

Experiment Number: 60311 - 05

**P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH  
AVERAGE SEVERITY GRADES[b]**

Date Report Requested: 01/18/2012

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

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

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
-------------------------------	---------	------------	-----------	-----------

**Disposition Summary**

<b>Animals Initially In Study</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>
<b>Early Deaths</b>				
<b>Accidentally Killed</b>			<b>1</b>	
<b>Moribund Sacrifice</b>	<b>28</b>	<b>28</b>	<b>27</b>	<b>32</b>
<b>Natural Death</b>	<b>5</b>	<b>2</b>	<b>6</b>	<b>2</b>
<b>Survivors</b>				
<b>Terminal Sacrifice</b>	<b>17</b>	<b>20</b>	<b>16</b>	<b>16</b>
<b>Animals Examined Microscopically</b>	<b>50</b>	<b>50</b>	<b>50</b>	<b>50</b>

## ALIMENTARY SYSTEM

Esophagus	(50)	(50)	(48)	(48)
Inflammation, Suppurative	1 [4.0]			
Intestine Large, Cecum	(49)	(50)	(49)	(50)
Inflammation, Granulomatous		1 [4.0]		
Epithelium, Hyperplasia			1 [1.0]	
Intestine Large, Colon	(50)	(50)	(49)	(50)
Epithelium, Hyperplasia			1 [1.0]	
Intestine Large, Rectum	(50)	(49)	(49)	(49)
Intestine Small, Duodenum	(50)	(50)	(49)	(50)
Inflammation, Chronic Active			5 [1.8]	
Necrosis			1 [2.0]	1 [3.0]
Intestine Small, Ileum	(48)	(50)	(47)	(50)
Inflammation, Suppurative			1 [1.0]	
Epithelium, Hyperplasia			1 [1.0]	
Intestine Small, Jejunum	(48)	(49)	(48)	(49)
Epithelium, Hyperplasia			1 [1.0]	
Liver	(50)	(50)	(50)	(50)
Atrophy	1 [2.0]			2 [1.5]
Basophilic Focus	5	17	17	19
Clear Cell Focus	9	11	7	9
Degeneration, Cystic		5 [1.2]		1 [1.0]
Eosinophilic Focus	3	2		1
Fatty Change	2 [2.0]	4 [1.3]	3 [1.7]	4 [1.0]

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Hepatodiaphragmatic Nodule	4	9	11	9
Inflammation, Chronic Active	1 [2.0]			1 [1.0]
Mixed Cell Focus		1	1	1
Necrosis	5 [1.6]	6 [2.0]	4 [1.5]	2 [2.0]
Regeneration			1 [2.0]	
Thrombosis	1 [1.0]			
Bile Duct, Hyperplasia	1 [3.0]			
Mesentery	(18)	(4)	(9)	(3)
Infiltration Cellular			1 [2.0]	
Artery, Inflammation, Chronic Active				1 [3.0]
Artery, Thrombosis	1 [3.0]			
Fat, Necrosis	14 [1.1]	4 [1.0]	8 [1.1]	1 [1.0]
Pancreas	(50)	(50)	(49)	(50)
Acinus, Atrophy	23 [1.1]	35 [1.4]	28 [1.4]	30 [1.4]
Acinus, Hyperplasia	1 [2.0]			
Artery, Mineralization				1 [2.0]
Salivary Glands	(50)	(50)	(50)	(50)
Degeneration				1 [2.0]
Stomach, Forestomach	(50)	(50)	(50)	(50)
Edema	2 [2.5]			
Hyperplasia, Squamous	10 [2.2]	14 [2.2]	13 [1.9]	11 [1.5]
Inflammation, Chronic Active	2 [1.5]	4 [2.8]	2 [2.5]	1 [2.0]
Mineralization	2 [2.0]			
Ulcer	4 [2.5]	4 [2.0]	10 [2.8]	2 [3.0]
Stomach, Glandular	(50)	(50)	(49)	(50)
Edema	1 [2.0]			
Erosion		1 [1.0]	2 [2.0]	
Inflammation, Chronic Active		1 [3.0]	1 [2.0]	1 [1.0]
Mineralization	1 [2.0]			
Ulcer	1 [3.0]	2 [1.5]	2 [3.0]	1 [3.0]
Tooth	(0)	(2)	(0)	(0)
Inflammation, Chronic Active		2 [2.5]		

## CARDIOVASCULAR SYSTEM

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Blood Vessel	(1)	(1)	(0)	(0)
Aorta, Mineralization	1 [3.0]			
Heart	(50)	(50)	(50)	(50)
Cardiomyopathy	45 [1.7]	44 [1.5]	46 [1.6]	39 [1.5]
Inflammation, Suppurative		1 [2.0]	2 [2.0]	
Thrombosis	4 [3.0]	2 [2.0]	2 [1.5]	
Artery, Inflammation, Chronic Active		1 [3.0]		1 [2.0]
Atrium, Congestion		1 [2.0]	1 [2.0]	
Epicardium, Hyperplasia		1 [2.0]		

## ENDOCRINE SYSTEM

Adrenal Cortex	(50)	(50)	(50)	(50)
Accessory Adrenal Cortical Nodule	3 [1.0]		2 [1.0]	3 [1.0]
Atrophy		1 [1.0]		
Degeneration	1 [3.0]			
Hyperplasia	35 [1.4]	24 [1.6]	23 [1.5]	29 [1.0]
Necrosis		1 [2.0]	1 [1.0]	
Adrenal Medulla	(50)	(50)	(50)	(50)
Hyperplasia	19 [2.3]	21 [2.5]	9 [3.0]	9 [2.4]
Necrosis		1 [4.0]		
Islets, Pancreatic	(50)	(50)	(48)	(49)
Hyperplasia		1 [2.0]	1 [4.0]	3 [2.3]
Parathyroid Gland	(45)	(45)	(47)	(46)
Pituitary Gland	(50)	(50)	(49)	(49)
Angiectasis	1 [1.0]			1 [3.0]
Cyst	1			
Hemorrhage		1 [3.0]	1 [3.0]	
Pars Distalis, Hyperplasia	18 [2.1]	12 [1.8]	14 [2.4]	22 [2.4]
Thyroid Gland	(49)	(50)	(50)	(49)
Hemorrhage	1 [1.0]			
C-cell, Hyperplasia	7 [1.4]	8 [1.6]	5 [1.8]	9 [2.0]
Follicle, Cyst				1

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
<b>GENERAL BODY SYSTEM</b>				
Peritoneum	(0)	(0)	(0)	(1)
Inflammation, Chronic Active				1 [2.0]
<b>GENITAL SYSTEM</b>				
Epididymis	(50)	(50)	(50)	(50)
Cyst	1			
Penis	(0)	(1)	(0)	(0)
Concretion		1 [2.0]		
Preputial Gland	(50)	(50)	(49)	(48)
Atrophy				1 [3.0]
Ectasia	3 [2.3]	1 [3.0]	1 [3.0]	
Inflammation, Chronic Active	5 [1.2]	4 [1.3]	3 [2.0]	3 [2.0]
Prostate	(50)	(50)	(50)	(50)
Fibrosis			1 [2.0]	
Hyperplasia	1 [1.0]	6 [2.0]	1 [1.0]	1 [1.0]
Inflammation, Chronic Active	36 [1.7]	39 [1.5]	42 [1.6]	28 [1.6]
Seminal Vesicle	(50)	(50)	(50)	(50)
Inflammation, Chronic Active	1 [4.0]	1 [2.0]		1 [3.0]
Testes	(50)	(50)	(50)	(50)
Atrophy	35 [3.3]	34 [3.0]	36 [3.0]	39 [2.6]
Infarct	1 [3.0]		2 [3.5]	12 [2.7]
Arteriole, Inflammation, Chronic Active	2 [2.5]		1 [2.0]	
Interstitial Cell, Hyperplasia	7 [2.1]	10 [2.1]	12 [1.3]	12 [1.9]
<b>HEMATOPOIETIC SYSTEM</b>				
Bone Marrow	(50)	(50)	(50)	(50)
Necrosis			1 [2.0]	
Lymph Node	(12)	(9)	(5)	(9)
Iliac, Ectasia	1 [3.0]			
Iliac, Lumbar, Ectasia		1 [1.0]		

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Iliac, Renal, Ectasia		1 [3.0]		
Lumbar, Hyperplasia		1 [1.0]		
Pancreatic, Ectasia	1 [2.0]			1 [3.0]
Pancreatic, Infiltration Cellular, Histiocyte			1 [3.0]	
Pancreatic, Necrosis		1 [4.0]		
Renal, Ectasia	2 [2.0]	3 [2.7]	1 [2.0]	1 [2.0]
Renal, Hemorrhage				1 [1.0]
Lymph Node, Bronchial	(27)	(25)	(21)	(20)
Lymph Node, Mandibular	(48)	(49)	(50)	(48)
Atrophy	1 [2.0]			
Congestion		1 [3.0]		
Ectasia	1 [4.0]	2 [3.0]	1 [3.0]	2 [2.5]
Hyperplasia	1 [2.0]	2 [1.5]	1 [1.0]	1 [2.0]
Necrosis	1 [2.0]	1 [2.0]		
Lymph Node, Mediastinal	(46)	(48)	(46)	(48)
Hyperplasia, Lymphoid			1 [2.0]	
Lymph Node, Mesenteric	(49)	(50)	(49)	(49)
Hemorrhage	1 [2.0]			
Infiltration Cellular, Histiocyte				1 [2.0]
Spleen	(50)	(50)	(50)	(50)
Congestion		1 [1.0]		
Fibrosis	8 [1.6]	8 [1.6]	7 [2.1]	4 [1.5]
Hematopoietic Cell Proliferation	3 [2.0]	2 [2.0]		3 [1.7]
Hemorrhage	1 [2.0]	1 [1.0]		
Necrosis	3 [3.0]	2 [2.0]	1 [1.0]	6 [2.0]
Stromal Hyperplasia			1 [4.0]	
Capsule, Angiectasis	1 [1.0]			
Thymus	(46)	(44)	(47)	(46)

## INTEGUMENTARY SYSTEM

Mammary Gland	(31)	(32)	(30)	(31)
Galactocele	2 [2.0]	1 [2.0]	1 [4.0]	
Hyperplasia	2 [3.5]	1 [3.0]	1 [3.0]	
Inflammation, Chronic Active	1 [1.0]			

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Skin	(50)	(50)	(50)	(50)
Cyst Epithelial Inclusion	1 [2.0]			1 [3.0]
Hemorrhage		1 [2.0]		
Hyperplasia, Squamous	2 [3.5]	2 [2.5]	5 [3.0]	1 [3.0]
Inflammation	7 [2.4]	5 [2.2]	9 [2.7]	4 [3.0]
Inflammation, Granulomatous		1 [4.0]		

## MUSCULOSKELETAL SYSTEM

Bone	(50)	(50)	(50)	(50)
Cranium, Fibrosis		1 [2.0]		
Cranium, Fracture			1	
Cranium, Inflammation, Chronic Active		1 [2.0]		
Maxilla, Inflammation, Chronic Active				1 [1.0]
Vertebra, Degeneration		1 [2.0]		
Skeletal Muscle	(1)	(0)	(0)	(4)

## NERVOUS SYSTEM

Brain	(50)	(50)	(50)	(50)
Compression	15 [2.0]	14 [1.9]	18 [1.8]	7 [2.3]
Edema	2 [3.0]			1 [3.0]
Hemorrhage	2 [2.0]	3 [2.0]	4 [2.0]	3 [2.0]
Infiltration Cellular, Mononuclear Cell	1 [1.0]			1 [1.0]
Metaplasia, Osseous	1 [4.0]			
Meninges, Inflammation, Suppurative	1 [3.0]			
Spinal Cord	(1)	(0)	(0)	(0)
Infiltration Cellular	1 [2.0]			

## RESPIRATORY SYSTEM

Larynx	(50)	(50)	(50)	(50)
Autolysis			1	
Foreign Body	3		2	

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Hyperkeratosis				1 [2.0]
Inflammation	28 [1.2]	18 [1.1]	18 [1.1]	16 [1.1]
Metaplasia, Squamous	3 [1.3]	1 [1.0]	1 [1.0]	2 [2.0]
Ulcer	1 [1.0]			
Respiratory Epithelium, Hyperplasia				1 [1.0]
Squamous Epithelium, Hyperplasia				1 [1.0]
Lung (50)	(50)	(50)	(50)	(50)
Inflammation, Suppurative		1 [4.0]	1 [3.0]	
Inflammation, Chronic Active	22 [1.1]	50 [3.0]	50 [2.9]	50 [2.9]
Metaplasia, Osseous	3 [1.0]	3 [2.0]		
Mineralization	1 [2.0]			
Thrombosis	2 [1.5]			
Alveolar Epithelium, Hyperplasia	3 [1.0]	47 [2.8]	49 [3.3]	49 [3.6]
Alveolus, Proteinosis		48 [2.6]	49 [2.9]	49 [3.1]
Artery, Mediastinum, Inflammation, Chronic Active		1 [2.0]		
Bronchiole, Epithelium, Hyperplasia		44 [1.5]	47 [2.7]	50 [3.7]
Mediastinum, Inflammation, Suppurative			1 [2.0]	
Mediastinum, Metaplasia, Osseous		1 [4.0]		
Nose (48)	(48)	(47)	(45)	(50)
Foreign Body	5	2	4	5
Hemorrhage			1 [3.0]	
Inflammation, Suppurative	9 [1.0]	12 [1.7]	24 [2.2]	46 [2.6]
Inflammation, Chronic Active	28 [1.2]	35 [1.3]	40 [1.7]	49 [2.6]
Thrombosis	7 [2.9]	2 [2.5]	4 [2.8]	2 [1.5]
Olfactory Epithelium, Accumulation, Hyaline Droplet	2 [1.5]	4 [1.0]	1 [2.0]	2 [1.0]
Olfactory Epithelium, Atrophy	2 [1.0]	21 [1.0]	34 [1.0]	29 [1.2]
Olfactory Epithelium, Hyperplasia		1 [1.0]	2 [1.5]	7 [1.1]
Olfactory Epithelium, Hyperplasia, Basal Cell		1 [1.0]		13 [1.0]
Olfactory Epithelium, Metaplasia, Respiratory	12 [1.1]	26 [1.7]	37 [1.5]	50 [2.2]
Olfactory Epithelium, Necrosis		1 [1.0]	5 [1.6]	5 [1.8]
Respiratory Epithelium, Hyperplasia	20 [1.3]	35 [1.2]	45 [1.7]	50 [2.2]
Respiratory Epithelium, Metaplasia, Squamous		1 [1.0]	11 [1.2]	35 [1.3]
Respiratory Epithelium, Necrosis	1 [1.0]	4 [1.8]	5 [1.4]	13 [1.6]
Turbinate, Atrophy	1 [1.0]	35 [1.0]	35 [1.0]	41 [1.0]

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)



Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS MALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Turbinate, Hyperostosis	2 [1.0]			
Trachea	(50)	(50)	(50)	(50)
Inflammation, Suppurative				1 [1.0]
Metaplasia, Squamous				1 [1.0]

## SPECIAL SENSES SYSTEM

Ear	(1)	(5)	(0)	(0)
Inflammation, Chronic Active	1 [3.0]	5 [1.8]		
Eye	(50)	(50)	(50)	(50)
Cataract	3 [1.7]	9 [1.8]	9 [2.2]	7 [2.0]
Inflammation, Suppurative	1 [2.0]			
Metaplasia, Osseous	31 [1.2]	36 [1.3]	33 [1.2]	31 [1.1]
Harderian Gland	(50)	(50)	(50)	(50)
Zymbal's Gland	(4)	(3)	(0)	(1)

## URINARY SYSTEM

Kidney	(50)	(50)	(50)	(50)
Accumulation, Hyaline Droplet		1 [2.0]	4 [2.8]	1 [3.0]
Congestion			1 [1.0]	
Cyst		3		1
Fibrosis				1 [2.0]
Infarct	2 [2.0]			1 [2.0]
Metaplasia, Osseous				1 [2.0]
Nephropathy	49 [2.9]	49 [3.0]	50 [2.9]	50 [2.5]
Thrombosis		1 [1.0]		
Artery, Inflammation, Chronic Active				1 [3.0]
Pelvis, Inflammation, Suppurative			1 [2.0]	
Urinary Bladder	(50)	(50)	(50)	(50)
Hemorrhage	1 [1.0]			
Inflammation			2 [3.0]	1 [3.0]
Inflammation, Granulomatous	2 [1.0]			
Transitional Epithelium, Hyperplasia	1 [4.0]	1 [4.0]	1 [3.0]	

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Experiment Number: 60311 - 05

**P18: INCIDENCE RATES OF NON-NEOPLASTIC LESIONS BY ANATOMIC SITE (a) WITH  
AVERAGE SEVERITY GRADES[b]**

Date Report Requested: 01/18/2012

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

---

Fischer 344-Taconic RATS MALE

Control

1.25 mg/m3

2.5 mg/m3

5.0 mg/m3

---

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

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
---------------------------------	---------	------------	-----------	-----------

**Disposition Summary**

Animals Initially In Study	50	50	50	50
Early Deaths				
Moribund Sacrifice	11	20	19	24
Natural Death	4	4	7	1
Survivors				
Moribund Sacrifice				1
Terminal Sacrifice	35	26	24	24
Animals Examined Microscopically	50	50	50	50

## ALIMENTARY SYSTEM

Esophagus	(50)	(50)	(49)	(48)
Intestine Large, Cecum	(50)	(50)	(49)	(50)
Hemorrhage			1 [1.0]	
Inflammation, Chronic Active				1 [4.0]
Intestine Large, Colon	(50)	(50)	(49)	(50)
Mucosa, Hyperplasia		2 [2.0]		
Intestine Large, Rectum	(50)	(50)	(50)	(49)
Intestine Small, Duodenum	(48)	(50)	(50)	(50)
Infiltration Cellular, Chronic Active		1 [1.0]		
Intestine Small, Ileum	(49)	(50)	(48)	(50)
Intestine Small, Jejunum	(50)	(50)	(47)	(50)
Congestion			1 [1.0]	
Hemorrhage			1 [3.0]	
Inflammation, Suppurative			1 [4.0]	
Necrosis			1 [3.0]	
Liver	(50)	(50)	(50)	(50)
Angiectasis	1 [2.0]	1 [1.0]		1 [2.0]
Atrophy	1 [2.0]			
Basophilic Focus	16	20	22	33
Clear Cell Focus	12	6	3	6
Eosinophilic Focus		1	2	2
Fatty Change	13 [1.6]	9 [1.8]	6 [2.0]	3 [1.7]
Fibrosis		1 [1.0]		

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Hepatodiaphragmatic Nodule	6	11	12	15
Inflammation, Chronic Active	1 [2.0]			2 [2.5]
Mixed Cell Focus	1	4	2	
Necrosis	6 [1.3]	3 [1.3]	2 [2.0]	2 [1.0]
Regeneration	2 [1.5]	3 [3.0]	5 [2.4]	4 [1.8]
Bile Duct, Cyst			1	
Serosa, Thrombosis	1 [2.0]			
Mesentery	(13)	(15)	(8)	(9)
Fibrosis		1 [1.0]		
Fat, Necrosis	12 [1.0]	14 [1.1]	8 [1.0]	9 [1.1]
Pancreas	(50)	(50)	(50)	(50)
Basophilic Focus		1		
Acinus, Atrophy	18 [1.1]	23 [1.2]	27 [1.2]	32 [1.2]
Acinus, Hyperplasia			1 [1.0]	
Salivary Glands	(50)	(50)	(50)	(50)
Atrophy	1 [2.0]		1 [1.0]	
Inflammation, Chronic Active			1 [3.0]	
Duct, Hyperplasia		1 [2.0]		
Stomach, Forestomach	(50)	(50)	(50)	(50)
Edema			1 [3.0]	1 [2.0]
Erosion			1 [2.0]	
Fibrosis		1 [1.0]		
Hyperplasia, Squamous	5 [1.6]	10 [2.4]	2 [3.0]	3 [2.7]
Inflammation, Chronic Active		1 [4.0]	1 [3.0]	
Ulcer	1 [2.0]	5 [2.6]	2 [2.5]	2 [3.5]
Stomach, Glandular	(50)	(50)	(50)	(50)
Edema	2 [2.5]			
Erosion	1 [3.0]		1 [2.0]	
Inflammation, Suppurative				1 [1.0]
Necrosis				1 [1.0]
Thrombosis			1 [1.0]	
Ulcer		3 [1.7]	1 [3.0]	1 [2.0]
Tongue	(1)	(0)	(1)	(0)
Tooth	(1)	(0)	(2)	(2)
Inflammation, Chronic Active	1 [2.0]		2 [2.5]	2 [2.5]

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
---------------------------------	---------	------------	-----------	-----------

## CARDIOVASCULAR SYSTEM

Blood Vessel	(0)	(1)	(0)	(0)
Heart	(50)	(50)	(50)	(50)
Cardiomyopathy	41 [1.4]	34 [1.5]	42 [1.4]	35 [1.3]
Thrombosis	2 [2.0]	4 [2.5]	2 [2.5]	
Artery, Inflammation, Chronic Active	1 [3.0]		1 [3.0]	
Atrium, Congestion	1 [2.0]			
Pericardium, Hyperplasia				1 [3.0]

## ENDOCRINE SYSTEM

Adrenal Cortex	(50)	(50)	(50)	(50)
Accessory Adrenal Cortical Nodule	5 [1.0]		3 [1.0]	4 [1.0]
Atrophy	1 [3.0]		1 [4.0]	
Degeneration	3 [2.3]	1 [3.0]	3 [2.3]	3 [2.7]
Hemorrhage	1 [3.0]			
Hyperplasia	25 [1.6]	27 [1.7]	28 [1.5]	28 [1.9]
Necrosis	1 [2.0]		1 [3.0]	2 [2.0]
Adrenal Medulla	(50)	(50)	(50)	(50)
Degeneration, Cystic	1 [3.0]			
Hyperplasia	12 [1.8]	27 [2.0]	27 [2.3]	10 [2.8]
Infiltration Cellular, Mononuclear Cell	1 [2.0]			
Islets, Pancreatic	(50)	(50)	(50)	(50)
Hyperplasia	1 [1.0]	1 [4.0]		1 [3.0]
Parathyroid Gland	(42)	(45)	(38)	(45)
Pituitary Gland	(50)	(50)	(49)	(50)
Angiectasis			1 [2.0]	2 [3.5]
Cyst				1
Pars Distalis, Hyperplasia	19 [2.6]	20 [2.5]	18 [1.9]	19 [1.9]
Thyroid Gland	(50)	(49)	(49)	(50)
Hemorrhage				1 [1.0]
C-cell, Hyperplasia	9 [1.3]	9 [1.9]	8 [1.6]	6 [1.7]
Follicular Cell, Hyperplasia	1 [1.0]			

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
---------------------------------	---------	------------	-----------	-----------

## GENERAL BODY SYSTEM

Peritoneum	(1)	(1)	(0)	(0)
------------	-----	-----	-----	-----

## GENITAL SYSTEM

Clitoral Gland	(49)	(47)	(47)	(46)
Cyst				1
Hyperplasia	2 [2.5]	1 [4.0]	1 [2.0]	
Inflammation, Suppurative	2 [1.5]			1 [2.0]
Inflammation, Chronic Active		4 [2.3]		2 [2.5]
Ovary	(50)	(50)	(50)	(50)
Cyst	5	6	7	5
Inflammation, Suppurative			1 [3.0]	
Inflammation, Chronic Active	1 [4.0]			
Necrosis		1 [2.0]		
Uterus	(50)	(50)	(50)	(50)
Angiectasis	1 [4.0]			
Cyst	1			
Inflammation, Suppurative	1 [2.0]	1 [1.0]		
Inflammation, Chronic Active	1 [3.0]	2 [1.5]	1 [1.0]	1 [3.0]
Necrosis	2 [2.5]			
Thrombosis			1 [4.0]	
Endometrium, Hyperplasia, Cystic	4 [2.0]	2 [2.0]	1 [2.0]	4 [1.5]

## HEMATOPOIETIC SYSTEM

Bone Marrow	(50)	(50)	(50)	(50)
Fibrosis				1 [1.0]
Lymph Node	(4)	(3)	(7)	(5)
Deep Cervical, Infiltration Cellular		1 [1.0]		
Iliac, Ectasia		1 [4.0]		1 [3.0]
Inguinal, Fibrosis				1 [2.0]

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Renal, Ectasia	1 [2.0]		1 [1.0]	
Lymph Node, Bronchial	(26)	(18)	(22)	(17)
Lymph Node, Mandibular	(48)	(48)	(47)	(47)
Atrophy	1 [3.0]			
Ectasia			1 [2.0]	
Fibrosis		1 [1.0]		
Necrosis		1 [1.0]		
Lymph Node, Mediastinal	(42)	(43)	(48)	(48)
Atrophy	1 [2.0]			
Ectasia	1 [3.0]	1 [2.0]		
Hyperplasia				1 [1.0]
Infiltration Cellular, Histiocyte				1 [2.0]
Lymph Node, Mesenteric	(50)	(50)	(50)	(50)
Ectasia		1 [2.0]		
Fibrosis				1 [2.0]
Infiltration Cellular, Histiocyte	1 [2.0]			
Spleen	(50)	(50)	(50)	(50)
Fibrosis		1 [1.0]	5 [1.4]	3 [2.3]
Hematopoietic Cell Proliferation	2 [1.5]	5 [1.4]	3 [1.7]	2 [1.5]
Hemorrhage			3 [2.3]	
Infiltration Cellular, Histiocyte	1 [2.0]			
Necrosis		1 [1.0]		2 [1.0]
Thymus	(47)	(46)	(46)	(47)
Thrombosis		1 [2.0]		

## INTEGUMENTARY SYSTEM

Mammary Gland	(50)	(50)	(50)	(50)
Galactocele	1 [3.0]	1 [1.0]	4 [2.3]	1 [3.0]
Hyperplasia	3 [2.3]	2 [2.0]	1 [1.0]	5 [1.8]
Inflammation, Chronic Active		1 [3.0]		
Skin	(50)	(50)	(50)	(50)
Cyst Epithelial Inclusion	1 [1.0]	1 [2.0]		
Hyperkeratosis	1 [4.0]			
Hyperplasia, Squamous	1 [3.0]	1 [3.0]		2 [2.5]

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Inflammation		1 [2.0]	1 [3.0]	
Ulcer				1 [3.0]
Subcutaneous Tissue, Inflammation		1 [4.0]		

## MUSCULOSKELETAL SYSTEM

Bone	(50)	(50)	(50)	(50)
Fracture	1 [2.0]			
Femur, Hyperostosis	4 [2.0]	2 [3.0]	5 [3.0]	2 [1.5]
Maxilla, Inflammation, Chronic Active	2 [2.5]			1 [2.0]
Skeletal Muscle	(1)	(1)	(0)	(1)

## NERVOUS SYSTEM

Brain	(50)	(50)	(50)	(50)
Compression	16 [1.8]	14 [1.8]	14 [2.2]	17 [2.0]
Hemorrhage		2 [2.0]		3 [1.7]
Infiltration Cellular, Mononuclear Cell	1 [2.0]			
Necrosis			1 [3.0]	

## RESPIRATORY SYSTEM

Larynx	(50)	(50)	(50)	(50)
Foreign Body	1	3	6	2
Inflammation	22 [1.2]	23 [1.5]	14 [1.6]	13 [1.5]
Metaplasia, Squamous	4 [1.0]	4 [1.0]	3 [1.0]	5 [1.0]
Respiratory Epithelium, Hyperplasia		4 [1.3]		1 [1.0]
Lung	(50)	(50)	(50)	(50)
Hemorrhage				1 [2.0]
Inflammation, Suppurative				1 [3.0]
Inflammation, Chronic Active	20 [1.0]	50 [3.0]	50 [2.9]	50 [2.9]
Necrosis				1 [2.0]
Pigmentation				1 [2.0]
Alveolar Epithelium, Hyperplasia	9 [1.1]	49 [2.8]	50 [2.7]	49 [3.4]

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)



Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Alveolar Epithelium, Metaplasia, Squamous Alveolus, Proteinosis		2 [3.5]	1 [3.0]	
Bronchiole, Epithelium, Hyperplasia		50 [2.7]	50 [2.7]	50 [2.9]
Interstitial, Fibrosis	47 [1.5]		46 [2.1]	48 [3.8]
Mediastinum, Inflammation	1 [2.0]			
Nose	1 [2.0]			
Foreign Body	(50)	(50)	(49)	(50)
Inflammation	5	3		
Inflammation, Suppurative			1 [1.0]	
Inflammation, Chronic Active	6 [1.2]	4 [1.3]	4 [1.0]	42 [2.2]
Thrombosis	22 [1.3]	42 [1.1]	39 [1.1]	50 [2.4]
Olfactory Epithelium, Accumulation, Hyaline Droplet	1 [2.0]	4 [2.8]	6 [1.7]	3 [2.0]
Olfactory Epithelium, Atrophy	8 [1.5]	2 [1.0]		
Olfactory Epithelium, Hyperplasia		22 [1.1]	35 [1.0]	35 [1.2]
Olfactory Epithelium, Hyperplasia, Basal Cell			3 [1.0]	5 [1.0]
Olfactory Epithelium, Metaplasia, Respiratory			1 [1.0]	19 [1.0]
Olfactory Epithelium, Necrosis	6 [1.0]	18 [1.3]	24 [1.2]	47 [2.1]
Respiratory Epithelium, Accumulation, Hyaline Droplet	1 [2.0]	2 [1.5]		1 [3.0]
Respiratory Epithelium, Hyperplasia	15 [1.2]	43 [1.0]	48 [1.0]	49 [2.1]
Respiratory Epithelium, Metaplasia, Squamous	2 [1.0]		3 [1.0]	45 [2.0]
Respiratory Epithelium, Necrosis	1 [3.0]	1 [2.0]	1 [1.0]	15 [1.6]
Turbinate, Atrophy	1 [1.0]	38 [1.0]	27 [1.0]	45 [1.0]
Turbinate, Hyperostosis	3 [2.0]	2 [2.0]	5 [1.8]	2 [1.5]
Trachea	(50)	(50)	(50)	(50)

## SPECIAL SENSES SYSTEM

Ear	(4)	(4)	(0)	(3)
Inflammation, Chronic Active	4 [2.0]	4 [2.0]		3 [2.3]
Eye	(50)	(50)	(49)	(50)
Cataract	8 [2.5]	10 [2.1]	11 [2.2]	3 [1.3]
Hemorrhage		1 [2.0]		
Metaplasia, Osseous	24 [1.1]	19 [1.1]	26 [1.0]	13 [1.1]
Cornea, Inflammation, Chronic Active		1 [2.0]		

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)

Test Type: CHRONIC

Cobalt

Time Report Requested: 14:48:12

Route: RESPIRATORY EXPOSURE WHOLE BODY

CAS Number: 7440-48-4

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

Species/Strain: RATS/F344/N Tac

Lab: BNW

Fischer 344-Taconic RATS FEMALE	Control	1.25 mg/m3	2.5 mg/m3	5.0 mg/m3
Harderian Gland	(50)	(50)	(50)	(50)
Atrophy		1 [2.0]		
Hyperplasia			1 [2.0]	
Inflammation, Chronic Active	3 [3.3]			2 [2.0]
Zymbal's Gland	(0)	(1)	(0)	(0)
<b>URINARY SYSTEM</b>				
Kidney	(50)	(50)	(50)	(50)
Cyst		1		1
Infarct		1 [3.0]		2 [1.5]
Mineralization			1 [1.0]	
Necrosis, Focal	1 [1.0]			
Nephropathy	48 [2.6]	48 [2.4]	47 [2.0]	48 [2.1]
Renal Tubule, Hyperplasia		2 [4.0]		
Renal Tubule, Necrosis			1 [3.0]	
Urinary Bladder	(50)	(50)	(50)	(50)

\*\*\* END OF REPORT \*\*\*

a - Number of animals examined microscopically at site and number of animals with lesion

b-Average severity grade(1-minimal;2-mild;3-moderate;4-marked)