | X     |       |       |       |       | X     |       |       |       |       |          |       |       |       | 5     |    |  |
| Spleen Leukemia Mononuclear                     | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | +     | 50    |    |  |
|   | X           | X     | X     | X     | X     | X     | X     |       |       | X     | X     | X     | X     |       |       | X     | X     | X     | X     |       |          | X     |       | X     | 28    |    |  |
| Thymus Leukemia Mononuclear                     | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | +     | +     | +     | M        | M     | +     | M     | 46    |    |  |
|   |             |       |       |       | X     |       | X     |       |       |       | X     |       |       |       |       |       |       |       |       |       |          |       |       |       | 4     |    |  |
| <b>INTEGUMENTARY SYSTEM</b>                     |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       |       |       |    |  |
| Mammary Gland                                   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | +     | 50    |    |  |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>2.5 mg/m3 | DAY ON TEST |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | * TOTALS |  |
|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|--|
|   | 0591        | 0590  | 0731  | 0734  | 0589  | 0654  | 0177  | 0773  | 0771  | 0593  | 0665  | 0773  | 0771  | 0772  | 0772  | 0668  | 0772  | 0773  | 0590  | 0668  | 0771  | 0771  | 0667  | 0773  |          |  |
| ANIMAL ID                                       | 00526       | 00527 | 00528 | 00529 | 00553 | 00555 | 00557 | 00558 | 00559 | 00560 | 00561 | 00562 | 00563 | 00564 | 00565 | 00566 | 00567 | 00568 | 00569 | 00570 | 00571 | 00572 | 00573 | 00574 |          |  |
| Adenocarcinoma                                  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1        |  |
| Adenoma   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1        |  |
| Fibroadenoma                                    |             |       |       |       |       |       | X     | X     | X     |       | X     | X     |       |       |       | X     | X     |       | X     | X     | X     |       |       | 15    |          |  |
| Skin  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |  |
| Keratoacanthoma                                 |             |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       | 2     |          |  |
| Squamous Cell Papilloma                         |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       | 1     |          |  |
| <b>MUSCULOSKELETAL SYSTEM</b>                   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |  |
| Bone  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |  |
| <b>NERVOUS SYSTEM</b>                           |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |  |
| Brain   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |  |
| Carcinoma, Metastatic, Pituitary Gland          |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       | 1     |          |  |
| Glioma Malignant                                |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |          |  |
| Leukemia Mononuclear                            |             |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |          |  |
| <b>RESPIRATORY SYSTEM</b>                       |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |  |
| Larynx  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |  |
| Leukemia Mononuclear                            |             |       |       |       |       | X     | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 2     |          |  |
| Lung  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |  |
| Alveolar/Bronchiolar Adenoma                    |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       | X     |       |       | 6     |          |  |
| Alveolar/Bronchiolar Adenoma, Multiple          |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 3     |          |  |
| Alveolar/Bronchiolar Carcinoma                  |             |       |       |       |       |       |       |       |       | X     | X     |       |       |       |       | X     | X     |       |       |       | X     | X     |       | 14    |          |  |
| Alveolar/Bronchiolar Carcinoma, Multiple        |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 3     |          |  |
| Cystic Keratinizing Epithelioma                 |             |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |       | 1     |          |  |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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





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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>5.0 mg/m3 | DAY ON TEST           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | ANIMAL ID | females<br>(cont...) |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------|----------------------|
|   | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>4<br>7<br>8      | 0<br>7<br>3<br>0      | 0<br>4<br>7<br>3      | 0<br>6<br>0<br>0      | 0<br>7<br>2<br>5      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>9<br>1      | 0<br>7<br>1<br>2      | 0<br>5<br>3<br>0      | 0<br>5<br>0<br>6      | 0<br>7<br>3<br>2      | 0<br>6<br>4<br>6      | 0<br>7<br>3<br>2      | 0<br>4<br>8<br>9      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      |                       |           |                      |
|   | 0<br>0<br>7<br>0<br>1 | 0<br>0<br>7<br>0<br>2 | 0<br>0<br>7<br>0<br>3 | 0<br>0<br>7<br>0<br>4 | 0<br>0<br>7<br>0<br>5 | 0<br>0<br>7<br>0<br>6 | 0<br>0<br>7<br>0<br>7 | 0<br>0<br>7<br>0<br>8 | 0<br>0<br>7<br>0<br>9 | 0<br>0<br>7<br>1<br>0 | 0<br>0<br>7<br>1<br>1 | 0<br>0<br>7<br>1<br>2 | 0<br>0<br>7<br>1<br>3 | 0<br>0<br>7<br>1<br>4 | 0<br>0<br>7<br>1<br>5 | 0<br>0<br>7<br>1<br>6 | 0<br>0<br>7<br>1<br>7 | 0<br>0<br>7<br>1<br>8 | 0<br>0<br>7<br>1<br>9 | 0<br>0<br>7<br>2<br>0 | 0<br>0<br>7<br>2<br>1 | 0<br>0<br>7<br>2<br>2 | 0<br>0<br>7<br>2<br>3 | 0<br>0<br>7<br>2<br>4 | 0<br>0<br>7<br>2<br>5 |           |                      |

**ALIMENTARY SYSTEM**

|                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Esophagus                 | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Cecum    | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Colon    | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Intestine Large, Rectum   | + | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Intestine Small, Duodenum | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Intestine Small, Ileum    | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Intestine Small, Jejunum  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Liver                     | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Leukemia Mononuclear      |   |   |   | X | X |   | X |   | X |   |   |   | X | X |   |   |   | X | X | X |   |   |   |   |   |   |
| Mesentery                 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Leukemia Mononuclear      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Pancreas                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Salivary Glands           | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Stomach, Forestomach      | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |
| Squamous Cell Papilloma   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Stomach, Glandular        | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |   |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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



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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>5.0 mg/m3                                   | DAY ON TEST      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |   | ANIMAL ID             | females<br>(cont...) |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---|-----------------------|----------------------|
|   | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>4<br>7<br>8 | 0<br>7<br>3<br>0 | 0<br>4<br>7<br>3 | 0<br>6<br>0<br>0 | 0<br>7<br>2<br>5 | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>1 | 0<br>6<br>9<br>1 | 0<br>7<br>1<br>2 | 0<br>5<br>3<br>0 | 0<br>5<br>0<br>6 | 0<br>7<br>3<br>2 | 0<br>6<br>4<br>6 | 0<br>7<br>3<br>2 | 0<br>4<br>8<br>9 | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>1 |   |                       |                      |
|   | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0 | 0<br>0<br>7<br>0<br>1 |                      |
| Leukemia Mononuclear<br>Pars Distalis, Adenoma<br>Pars Distalis, Carcinoma        | X                | X                |                  |                  |                  |                  |                  | X                |                  | X                |                  | X                | X                |                  |                  | X                |                  | X                | X                |                  | X                |                  |                  |                  | X |                       |                      |
| Thyroid Gland<br>C-cell, Adenoma<br>C-cell, Carcinoma<br>Follicular Cell, Adenoma | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | +                | + |                       |                      |

**GENERAL BODY SYSTEM**

NONE

**GENITAL SYSTEM**

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Clitoral Gland<br>Adenoma<br>Carcinoma          | + | M | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | M | + | + | + |  |
| Ovary<br>Leukemia Mononuclear<br>Thecoma Benign | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
| Uterus<br>Leukemia Mononuclear<br>Polyp Stromal | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |

**HEMATOPOIETIC SYSTEM**

|             |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| Bone Marrow | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |  |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|

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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>5.0 mg/m3  | DAY ON TEST           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | females<br>(cont...)  |   |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|---|
|  | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>4<br>7<br>8      | 0<br>7<br>3<br>0      | 0<br>4<br>7<br>3      | 0<br>6<br>0<br>0      | 0<br>7<br>2<br>5      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>9<br>1      | 0<br>7<br>1<br>2      | 0<br>5<br>3<br>0      | 0<br>5<br>0<br>6      | 0<br>7<br>3<br>2      | 0<br>6<br>4<br>6      | 0<br>7<br>3<br>2      | 0<br>4<br>8<br>9      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      |                       |   |
| ANIMAL ID  | 0<br>0<br>7<br>0<br>1 | 0<br>0<br>7<br>0<br>2 | 0<br>0<br>7<br>0<br>3 | 0<br>0<br>7<br>0<br>4 | 0<br>0<br>7<br>0<br>5 | 0<br>0<br>7<br>0<br>6 | 0<br>0<br>7<br>0<br>7 | 0<br>0<br>7<br>0<br>8 | 0<br>0<br>7<br>0<br>9 | 0<br>0<br>7<br>0<br>0 | 0<br>0<br>7<br>0<br>1 | 0<br>0<br>7<br>0<br>2 | 0<br>0<br>7<br>0<br>3 | 0<br>0<br>7<br>0<br>4 | 0<br>0<br>7<br>0<br>5 | 0<br>0<br>7<br>0<br>6 | 0<br>0<br>7<br>0<br>7 | 0<br>0<br>7<br>0<br>8 | 0<br>0<br>7<br>0<br>9 | 0<br>0<br>7<br>0<br>0 | 0<br>0<br>7<br>0<br>1 | 0<br>0<br>7<br>0<br>2 | 0<br>0<br>7<br>0<br>3 | 0<br>0<br>7<br>0<br>4 | 0<br>0<br>7<br>0<br>5 |   |
| Leukemia Mononuclear                             |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |
| Lymph Node                                       |                       |                       |                       | +                     |                       | +                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | + |
| Lumbar, Pancreatic, Renal, Leukemia Mononuclear  |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |
| Pancreatic, Leukemia Mononuclear                 |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |
| Renal, Leukemia Mononuclear                      |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X |
| Lymph Node, Bronchial                            | +                     | M                     | +                     | M                     | M                     | M                     | +                     | M                     | M                     | +                     | +                     | M                     | M                     | M                     | +                     | +                     | M                     | +                     | +                     | M                     | +                     | +                     | +                     | +                     | M                     |   |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |
| Leukemia Mononuclear                             |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |   |
| Lymph Node, Mandibular                           | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | M                     | +                     | +                     | M                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |   |
| Leukemia Mononuclear                             |                       |                       |                       |                       | X                     | X                     |                       |                       |                       |                       | X                     |                       |                       |                       | X                     |                       |                       |                       |                       |                       | X                     | X                     |                       |                       |                       |   |
| Lymph Node, Mediastinal                          | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |   |
| Leukemia Mononuclear                             |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       | X                     |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       | X                     |   |
| Lymph Node, Mesenteric                           | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |   |
| Leukemia Mononuclear                             |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |   |
| Spleen   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |   |
| Leukemia Mononuclear                             | X                     |                       | X                     |                       | X                     | X                     |                       | X                     |                       | X                     |                       |                       |                       | X                     | X                     |                       |                       |                       |                       | X                     | X                     | X                     |                       |                       |                       |   |
| Thymus   | +                     | +                     | +                     | +                     | +                     | +                     | M                     | +                     | +                     | +                     | +                     | M                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |   |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |   |
| Leukemia Mononuclear                             |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |   |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>5.0 mg/m3 | DAY ON TEST      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                       | ANIMAL ID | females<br>(cont...) |
|---|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|-----------|----------------------|
|   | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>0 | 0<br>7<br>3<br>1 | 0<br>4<br>7<br>8 | 0<br>7<br>3<br>0 | 0<br>4<br>7<br>3 | 0<br>6<br>0<br>0 | 0<br>7<br>2<br>5 | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>1 | 0<br>6<br>9<br>1 | 0<br>7<br>1<br>2 | 0<br>5<br>3<br>0 | 0<br>5<br>0<br>6 | 0<br>7<br>3<br>2 | 0<br>6<br>4<br>6 | 0<br>7<br>3<br>2 | 0<br>4<br>8<br>9 | 0<br>7<br>3<br>2 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>1 | 0<br>7<br>3<br>2 |                       |           |                      |
|   | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0                | 0<br>0<br>7<br>0<br>1 |           |                      |

**INTEGUMENTARY SYSTEM**

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mammary Gland                             | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Adenoma                                   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Carcinoma                                 |   |   |   |   |   |   |   |   |   |   |   | X | X |   |   |   |   |   |   |   | X |   |   |
| Fibroadenoma                              |   | X | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |
| Skin                                      | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Keratoacanthoma                           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |
| Subcutaneous Tissue, Fibroma              |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Subcutaneous Tissue, Schwannoma Malignant |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**MUSCULOSKELETAL SYSTEM**

|  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bone                                   | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Skeletal Muscle                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Schwannoma Malignant, Metastatic, Skin |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**NERVOUS SYSTEM**

|  |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brain                                  | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Carcinoma, Metastatic, Pituitary Gland |   |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Leukemia Mononuclear                   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |

**RESPIRATORY SYSTEM**

|        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|--------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Larynx | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| Lung   | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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

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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>5.0 mg/m3               | DAY ON TEST           |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | females<br>(cont...)  |  |  |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|--|--|
|   | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>0      | 0<br>7<br>3<br>1      | 0<br>4<br>7<br>8      | 0<br>7<br>3<br>0      | 0<br>4<br>7<br>3      | 0<br>6<br>0<br>0      | 0<br>7<br>2<br>5      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>6<br>9<br>1      | 0<br>7<br>1<br>2      | 0<br>5<br>3<br>0      | 0<br>5<br>0<br>6      | 0<br>7<br>3<br>2      | 0<br>6<br>4<br>6      | 0<br>7<br>3<br>2      | 0<br>4<br>8<br>9      | 0<br>7<br>3<br>2      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>1      | 0<br>7<br>3<br>2      |                       |  |  |
| ANIMAL ID   | 0<br>0<br>7<br>0<br>1 | 0<br>0<br>7<br>0<br>2 | 0<br>0<br>7<br>0<br>3 | 0<br>0<br>7<br>0<br>4 | 0<br>0<br>7<br>0<br>5 | 0<br>0<br>7<br>0<br>6 | 0<br>0<br>7<br>0<br>7 | 0<br>0<br>7<br>0<br>8 | 0<br>0<br>7<br>0<br>9 | 0<br>0<br>7<br>1<br>0 | 0<br>0<br>7<br>1<br>1 | 0<br>0<br>7<br>1<br>2 | 0<br>0<br>7<br>1<br>3 | 0<br>0<br>7<br>1<br>4 | 0<br>0<br>7<br>1<br>5 | 0<br>0<br>7<br>1<br>6 | 0<br>0<br>7<br>1<br>7 | 0<br>0<br>7<br>1<br>8 | 0<br>0<br>7<br>1<br>9 | 0<br>0<br>7<br>2<br>0 | 0<br>0<br>7<br>2<br>1 | 0<br>0<br>7<br>2<br>2 | 0<br>0<br>7<br>2<br>3 | 0<br>0<br>7<br>2<br>4 | 0<br>0<br>7<br>2<br>5 |  |  |
| Alveolar/Bronchiolar Adenoma                                  |                       |                       |                       |                       |                       | X                     | X                     |                       |                       |                       |                       | X                     | X                     |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |  |  |
| Alveolar/Bronchiolar Adenoma, Multiple                        |                       | X                     |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |  |  |
| Alveolar/Bronchiolar Carcinoma                                |                       | X                     |                       |                       |                       | X                     |                       | X                     |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |  |  |
| Alveolar/Bronchiolar Carcinoma, Multiple                      | X                     |                       | X                     |                       |                       |                       |                       |                       | X                     | X                     | X                     |                       |                       | X                     |                       | X                     |                       |                       | X                     |                       | X                     |                       | X                     | X                     |                       |  |  |
| Cystic Keratinizing Epithelioma                               | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |  |  |
| Leukemia Mononuclear  |                       |                       |                       | X                     | X                     |                       |                       |                       | X                     |                       |                       |                       |                       | X                     |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |  |  |
| Pheochromocytoma Malignant, Metastatic, Adrenal Medulla       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |  |  |
| Squamous Cell Carcinoma                                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |  |  |
| Mediastinum, Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |  |  |
| Nose  | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |  |  |
| Leukemia Mononuclear  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       | X                     |                       |                       |                       |                       |                       |  |  |
| Trachea   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |  |  |
| <b>SPECIAL SENSES SYSTEM</b>                                  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |  |  |
| Ear   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |  |  |
| Eye   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |  |  |
| Harderian Gland   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |  |  |
| <b>URINARY SYSTEM</b>   |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |  |  |
| Kidney  | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |  |  |
| Leukemia Mononuclear  |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       |                       | X                     |                       |                       |                       |  |  |
| Urinary Bladder   | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     | +                     |  |  |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
 I .. Insufficient tissue

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







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

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>5.0 mg/m3 | DAY ON TEST   |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               | * TOTALS |       |       |       |       |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|-------|-------|-------|-------|
|   | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 | 0647000077226 |          |       |       |       |       |
| ANIMAL ID                                       | 00726         | 00727         | 00728         | 00729         | 00730         | 00731         | 00732         | 00733         | 00734         | 00735         | 00736         | 00737         | 00738         | 00739         | 00740         | 00741         | 00742         | 00743         | 00744         | 00745         | 00746    | 00747 | 00748 | 00749 | 00750 |

Tooth + + 2

**CARDIOVASCULAR SYSTEM**

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| Heart   | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Leukemia Mononuclear  |   | X |   |   |   | X |   |   | X |   |   | X |   |   |   | X |   |   |   |   |   |   |   | X |   | 8  |
| Pheochromocytoma Malignant, Metastatic, Adrenal Medulla           |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   | 1  |
| Pericardium, Rhabdomyosarcoma, Metastatic, Uncertain Primary Site |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1  |

**ENDOCRINE SYSTEM**

|                                       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |
|---------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|
| Adrenal Cortex                        | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Leukemia Mononuclear                  |   | X |   |   |   |   |   |   | X |   |   | X |   |   |   | X |   |   |   | X |   |   | X | X |   | 11 |
| Adrenal Medulla                       | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Leukemia Mononuclear                  | X | X |   |   |   |   |   |   | X |   |   | X |   |   |   | X |   |   |   | X |   |   | X | X |   | 12 |
| Pheochromocytoma Benign               |   |   |   | X |   | X |   |   |   | X | X | X |   |   |   | X | X | X |   | X | X |   |   | X |   | 17 |
| Pheochromocytoma Malignant            |   |   |   | X |   |   |   |   | X |   |   | X |   |   |   |   |   |   | X |   |   |   |   |   |   | 7  |
| Bilateral, Pheochromocytoma Benign    | X |   |   |   |   |   | X | X | X |   |   |   | X |   | X | X |   |   |   |   |   |   | X |   |   | 19 |
| Bilateral, Pheochromocytoma Malignant |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   | X |   |   |   | 4  |
| Islets, Pancreatic                    | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |
| Adenoma                               |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 1  |
| Carcinoma                             |   |   |   |   |   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   | 3  |
| Parathyroid Gland                     | M | + | + | + | + | + | + | + | M | + | + | + | + | + | M | + | + | + | + | + | + | + | + | + | + | 45 |
| Pituitary Gland                       | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | 50 |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
 X .. Lesion present  
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Experiment Number: 60311 - 05  
 Test Type: CHRONIC  
 Route: RESPIRATORY EXPOSURE WHOLE BODY  
 Species/Strain: RATS/F344/N Tac

P04: NEOPLASMS BY INDIVIDUAL ANIMAL  
 Cobalt  
 CAS Number: 7440-48-4

Date Report Requested: 01/18/2012  
 Time Report Requested: 14:48:11  
 First Dose M/F: 05/08/06 / 05/08/06  
 Lab: BNW

| FISCHER 344-TACONIC RATS<br>FEMALE<br>5.0 mg/m3                                   | DAY ON TEST |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        | * TOTALS |                   |
|---|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|----------|-------------------|
|   | 064704      | 066731 | 067321 | 067331 | 067590 | 067730 | 067634 | 066681 | 066611 | 067439 | 067730 | 067730 | 067670 | 067731 | 067731 | 067731 | 067731 | 067731 | 067731 | 067731 | 067731 | 067731 | 067731 | 067731 |          | 067731            |
| ANIMAL ID   | 00726       | 00727  | 00728  | 00729  | 00730  | 00731  | 00732  | 00733  | 00734  | 00735  | 00736  | 00737  | 00738  | 00739  | 00740  | 00741  | 00742  | 00743  | 00744  | 00745  | 00746  | 00747  | 00748  | 00749  | 00750    |                   |
| Leukemia Mononuclear<br>Pars Distalis, Adenoma<br>Pars Distalis, Carcinoma        |             | X      |        |        | X      |        |        | X      |        | X      | X      | X      |        | X      |        |        |        | X      | X      | X      | X      |        |        |        |          | 1<br>22<br>1      |
| Thyroid Gland<br>C-cell, Adenoma<br>C-cell, Carcinoma<br>Follicular Cell, Adenoma | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +        | 50<br>2<br>1<br>1 |
| <b>GENERAL BODY SYSTEM</b>  |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |                   |
| NONE  |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |                   |
| <b>GENITAL SYSTEM</b>   |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |                   |
| Clitoral Gland<br>Adenoma<br>Carcinoma  | +           | +      | +      | +      | +      | M      | +      | +      | +      | +      | +      | +      | +      | +      | M      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +        | 46<br>2<br>4      |
| Ovary<br>Leukemia Mononuclear<br>Thecoma Benign                                   | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +        | 50<br>7<br>1      |
| Uterus<br>Leukemia Mononuclear<br>Polyp Stromal                                   | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +        | 50<br>1<br>10     |
| <b>HEMATOPOIETIC SYSTEM</b>   |             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |          |                   |
| Bone Marrow   | +           | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +      | +        | 50                |

\* .. Total animals with tissue examined microscopically; Total animals with tumor  
 + .. Tissue examined microscopically  
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|--|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|-------|-------|------|
|  | 0674        | 0673  | 0641  | 0673  | 0673  | 0659  | 0673  | 0663  | 0666  | 0671  | 0657  | 0673  | 0667  | 0673  | 0666  | 0677  | 0657  | 0676  | 0677  | 0677  |          | 0667  | 0676  | 0677 |
| ANIMAL ID  | 00726       | 00772 | 00777 | 00777 | 00777 | 00773 | 00773 | 00773 | 00773 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777    | 00777 | 00777 |      |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Lymph Node                                       |             |       |       |       |       |       |       |       |       | +     |       |       |       |       |       |       |       |       |       |       |          |       |       | 5    |
| Lumbar, Pancreatic, Renal, Leukemia Mononuclear  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Pancreatic, Leukemia Mononuclear                 |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 2    |
| Renal, Leukemia Mononuclear                      |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Lymph Node, Bronchial                            | M           | +     | +     | +     | +     | M     | M     | M     | M     | M     | M     | M     | M     | M     | M     | M     | M     | M     | M     | M     | M        | M     | M     | 17   |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 2    |
| Lymph Node, Mandibular                           | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | M     | 47   |
| Leukemia Mononuclear                             | X           |       |       |       |       |       |       |       |       | X     |       |       |       |       | X     |       |       |       |       |       |          |       |       | 9    |
| Lymph Node, Mediastinal                          | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | M     | +     | +     | +     | +     | +     | +        | +     | +     | 48   |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       | X     |       |       |       |       |       |       |       |       |       |       |          |       | X     | 6    |
| Lymph Node, Mesenteric                           | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50   |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       | X     |       |       |       |       | X     |       |       |       |       |       |          |       | X     | 5    |
| Spleen   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +        | +     | +     | 50   |
| Leukemia Mononuclear                             | X           | X     |       | X     | X     | X     | X     |       | X     | X     |       | X     |       |       | X     |       | X     |       | X     | X     | X        |       | X     | 27   |
| Thymus   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | M     | +     | +     | +     | +     | +        | +     | +     | 47   |
| Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       |       | 1    |
| Leukemia Mononuclear                             |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |       | X     | 3    |

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|---|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----------|
|   | 0674        | 0673  | 0641  | 0672  | 0673  | 0659  | 0673  | 0663  | 0666  | 0671  | 0657  | 0673  | 0667  | 0673  | 0667  | 0657  | 0676  | 0677  | 0673  | 0673  | 0671  | 0677  | 0667  | 0673  |          |
| ANIMAL ID   | 00726       | 00772 | 00778 | 00772 | 00777 | 00773 | 00733 | 00733 | 00733 | 00733 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 | 00777 |          |
| Alveolar/Bronchiolar Adenoma                                  |             |       |       | X     |       |       |       |       |       |       | X     |       |       | X     |       |       |       |       | X     |       |       |       |       | 9     |          |
| Alveolar/Bronchiolar Adenoma, Multiple                        |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       |       |       | 4     |          |
| Alveolar/Bronchiolar Carcinoma                                |             |       | X     |       |       |       | X     |       |       |       |       | X     |       | X     |       |       |       |       | X     | X     |       | X     |       | 12    |          |
| Alveolar/Bronchiolar Carcinoma, Multiple                      | X           |       |       |       | X     |       |       |       |       |       | X     |       |       | X     |       |       |       | X     |       |       | X     |       | X     | 18    |          |
| Cystic Keratinizing Epithelioma                               |             | X     |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 2     |          |
| Leukemia Mononuclear  | X           | X     |       |       | X     | X     |       |       | X     |       | X     |       |       |       | X     |       |       |       |       |       | X     | X     |       | 14    |          |
| Pheochromocytoma Malignant, Metastatic, Adrenal Medulla       |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       | 1     |          |
| Squamous Cell Carcinoma                                       |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | X     |       |       | 1     |          |
| Mediastinum, Alveolar/Bronchiolar Carcinoma, Metastatic, Lung |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |          |
| Nose  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Leukemia Mononuclear  |             |       |       |       |       |       |       |       | X     |       |       |       |       |       | X     |       |       |       |       |       |       |       |       | 4     |          |
| Trachea   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| <b>SPECIAL SENSES SYSTEM</b>                                  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |
| Ear   |             |       |       |       | +     |       | +     |       |       |       |       |       |       |       |       |       |       |       |       |       | +     |       |       | 3     |          |
| Eye   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Harderian Gland   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| <b>URINARY SYSTEM</b>   |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |          |
| Kidney  | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |
| Leukemia Mononuclear  |             |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       | 1     |          |
| Urinary Bladder   | +           | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | +     | 50    |          |

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