

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

D_RD

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

C 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: 2.1.0

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Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	1	TMT:	1	SEX:	Male	DAY ON TEST:	383
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54387

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Liver | * Lung | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Parathyroid Gland | * Pituitary Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Testes | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | | |
|-------------------------|---------------------------|----------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Thymus |
|-------------------------|---------------------------|----------|

OBSERVATIONS

- | | | |
|-------------------------------|----------------|----------------------|
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Minimal |
| * Larynx | Inflammation | Minimal |
| * Lymph Node, Mandibular | Hyperplasia | Mild |
| [Hyperplasia TGLs = 1-9] | | |
| Mesentery | Necrosis | Minimal |
| Fat | | |
| [Necrosis TGLs = 2-16] | | |
| * Pancreas | Atrophy | Minimal |
| * Preputial Gland | Inflammation | Chronic Active, Mild |
| [Inflammation TGLs = 4-9] | | |
| Zymbal's Gland | Carcinoma | |
| [Carcinoma TGLs = 3-14, 15] | | |

PRIMARY CAUSE OF DEATH - Zymbal's Gland Carcinoma

TDMS No. 60311 - 05

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Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	2	TMT:	1	SEX:	Male	DAY ON TEST:	611
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54388

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|-------------------|--|---------------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Brain | Compression | Mild |
| * Heart | Cardiomyopathy
Schwannoma Malignant | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-14] | |
| * Lung | Alveolar/Bronchiolar Adenoma | |
| * Nose | Olfactory Epi
Olfactory Epi | Minimal
Respiratory, Minimal |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis
Adenoma | |
| | [Adenoma TGLs = 2-16] | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Spleen | Fibrosis | Minimal |
| | [Fibrosis TGLs = 1-6] | |
| * Testes | Atrophy | Minimal |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 3

TMT: 1
DOSE: Control

SEX: Male
DISP: Moribund Sacrifice

DAY ON TEST: 626
HISTO: 54389

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|------------------------------|-----------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Brain | | Astrocytoma Malignant | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Atrophy | Mild |
| | Bile Duct | Hyperplasia | Moderate |
| | | Thrombosis | Minimal |
| * Lung | | Thrombosis | Minimal |
| Mesentery | Artery | Thrombosis | Moderate |
| | [Thrombosis TGLs = 3-8] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | | Angiectasis | Minimal |
| | [Angiectasis TGLs = 2-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Skin | | Inflammation | Moderate |
| | [Inflammation TGLs = 1-14] | | |
| * Spleen | Capsule | Angiectasis | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

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P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	3	TMT:	1	SEX:	Male	DAY ON TEST:	626
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54389

ORGAN AND ACCOUNTABLE SITE STATUS

Note: not angiectasis-really a capsular cyst - no code
[Angiectasis TGLs = 4-6]

* Testes	Interstit Cell	Atrophy Hyperplasia	Minimal Minimal
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PRIMARY CAUSE OF DEATH - Brain Astrocytoma Malignant

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 4	TMT: 1	SEX: Male	DAY ON TEST: 697
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54390

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Mammary Gland | * Nose | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|---------------------------|---|----------------------|------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Mild |
| | | Leukemia Mononuclear | |
| * Brain | | Hemorrhage | Mild |
| | [Hemorrhage TGLs = 10-1] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear | |
| | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Mild |
| | | Leukemia Mononuclear | |
| Lymph Node | Lumbar, Renal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-19, 11-21] | | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-17] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	4	TMT:	1	SEX:	Male	DAY ON TEST:	697
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54390

ORGAN AND ACCOUNTABLE SITE STATUS

	[Leukemia Mononuclear TGLs = 9-16]		
* Pancreas		Atrophy Leukemia Mononuclear	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Trichoepithelioma	
	[Trichoepithelioma TGLs = 1-18]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 6-15]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 4-9]		
	[Atrophy TGLs = 5-9]		
* Thymus		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 3-14]		
* Urinary Bladder		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

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Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	5	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54391

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Pancreas | * Parathyroid Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Thymus

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-6, 21] | | |
| * Lung | | Leukemia Mononuclear | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Preputial Gland | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-26, 27] | | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 3-9, 4-9] | Atrophy | Marked |

TDMS No. 60311 - 05

Test Type: CHRONIC

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Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 6	TMT: 1	SEX: Male	DAY ON TEST: 682
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54392

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Thymus

OBSERVATIONS

- | | | | |
|---------------------------|---|-------------------------|------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 12-7] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear | |
| | | Nephropathy | Marked |
| | [Nephropathy TGLs = 11-7] | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 10-6] | | |
| * Lung | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-4, 5] | | |
| Lymph Node | Axillary, Deep Cervical,
Renal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-18, 9-16, 15-19] | | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-17] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-3] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	6	TMT:	1	SEX:	Male	DAY ON TEST:	682
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54392

ORGAN AND ACCOUNTABLE SITE STATUS

Mesentery	Fat	Necrosis	Minimal
[Necrosis TGLs = 13-19]			
* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma TGLs = 7-10]			
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Trichoepithelioma	
[Trichoepithelioma TGLs = 2-14]			
* Spleen		Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell	Adenoma	
[Adenoma TGLs = 14-9]			

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 7	TMT: 1	SEX: Male	DAY ON TEST: 616
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54393

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Liver | * Lung |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Pancreas | * Parathyroid Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------|----------------|-------------------------|
| * Brain | Meninges | Inflammation | Suppurative, Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Preputial Gland | | Inflammation | Chronic Active, Minimal |
| * Testes | Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 4-9] | | |
| Zymbal's Gland | | Carcinoma | |
| | [Carcinoma TGLs = 3-14, 15] | | |

PRIMARY CAUSE OF DEATH - Brain Meninges Inflammation
 CONTRIBUTORY CAUSE OF DEATH - Zymbal's Gland Carcinoma

TDMS No. 60311 - 05

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Species/Strain: RATS/F344/N Tac

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Cobalt

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Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	8	TMT:	1	SEX:	Male	DAY ON TEST:	730
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54394

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lung | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|---------------------------------|------------------|-------------------------|
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Clear Cell Focus | |
| * Mammary Gland | | Hyperplasia | Moderate |
| * Nose | | Corpora Amylacea | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Skin | | Keratoacanthoma | |
| | [Keratoacanthoma TGLs = 1-16] | | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 2-9, 3-9] | Atrophy | Marked |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

TDMS No. 60311 - 05

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Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 9	TMT: 1	SEX: Male	DAY ON TEST: 676
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54395

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Nose | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|---------------------------|-------------------------------------|--------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Marked |
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Mild |
| * Heart | Leukemia Mononuclear | |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Moderate |
| | [Nephropathy TGLs = 9-7] | |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-6] | |
| * Lung | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| Mesentery | Necrosis | Minimal |
| | Fat | |
| | [Necrosis TGLs = 6-20] | |
| * Pancreas | Atrophy | Minimal |
| | [Atrophy TGLs = 3-17] | |
| * Pituitary Gland | Adenoma | |
| | Pars Distalis | |
| | [Adenoma TGLs = 10-10] | |
| * Prostate | Inflammation | Chronic Active, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	9	TMT:	1	SEX:	Male	DAY ON TEST:	676
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54395

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin	[Leukemia Mononuclear TGLs = 7-18]	Leukemia Mononuclear	
		Hyperplasia Inflammation	Squamous, Moderate Moderate
* Spleen	[Hyperplasia TGLs = 1-19] [Inflammation TGLs = 2-14]		
		Fibrosis Leukemia Mononuclear	Mild
* Testes	[Fibrosis TGLs = 5-16] [Leukemia Mononuclear TGLs = 4-17, 11-17]		
	Interstit Cell	Adenoma Atrophy	Marked
* Thymus		Leukemia Mononuclear	
* Urinary Bladder	Transit Epithe	Hyperplasia Leukemia Mononuclear	Marked
	[Hyperplasia TGLs = 12-10]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 10	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54396

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Thymus | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | |
|---------------------------|---|-------------------------|
| * Adrenal Cortex | Hyperplasia | Moderate |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | |
| * Lung | Leukemia Mononuclear | |
| Lymph Node | Pancreatic, Renal | |
| | [Leukemia Mononuclear TGLs = 11-23, 16-7] | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-25] | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-3] | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 14-8, 24] | |
| Mesentery | Fat | |
| | [Necrosis TGLs = 8-23] | Minimal |
| * Nose | Inflammation | Chronic Active, Minimal |
| | Leukemia Mononuclear | |
| * Pituitary Gland | Cyst | Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	10	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54396

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate	[Cyst TGLs = 13-10]	Inflammation Leukemia Mononuclear	Chronic Active, Minimal
* Skin	[Inflammation TGLs = 15-26]	Inflammation	Minimal
* Spleen	[Leukemia Mononuclear TGLs = 9-21, 10-23] [Necrosis TGLs = 9-21]	Leukemia Mononuclear Necrosis	Moderate
* Stomach, Forestomach		Hyperplasia Leukemia Mononuclear Ulcer	Squamous, Mild Minimal
* Stomach, Glandular		Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy Necrosis	Marked Moderate
* Thyroid Gland	[Adenoma TGLs = 4-9] [Atrophy TGLs = 5-9] Follicular Cel	Carcinoma	
Zymbal's Gland	[Carcinoma TGLs = 3-3, 20] [Carcinoma TGLs = 12-22]	Carcinoma	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 11	TMT: 1	SEX: Male	DAY ON TEST: 663
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54397

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | |
|-----------------------------------|--|-------------------------|
| * Adrenal Cortex | Degeneration | Moderate |
| * Adrenal Medulla | Hyperplasia
Pheochromocytoma Benign | Moderate |
| * Brain | Infiltration Cellular | Mononuclear CI, Minimal |
| * Esophagus | Inflammation | Suppurative, Marked |
| * Heart | Cardiomyopathy | Moderate |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 5-7, 14] | | |
| * Larynx | Inflammation | Minimal |
| * Liver | Fatty Change | Moderate |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | Galactocele | Moderate |
| [Galactocele TGLs = 1-16, 2-17] | | |
| Mesentery | Fat | |
| [Necrosis TGLs = 3-14] | Necrosis | Minimal |
| * Nose | Inflammation | Chronic Active, Mild |
| * Pancreas | Hyperplasia | Mild |
| * Pituitary Gland | Pars Distalis
Adenoma | |
| [Adenoma TGLs = 6-10] | | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Spleen | Fibrosis | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	11	TMT:	1	SEX:	Male	DAY ON TEST:	663
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54397

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach		Hyperplasia	Squamous, Moderate
		Ulcer	Marked
[Ulcer TGLs = 4-10]			
* Testes		Atrophy	Moderate
	Interstit Cell	Hyperplasia	Moderate

PRIMARY CAUSE OF DEATH - Esophagus Inflammation

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 12	TMT: 1	SEX: Male	DAY ON TEST: 542
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54398

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose | * Parathyroid Gland |
| * Preputial Gland | * Prostate | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|-------------------|--|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Minimal |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis
Hyperplasia TGLs = 3-10] | Minimal |
| * Skin | Basal Cell Adenoma
Lipoma
[Basal Cell Adenoma TGLs = 1-18]
[Lipoma TGLs = 2-15, 16, 17] | |
| Spinal Cord | Infiltration Cellular | Mild |
| * Testes | Bilateral, Interstit Cell
Adenoma
[Adenoma TGLs = 4-9] | |

PRIMARY CAUSE OF DEATH - Spinal Cord Infiltration Cellular

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 13	TMT: 1	SEX: Male	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54399

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |

OBSERVATIONS

- | | | |
|-------------------|--|-------------------------|
| * Adrenal Cortex | Hyperplasia | Moderate |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Basophilic Focus
Clear Cell Focus
Inflammation | Chronic Active, Mild |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-16] | |
| Mesentery | Fat | |
| | [Necrosis TGLs = 3-17] | Minimal |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Testes | Bilateral, Interstit Cell | |
| | Adenoma
Atrophy | Moderate |
| | [Adenoma TGLs = 4-9] | |
| * Urinary Bladder | Transit Epithe | |
| | Carcinoma | |

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 14	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54400

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Nose | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|--------------------------------------|----------------------|------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Moderate |
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | Leukemia Mononuclear | |
| Lymph Node Renal | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 8-19] | | |
| Mesentery Fat | Necrosis | Minimal |
| [Necrosis TGLs = 3-18] | | |
| * Pituitary Gland Pars Distalis | Adenoma | |
| [Adenoma TGLs = 2-10] | | |
| * Prostate | Inflammation | Chronic Active, Marked |
| [Inflammation TGLs = 7-16] | | |
| * Skin | Keratoacanthoma | |
| [Keratoacanthoma TGLs = 1-17] | | |
| * Spleen | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 5-15] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	14	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54400

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Adenoma	
		Atrophy	Mild
	[Adenoma TGLs = 6-9]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 15	TMT: 1	SEX: Male	DAY ON TEST: 562
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54401

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lung | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Pancreas | * Parathyroid Gland | * Pituitary Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------|------------------|-------------------------|
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Minimal |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| * Nose | | Corpora Amylacea | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Preputial Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14, 15] | | |
| * Testes | Interstitial Cell | Hyperplasia | Moderate |
| * Thyroid Gland | C Cell | Hyperplasia | Mild |

PRIMARY CAUSE OF DEATH - Preputial Gland Carcinoma

ANIMAL NUM:	16	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54402

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|----------------------------|------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Brain | | Compression | Mild |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 4-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Nose | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 5-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Testes | Interstit Cell | Adenoma | |
| | | Atrophy | Marked |
| | [Adenoma TGLs = 2-9] | | |
| | [Atrophy TGLs = 3-9] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 17	TMT: 1	SEX: Male	DAY ON TEST: 688
	DOSE: Control	DISP: Natural Death	HISTO: 54403

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|--------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

AUTO PRECLUDES DIAG.

- | | |
|--------------------------|----------------------------|
| * Intestine Small, Ileum | * Intestine Small, Jejunum |
|--------------------------|----------------------------|

OBSERVATIONS

- | | | |
|-------------------------|-----------------------------------|----------------------|
| * Brain | Compression | Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation | Minimal |
| * Liver | Fatty Change | Minimal |
| * Lung | Alveolar Epith Hyperplasia | Minimal |
| * Mammary Gland | Adenoma | |
| [Adenoma TGLs = 5-17] | | |
| * Nose | Accumulation, Hyaline Droplet | Mild |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis Adenoma | |
| [Adenoma TGLs = 3-10] | | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Stomach, Forestomach | Ulcer | Mild |
| [Ulcer TGLs = 6-16] | | |
| * Testes | Bilateral, Interstit Cell Adenoma | |
| [Adenoma TGLs = 4-14] | | |
| * Thyroid Gland | C Cell Adenoma | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 18	TMT: 1	SEX: Male	DAY ON TEST: 705
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54404

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Nose | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 4-7, 15] | | |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-14] | | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| * Mammary Gland | | Inflammation | Chronic Active, Minimal |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 5-16] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Testes | Interstit Cell | Adenoma | |
| | Interstit Cell | Hyperplasia | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	18	TMT:	1	SEX:	Male	DAY ON TEST:	705
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54404

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 19	TMT: 1	SEX: Male	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54405

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | |
|---|------------------------------|--------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Brain | Compression | Mild |
| Ear | Inflammation | Chronic Active, Moderate |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 3-7] | | |
| * Larynx | Inflammation | Minimal |
| | Metaplasia | Squamous, Mild |
| * Liver | Clear Cell Focus | |
| * Lung | Alveolar/Bronchiolar Adenoma | Multiple |
| | Hyperplasia | Minimal |
| | Alveolar Epith | |
| [Alveolar/Bronchiolar Adenoma TGLs = 4-5] | | |
| [Hyperplasia TGLs = 5-15] | | |
| * Lymph Node, Mandibular | Ectasia | Marked |
| [Ectasia TGLs = 1-16] | | |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Adenoma | |
| | Pars Distalis | |
| [Adenoma TGLs = 2-10] | | |
| * Prostate | Inflammation | Chronic Active, Minimal |
| * Testes | Atrophy | Mild |
| | Inflammation | Chronic Active, Moderate |
| | Arteriole | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 20	TMT: 1	SEX: Male	DAY ON TEST: 683
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54406

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Liver | * Lung |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle | * Spleen |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

INSUFFICIENT TISSUE

- * Nose

OBSERVATIONS

- | | | |
|---|-----------------------------------|----------------------|
| * Adrenal Cortex | Accessory Adrenal Cortical Nodule | Minimal |
| * Adrenal Medulla | Hyperplasia | Marked |
| * Islets, Pancreatic | Carcinoma | |
| [Carcinoma TGLs = 8-16] | | |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 6-7] | | |
| * Larynx | Inflammation | Minimal |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| Pars Distalis | | |
| [Adenoma TGLs = 4-10] | | |
| * Preputial Gland | Ectasia | Mild |
| [Ectasia TGLs = 5-9] | | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Skin | Cyst Epithelial Inclusion | Mild |
| [Cyst Epithelial Inclusion TGLs = 2-14] | | |
| * Stomach, Forestomach | Edema | Moderate |
| | Ulcer | Moderate |
| [Ulcer TGLs = 9-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	20	TMT:	1	SEX:	Male	DAY ON TEST:	683
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54406

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Adenoma Atrophy	Marked
[Adenoma TGLs = 7-9]			
* Thyroid Gland	C Cell	Hyperplasia	Moderate

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 21	TMT: 1	SEX: Male	DAY ON TEST: 583
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54407

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Nose | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------------|----------------------|--------------------|
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | | Leukemia Mononuclear | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Spleen | | Fibrosis | Minimal |
| | | Leukemia Mononuclear | |
| | [Fibrosis TGLs = 2-14] | | |
| | [Leukemia Mononuclear TGLs = 4-14] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Moderate |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Mild |
| | [Adenoma TGLs = 1-9] | | |

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 22	TMT: 1	SEX: Male	DAY ON TEST: 702
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54408

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|--|-------------------------|--------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Pheochromocytoma Benign | |
| [Pheochromocytoma Benign TGLs = 6-7] | | |
| * Brain | Compression | Moderate |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Marked |
| [Nephropathy TGLs = 5-7, 14] | | |
| * Larynx | Foreign Body | Minimal |
| | Metaplasia | Squamous, Minimal |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | Inflammation | Chronic Active, Minimal |
| Mesentery | Necrosis | Minimal |
| [Necrosis Fat TGLs = 3-16] | | |
| * Nose | Hyperplasia | Minimal |
| * Pituitary Gland | Adenoma | |
| [Adenoma Pars Distalis TGLs = 2-10] | | |
| * Prostate | Inflammation | Chronic Active, Moderate |
| * Skin | Fibroma | |
| [Fibroma TGLs = 1-15, 16] | | |
| * Spleen | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	22	TMT:	1	SEX:	Male	DAY ON TEST:	702
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54408

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach	Hyperplasia Inflammation	Squamous, Mild Chronic Active, Minimal
* Testes	Atrophy	Marked

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM:	23	TMT:	1	SEX:	Male	DAY ON TEST:	719
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54409

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Trachea |

OBSERVATIONS

- | | | |
|---------------------------|--|-------------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| | Pheochromocytoma Benign | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| | Leukemia Mononuclear | |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | |
| * Larynx | Inflammation | Minimal |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | |
| * Lung | Leukemia Mononuclear | |
| | Leukemia Mononuclear | |
| | Lymph Node Pancreatic, Renal | |
| | [Leukemia Mononuclear TGLs = 10-17, 11-18] | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-9] | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-3] | |
| * Lymph Node, Mesenteric | Hemorrhage | Mild |
| | [Hemorrhage TGLs = 6-15] | |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Adenoma | |
| | Leukemia Mononuclear | |
| | Pars Distalis | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 23	TMT: 1	SEX: Male	DAY ON TEST: 719
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54409

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 1-10]		
* Prostate	Inflammation	Chronic Active, Moderate
* Skin	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 12-19]		
* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 3-14]		
* Stomach, Forestomach	Edema Hyperplasia	Mild Squamous, Minimal
* Stomach, Glandular	Edema	Mild
* Testes	Bilateral, Interstit Cell Adenoma Atrophy Leukemia Mononuclear	Marked
[Adenoma TGLs = 2-9]		
* Thymus	Leukemia Mononuclear	
* Thyroid Gland	C Cell Hyperplasia	Minimal
* Urinary Bladder	Hemorrhage	Minimal
[Hemorrhage TGLs = 9-10]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 24	TMT: 1	SEX: Male	DAY ON TEST: 668
	DOSE: Control	DISP: Natural Death	HISTO: 54410

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | |
|--|---|------------------------------------|
| * Adrenal Medulla | Hyperplasia
Pheochromocytoma Malignant | Mild |
| [Pheochromocytoma Malignant TGLs = 8-14] | | |
| * Brain | Compression | Mild |
| * Eye | Cataract
Metaplasia | Minimal
Osseous, Minimal |
| * Heart | Cardiomyopathy | Moderate |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 9-7, 14] | | |
| * Larynx | Inflammation | Mild |
| * Liver | Leukemia Mononuclear | |
| * Lung | Leukemia Mononuclear | |
| Lymph Node Iliac | Ectasia | Moderate |
| [Ectasia TGLs = 10-15] | | |
| * Nose | Foreign Body
Inflammation | Minimal
Chronic Active, Minimal |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland Pars Distalis | Adenoma | |
| [Adenoma TGLs = 4-10] | | |
| * Preputial Gland | Ectasia | Mild |
| [Ectasia TGLs = 2-7] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	24	TMT:	1	SEX:	Male	DAY ON TEST:	668
		DOSE:	Control	DISP:	Natural Death	HISTO:	54410

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Lipoma	
	[Lipoma TGLs = 1-16]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 7-14]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 6-9]		
	[Atrophy TGLs = 5-9]		
* Thyroid Gland	Follicular Cel	Carcinoma	
	[Carcinoma TGLs = 3-3]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 25	TMT: 1	SEX: Male	DAY ON TEST: 688
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54411

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Liver |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|---------------------------------------|----------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Brain | Compression | Moderate |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 2-7] | | |
| * Lung | Metaplasia | Osseous, Minimal |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Adenoma | |
| [Adenoma Pars Distalis TGLs = 1-10] | | |
| * Prostate | Inflammation | Chronic Active, Minimal |
| * Stomach, Forestomach | Hyperplasia | Squamous, Moderate |
| * Testes | Atrophy | Marked |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	26	TMT:	1	SEX:	Male	DAY ON TEST:	730
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54412

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Liver |
| * Lung | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Pancreas | * Parathyroid Gland | * Pituitary Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | |
|--|----------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Minimal |
| Mesentery | Necrosis | Mild |
| [Necrosis Fat TGLs = 2-15] | | |
| * Prostate | Inflammation | Chronic Active, Minimal |
| * Testes | Adenoma | |
| [Adenoma Bilateral, Interstit Cell TGLs = 1-9] | Atrophy | Marked |

ANIMAL NUM: 27	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54413

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | |
|--------------------------------------|---------------------------|---------------|
| * Adrenal Cortex | Hyperplasia | Moderate |
| * Eye | Metaplasia | Osseous, Mild |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 6-7] | | |
| * Larynx | Inflammation | Minimal |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | Leukemia Mononuclear | |
| Lymph Node Renal | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 7-17] | | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Nose | Turbinate Hyperostosis | Minimal |
| * Pituitary Gland | Pars Distalis Hyperplasia | Marked |
| [Hyperplasia TGLs = 8-10] | | |
| * Preputial Gland | Adenoma | |
| * Spleen | Fibrosis | Mild |
| | Leukemia Mononuclear | |
| [Fibrosis TGLs = 2-15] | | |
| [Leukemia Mononuclear TGLs = 1-14] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	27	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54413

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 3-9]		
	[Atrophy TGLs = 4-9]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 28	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54414

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Nose | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|---------------------------------|-------------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Pheochromocytoma Benign | |
| * Eye | Metaplasia | Osseous, Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 1-7] | | |
| * Liver | Clear Cell Focus | |
| * Lung | Inflammation | Chronic Active, Minimal |
| Mesentery Fat | Necrosis | Minimal |
| [Necrosis TGLs = 3-14] | | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland Pars Distalis | Hyperplasia | Moderate |
| * Prostate | Inflammation | Chronic Active, Minimal |
| * Stomach, Forestomach | Hyperplasia | Squamous, Mild |
| * Testes | Adenoma | |
| Bilateral, Interstit Cell | Atrophy | Minimal |
| [Adenoma TGLs = 2-9] | | |
| * Thyroid Gland C Cell | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	29	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54415

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---------------------------|----------------------|-------------------------|
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Leukemia Mononuclear | |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Preputial Gland | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Leukemia Mononuclear | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Marked |
- [Adenoma TGLs = 1-9, 2-9]

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 30	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54416

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Mediastinal

OBSERVATIONS

- | | | | |
|-------------------|----------------------------|----------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Brain | | Compression | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 2-7] | | |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Nose | | Foreign Body | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 3-9] | Atrophy | Marked |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 31	TMT: 1	SEX: Male	DAY ON TEST: 613
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54417

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Pancreas | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-----------------|---------------------|
| * Mammary Gland | * Parathyroid Gland |
|-----------------|---------------------|

OBSERVATIONS

- | | | |
|--------------------------|--------------------------------------|-------------------------|
| * Adrenal Cortex | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| | Leukemia Mononuclear | |
| * Kidney | Nephropathy | Moderate |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | |
| * Lung | Leukemia Mononuclear | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-16] | |
| * Nose | Accumulation, Hyaline Droplet | Minimal |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 1-10] | |
| * Prostate | Inflammation | Chronic Active, Minimal |
| * Spleen | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-15] | |
| * Testes | Interstitial Cell | |
| | [Adenoma TGLs = 3-9] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	31	TMT:	1	SEX:	Male	DAY ON TEST:	613
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54417

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland C Cell Adenoma

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 32	TMT: 1	SEX: Male	DAY ON TEST: 682
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54418

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | |
|-------------------|-------------------------------------|----------------------|
| * Adrenal Cortex | Accessory Adrenal Cortical Nodule | Minimal |
| | Hyperplasia | Mild |
| * Adrenal Medulla | Hyperplasia | Moderate |
| * Brain | Compression | Minimal |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | |
| * Lung | Alveolar Epith | Minimal |
| | [Hyperplasia TGLs = 7-16] | |
| | [Leukemia Mononuclear TGLs = 2-5] | |
| * Nose | Respirat Epith | Mild |
| | Hyperplasia | Chronic Active, Mild |
| | Inflammation | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 3-10] | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Skin | Fibroma | |
| | [Fibroma TGLs = 1-14] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	32	TMT:	1	SEX:	Male	DAY ON TEST:	682
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54418

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Leukemia Mononuclear	
* Testes	Interstit Cell	Adenoma	Mild
	[Adenoma TGLs = 4-9]	Atrophy	
	[Atrophy TGLs = 5-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 33	TMT: 1	SEX: Male	DAY ON TEST: 663
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54419

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Parathyroid Gland | * Preputial Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | |
|---------------------------|---|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Mild |
| | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 9-7] | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Moderate |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Mild |
| * Liver | Hepatodiaphragmatic Nodule | |
| | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 11-6] | |
| | [Leukemia Mononuclear TGLs = 10-6] | |
| * Lung | Alveolar Epith | Mild |
| | Hyperplasia | Chronic Active, Minimal |
| | Inflammation | |
| | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-14; 3-15; 17-4, 5] | |
| Lymph Node | Pancreatic, Renal | Leukemia Mononuclear |
| | [Leukemia Mononuclear TGLs = 12-7, 14-18] | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-3] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	33	TMT:	1	SEX:	Male	DAY ON TEST:	663
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54419

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mesenteric [Leukemia Mononuclear TGLs = 15-8]	Leukemia Mononuclear	
* Nose	Inflammation	Chronic Active, Minimal
* Pancreas	Atrophy	Minimal
* Pituitary Gland Pars Distalis [Adenoma TGLs = 13-10]	Adenoma	
* Skin [Inflammation TGLs = 16-17]	Inflammation	Moderate
* Spleen [Leukemia Mononuclear TGLs = 6-16, 17] [Necrosis TGLs = 7-16, 8-17]	Leukemia Mononuclear Necrosis	Moderate
* Stomach, Forestomach	Hyperplasia Inflammation	Squamous, Mild Chronic Active, Mild
* Testes Interstit Cell [Adenoma TGLs = 4-9] [Atrophy TGLs = 5-9]	Adenoma Atrophy	Marked

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 34	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54420

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|----------------------|--|------------------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Epididymis | Mesothelioma Malignant | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| * Islets, Pancreatic | Adenoma | |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Foreign Body
Inflammation | Mild
Mild |
| * Liver | Eosinophilic Focus
Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-6] | |
| * Lung | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-4, 5] | |
| Mesentery | Mesothelioma Malignant | |
| | [Mesothelioma Malignant TGLs = 4-16] | |
| * Nose | Respirat Epith | Hyperplasia
Inflammation |
| | | Minimal
Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia |
| * Prostate | | Minimal |
| Skeletal Muscle | Mesothelioma Malignant
Mesothelioma Malignant | |
| | [Mesothelioma Malignant TGLs = 3-14] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	34	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54420

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin		Fibroma
	[Fibroma TGLs = 9-20]	
* Spleen		Leukemia Mononuclear
* Testes	Bilateral, Interstit Cell	Adenoma
		Mesothelioma Malignant
	[Adenoma TGLs = 2-9, 6-9]	
	[Mesothelioma Malignant TGLs = 5-18, 10-19]	
* Urinary Bladder		Mesothelioma Malignant

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	35	TMT:	1	SEX:	Male	DAY ON TEST:	691
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54421

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|----------------------|----------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| * Brain | | Edema | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | | Thrombosis | Moderate |
| | [Cardiomyopathy TGLs = 4-6] | | |
| | [Thrombosis TGLs = 3-6] | | |
| * Kidney | | Infarct | Mild |
| | | Nephropathy | Moderate |
| | [Infarct TGLs = 8-7, 9-7] | | |
| * Liver | | Leukemia Mononuclear | |
| | | Necrosis | Minimal |
| | [Leukemia Mononuclear TGLs = 7-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Mild |
| | | Leukemia Mononuclear | |
| | [Hyperplasia TGLs = 2-5] | | |
| * Lymph Node, Mandibular | | Atrophy | Mild |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| * Pancreas | | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	35	TMT:	1	SEX:	Male	DAY ON TEST:	691
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54421

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia Leukemia Mononuclear	Minimal
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen	[Leukemia Mononuclear TGLs = 6-14]	Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Minimal
	[Adenoma TGLs = 5-9]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Heart Thrombosis

ANIMAL NUM: 36	TMT: 1	SEX: Male	DAY ON TEST: 519
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54422

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Bronchial | * Nose | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | |
|---------------------------|--|------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 7-7] | |
| * Brain | Hemorrhage | Mild |
| | [Hemorrhage TGLs = 9-1] | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Leukemia Mononuclear | |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Minimal |
| * Larynx | Inflammation | Mild |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | |
| * Lung | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-9] | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-3] | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-15] | |
| Mesentery | Fat | Necrosis |
| | | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	36	TMT:	1	SEX:	Male	DAY ON TEST:	519
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54422

ORGAN AND ACCOUNTABLE SITE STATUS

	[Necrosis TGLs = 10-14]		
* Pancreas		Leukemia Mononuclear	
* Parathyroid Gland		Leukemia Mononuclear	
* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
	[Hyperplasia TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Minimal
		Leukemia Mononuclear	
* Spleen		Hemorrhage	Mild
		Leukemia Mononuclear	
	[Hemorrhage TGLs = 5-14]		
	[Leukemia Mononuclear TGLs = 4-14]		
* Testes	Interstit Cell	Hyperplasia	Mild
* Thyroid Gland		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 37	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54423

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Nose |
| * Pancreas | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|-------------------|----------------------------|-----------------------------------|-------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 1-7] | | |
| * Larynx | | Inflammation | Marked |
| * Liver | | Clear Cell Focus | |
| * Lung | | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Prostate | | Hyperplasia | Minimal |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Marked |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 38	TMT: 1	SEX: Male	DAY ON TEST: 727
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54424

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-----------------|---------------------|
| * Mammary Gland | * Parathyroid Gland |
|-----------------|---------------------|

OBSERVATIONS

- | | | |
|---|---|----------------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia
Pheochromocytoma Benign | Marked |
| * Eye | Metaplasia | Osseous, Mild |
| * Heart | Thrombosis | Mild |
| [Thrombosis TGLs = 3-16] | | |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 8-7] | | |
| * Liver | Necrosis | Moderate |
| [Necrosis TGLs = 7-6] | | |
| * Lung | Inflammation
Squamous Cell Carcinoma | Chronic Active, Minimal |
| [Squamous Cell Carcinoma TGLs = 2-15] | | |
| * Lymph Node, Mandibular | Necrosis | Mild |
| * Nose | Respirat Epith
Hyperplasia
Inflammation | Moderate
Chronic Active, Mild |
| | Olfactory Epi
Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Pars Distalis
Hyperplasia | Marked |
| [Hyperplasia TGLs = 4-10] | | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Skin | Inflammation | Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	38	TMT:	1	SEX:	Male	DAY ON TEST:	727
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54424

ORGAN AND ACCOUNTABLE SITE STATUS

Squamous Cell Carcinoma

[Inflammation TGLs = 10-19]
 [Squamous Cell Carcinoma TGLs = 1-18]

* Spleen		Fibrosis	Minimal
		Hematopoietic Cell Proliferation	Mild
* Stomach, Glandular		Ulcer	Moderate
* Testes	Interstit Cell	Adenoma	Marked
		Atrophy	

[Adenoma TGLs = 5-9]
 [Atrophy TGLs = 6-9]

PRIMARY CAUSE OF DEATH - Heart Thrombosis

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 39	TMT: 1	SEX: Male	DAY ON TEST: 514
	DOSE: Control	DISP: Natural Death	HISTO: 54425

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lung | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|-------------------------|----------------|----------------------|
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-15] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Testes | Interstit Cell | Hyperplasia | Minimal |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 40	TMT: 1	SEX: Male	DAY ON TEST: 441
	DOSE: Control	DISP: Natural Death	HISTO: 54426

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Kidney | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland | * Nose |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Mediastinal

OBSERVATIONS

- | | | |
|--|----------------------------------|-------------------------|
| * Epididymis | Mesothelioma Malignant | |
| [Mesothelioma Malignant TGLs = 8-9] | | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| [Thrombosis TGLs = 2-14] | Thrombosis | Moderate |
| * Larynx | Inflammation | Minimal |
| * Liver | Necrosis | Mild |
| [Necrosis TGLs = 5-6] | | |
| * Lung | Inflammation | Chronic Active, Minimal |
| Mesentery | Mesothelioma Malignant | |
| [Mesothelioma Malignant TGLs = 6-16] | | |
| * Pituitary Gland | Adenoma | |
| Pars Distalis | | |
| [Adenoma TGLs = 3-10] | | |
| * Prostate | Inflammation | Chronic Active, Mild |
| * Spleen | Hematopoietic Cell Proliferation | Mild |
| * Testes | Adenoma | |
| Bilateral, Interstit Cell | Atrophy | Marked |
| | Mesothelioma Malignant | |
| [Adenoma TGLs = 4-9] | | |
| [Mesothelioma Malignant TGLs = 7-17] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	40	TMT:	1	SEX:	Male	DAY ON TEST:	441
		DOSE:	Control	DISP:	Natural Death	HISTO:	54426

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Epididymis Mesothelioma Malignant

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 41	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54427

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |

OBSERVATIONS

- | | | | |
|-------------------|-----------------------------|-------------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | [Nephropathy TGLs = 3-7] | Nephropathy | Moderate |
| * Liver | | Clear Cell Focus | |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | | Hyperplasia | Marked |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| | [Hyperplasia TGLs = 4-10] | | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 1-9, 2-9] | Atrophy | Marked |
| * Urinary Bladder | Transit Epithe | Papilloma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 42	TMT: 1	SEX: Male	DAY ON TEST: 696
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54428

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Prostate | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------------|------------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 4-14] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Necrosis | Minimal |
| * Lung | | Pheochromocytoma Malignant | Metastatic (Adrenal Medulla) |
| * Nose | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Preputial Gland | | Carcinoma | |
| | | Ectasia | Moderate |
| | [Ectasia TGLs = 1-16] | | |
| * Salivary Glands | | Adenoma | Tubular |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 2-15, 3-9] | | |

PRIMARY CAUSE OF DEATH - Preputial Gland Carcinoma

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 43	TMT: 1	SEX: Male	DAY ON TEST: 675
	DOSE: Control	DISP: Natural Death	HISTO: 54429

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------|--------------------------|---------------------------|-----------------------------|
| * Bone | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Stomach, Forestomach |
| * Stomach, Glandular | * Testes | * Trachea | * Urinary Bladder |

AUTO PRECLUDES DIAG.

- | | | | |
|--------------------------|--------------------------|----------------------------|--------|
| * Intestine Large, Cecum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Nose |
|--------------------------|--------------------------|----------------------------|--------|

OBSERVATIONS

- | | | |
|---------------------------|---|----------|
| * Adrenal Cortex | Hyperplasia | Mild |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| * Bone Marrow | Leukemia Mononuclear | |
| * Brain | Compression | Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Islets, Pancreatic | Carcinoma | |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Moderate |
| * Larynx | Inflammation | Minimal |
| * Liver | Leukemia Mononuclear | |
| * Lung | Leukemia Mononuclear | |
| Lymph Node | Renal | |
| | [Leukemia Mononuclear TGLs = 10-7, 11-16] | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 9-8, 17] | |
| * Mammary Gland | Galactocele | Minimal |
| | [Galactocele TGLs = 1-16] | |
| Mesentery | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-16] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 43	TMT: 1	SEX: Male	DAY ON TEST: 675
	DOSE: Control	DISP: Natural Death	HISTO: 54429

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Atrophy Leukemia Mononuclear	Minimal
[Leukemia Mononuclear TGLs = 5-18]		
* Pituitary Gland Pars Distalis	Adenoma	
[Adenoma TGLs = 12-10]		
* Prostate	Inflammation	Chronic Active, Marked
* Seminal Vesicle	Inflammation	Chronic Active, Marked
[Inflammation TGLs = 7-10, 8-10]		
* Skin	Inflammation	Mild
[Inflammation TGLs = 2-18]		
* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 3-15, 4-14, 14-7]		
* Thymus	Leukemia Mononuclear	
* Thyroid Gland	Hemorrhage	Minimal
[Hemorrhage TGLs = 13-3]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 44	TMT: 1	SEX: Male	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54430

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Nose | * Parathyroid Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|-------------------|------------------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Infarct | Mild |
| | Nephropathy | Marked |
| | [Infarct TGLs = 5-7] | |
| | [Nephropathy TGLs = 4-7] | |
| * Liver | Eosinophilic Focus | |
| * Lung | Inflammation | Chronic Active, Minimal |
| Mesentery | Necrosis | Minimal |
| | [Necrosis TGLs = 7-15] | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| | [Adenoma TGLs = 6-10] | |
| * Preputial Gland | Inflammation | Chronic Active, Minimal |
| * Prostate | Adenoma | |
| | Inflammation | Chronic Active, Minimal |
| | [Adenoma TGLs = 2-14] | |
| * Skin | Inflammation | Mild |
| | [Inflammation TGLs = 1-16] | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	44	TMT:	1	SEX:	Male	DAY ON TEST:	730
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54430

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen			Fibrosis	Mild
	[Fibrosis	TGLs = 3-6]		
* Testes		Interstit Cell	Atrophy	Moderate
		Arteriole	Hyperplasia	Moderate
			Inflammation	Chronic Active, Mild
* Thyroid Gland		C Cell	Adenoma	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 45	TMT: 1	SEX: Male	DAY ON TEST: 729
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54431

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | |
|------------------------------------|----------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Marked |
| * Eye | Metaplasia | Osseous, Mild |
| * Heart | Cardiomyopathy | Moderate |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 6-7] | | |
| * Larynx | Inflammation | Minimal |
| * Liver | Eosinophilic Focus | |
| [Eosinophilic Focus TGLs = 7-6] | Leukemia Mononuclear | |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pancreas | Atrophy | Moderate |
| * Pituitary Gland | Hyperplasia | Marked |
| Pars Distalis | | |
| [Hyperplasia TGLs = 1-10] | | |
| * Prostate | Inflammation | Chronic Active, Minimal |
| * Skin | Basal Cell Adenoma | |
| [Basal Cell Adenoma TGLs = 3-23] | Keratoacanthoma | |
| [Keratoacanthoma TGLs = 2-24] | | |
| * Spleen | Fibrosis | Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	45	TMT:	1	SEX:	Male	DAY ON TEST:	729
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54431

ORGAN AND ACCOUNTABLE SITE STATUS

Leukemia Mononuclear

[Fibrosis TGLs = 5-21]

* Testes Bilateral, Interstit Cell

Adenoma

[Adenoma TGLs = 4-9]

* Thyroid Gland C Cell

Hyperplasia

Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 46	TMT: 1	SEX: Male	DAY ON TEST: 670
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54432

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Testes | * Thymus | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------------|--|-----------------------------|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Moderate |
| * Brain | | Edema
Metaplasia | Moderate
Osseous, Marked |
| | [Edema TGLs = 1-1] | | |
| | [Metaplasia TGLs = 1-14] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | | Leukemia Mononuclear | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 2-15] | | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Leukemia Mononuclear
Necrosis | Moderate |
| | [Leukemia Mononuclear TGLs = 3-15] | | |
| | [Necrosis TGLs = 4-15] | | |
| * Thyroid Gland | C Cell | Carcinoma | |

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 47	TMT: 1	SEX: Male	DAY ON TEST: 724
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54433

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Mammary Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | | | |
|-------------------------|--------------------------|---------------------|-----------------|
| * Lymph Node, Bronchial | * Lymph Node, Mesenteric | * Parathyroid Gland | * Thyroid Gland |
|-------------------------|--------------------------|---------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|----------------------------|-------------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Epididymis | | Cyst | Mild |
| | [Cyst TGLs = 5-14] | | |
| * Eye | Antr Chamber, Cornea | Inflammation | Suppurative, Mild |
| * Heart | | Cardiomyopathy | Moderate |
| | [Thrombosis TGLs = 3-6] | Thrombosis | Marked |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Necrosis | Minimal |
| * Lung | | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Osseous, Minimal |
| Lymph Node | Renal | Ectasia | Mild |
| | [Ectasia TGLs = 7-14] | | |
| * Nose | | Foreign Body | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| | Respirat Epith | Necrosis | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	47	TMT:	1	SEX:	Male	DAY ON TEST:	724
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54433

ORGAN AND ACCOUNTABLE SITE STATUS

	[Hyperplasia	TGLs = 4-10]		
* Prostate			Inflammation	Chronic Active, Moderate
* Skin			Hyperplasia	Squamous, Marked
	[Hyperplasia	TGLs = 1-16]		
* Spleen			Hematopoietic Cell Proliferation	Mild
* Stomach, Forestomach			Mineralization	Minimal
* Testes		Interstit Cell	Adenoma	
			Atrophy	Marked

PRIMARY CAUSE OF DEATH - Heart Thrombosis

ANIMAL NUM: 48	TMT: 1	SEX: Male	DAY ON TEST: 598
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54434

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|------------------------|-------------------------------|-------------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| Blood Vessel | Aorta | Mineralization | Moderate |
| * Eye | | Cataract | Moderate |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Marked |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 4-7] | | |
| * Lung | | Inflammation | Chronic Active, Mild |
| | [Mineralization TGLs = 1-4] | Mineralization | Mild |
| Lymph Node | Pancreatic | Ectasia | Mild |
| | [Ectasia TGLs = 6-18] | | |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Mild |
| | | Mineralization | Moderate |
| * Stomach, Glandular | | Mineralization | Mild |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Marked |
| | [Adenoma TGLs = 2-9] | | |
| | [Atrophy TGLs = 3-9] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 49	TMT: 1	SEX: Male	DAY ON TEST: 678
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54435

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lung | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Nose |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Glandular | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | |
|--|----------------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 4-7] | | |
| * Liver | Hepatodiaphragmatic Nodule | |
| [Hepatodiaphragmatic Nodule TGLs = 2-14] | | |
| Lymph Node | Ectasia | Mild |
| Renal | | |
| [Ectasia TGLs = 3-15] | | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| Pars Distalis | | |
| [Adenoma TGLs = 1-10] | | |
| * Prostate | Inflammation | Chronic Active, Minimal |
| * Stomach, Forestomach | Hyperplasia | Squamous, Mild |
| * Testes | Atrophy | Marked |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 50	TMT: 1	SEX: Male	DAY ON TEST: 376
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54436

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Liver | * Lung | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|---------------------------------|------------------|-------------------------|
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Mild |
| | | Metaplasia | Squamous, Minimal |
| * Nose | | Corpora Amylacea | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Skin | | Keratoacanthoma | |
| | [Keratoacanthoma TGLs = 1-14] | | |
| * Testes | | Atrophy | Mild |

PRIMARY CAUSE OF DEATH - Skin Keratoacanthoma

ANIMAL NUM:	201	TMT:	3	SEX:	Male	DAY ON TEST:	540
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54687

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------------|----------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Mild |
| | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear | |
| | | Necrosis | Mild |
| | | Regeneration | Marked |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| | [Regeneration TGLs = 6-15] | | |
| * Lung | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | | Proteinosis | Minimal |
| | [Inflammation TGLs = 2-4, 5, 14] | | |
| * Nose | | Atrophy | Minimal |
| | Alveolus | Hyperplasia | Minimal |
| | Turbinate | | |
| | Respirat Epith | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Hyperplasia | Mild |
| | Pars Distalis | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-16] | | |
| * Testes | | Adenoma | |
| | Interstit Cell | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	201	TMT:	3	SEX:	Male	DAY ON TEST:	540
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54687

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma	Interstit Cell	Hyperplasia	Marked
TGLs = 4-9]			

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 202	TMT: 3	SEX: Male	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54688

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-------------------|--|--|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | | Leukemia Mononuclear
Pheochromocytoma Benign | |
| * Eye | | Cataract
Metaplasia | Minimal
Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Alveolar Epith | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Multiple
Moderate
Chronic Active, Moderate

Moderate |
| | Alveolus | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14, 5-15] | | |
| | [Inflammation TGLs = 3-4, 5, 16] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 6-19] | | |
| * Nose | Turbinate
Respirat Epith
Olfactory Epi | Accumulation, Hyaline Droplet
Atrophy
Hyperplasia
Metaplasia | Mild
Minimal
Mild
Respiratory, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	202	TMT:	3	SEX:	Male	DAY ON TEST:	730
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54688

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Fibroma	
	[Fibroma TGLs = 1-18]		
* Spleen		Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell	Adenoma	Mild
	[Adenoma TGLs = 4-9]	Atrophy	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 203	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54689

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | [Nephropathy TGLs = 3-7] | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-6] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Mild
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 1-4, 5, 14] | | |
| * Nose | Turbinate | Accumulation, Hyaline Droplet
Atrophy | Minimal
Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Leukemia Mononuclear | |
| * Testes | Bilateral, Interstit Cell | Adenoma
Atrophy | Mild |
| | [Adenoma TGLs = 4-9] | | |

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM:	204	TMT:	3	SEX:	Male	DAY ON TEST:	624
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54690

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|----------------------|--------------------------|
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| * Lung | | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Minimal |
| | Bronchiole | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 5-10] | | |
| * Prostate | | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| * Skin | | Hyperplasia | Squamous, Moderate |
| | [Hyperplasia TGLs = 1-14] | | |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	204	TMT:	3	SEX:	Male	DAY ON TEST:	624
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54690

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Adenoma Atrophy	Mild
[Adenoma TGLs = 3-9]			
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 205	TMT: 3	SEX: Male	DAY ON TEST: 708
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54691

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|--------------------------|--|----------------------------------|-----------------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Fatty Change | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Carcinoma | Metastatic (Zymbal'S Gland) |
| | Alveolus | Hyperplasia | Marked |
| | [Inflammation TGLs = 3-4, 5] | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| * Lymph Node, Mandibular | | Carcinoma | Metastatic (Zymbal'S Gland) |
| | [Carcinoma TGLs = 2-20] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Skin | | Inflammation | Minimal |
| | [Inflammation TGLs = 4-19] | | |
| * Spleen | | Hematopoietic Cell Proliferation | Mild |
| | [Hematopoietic Cell Proliferation TGLs = 7-17] | Hemorrhage | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	205	TMT:	3	SEX:	Male	DAY ON TEST:	708
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54691

ORGAN AND ACCOUNTABLE SITE STATUS

	[Hemorrhage	TGLs = 8-18]	
* Testes		Bilateral, Interstit Cell	Adenoma
	[Adenoma	TGLs = 5-9, 6-9]	
Zymbal's Gland			Carcinoma
	[Carcinoma	TGLs = 1-14, 16]	

PRIMARY CAUSE OF DEATH - Zymbal's Gland Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 206	TMT: 3	SEX: Male	DAY ON TEST: 683
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54692

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Forestomach | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|-------------------------------------|--|----------------------------------|
| * Adrenal Cortex | Leukemia Mononuclear
Necrosis | Mild |
| * Adrenal Medulla | Leukemia Mononuclear
Necrosis | Marked |
| [Necrosis TGLs = 6-7] | | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Leukemia Mononuclear | |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation
Metaplasia | Mild
Squamous, Minimal |
| * Liver | Leukemia Mononuclear
Regeneration | Moderate |
| [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | Inflammation
Leukemia Mononuclear
Proteinosis | Chronic Active, Moderate
Mild |
| [Inflammation TGLs = 1-4, 5, 14] | | |
| Lymph Node | Pancreatic
Necrosis | Marked |
| [Necrosis TGLs = 5-17] | | |
| * Nose | Turbinate
Olfactory Epi
Atrophy
Atrophy
Corpora Amylacea | Minimal
Minimal
Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	206	TMT:	3	SEX:	Male	DAY ON TEST:	683
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54692

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 2-10]		
* Prostate		Inflammation	Chronic Active, Mild
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-15]		
* Stomach, Glandular		Ulcer	Minimal
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 7-9]	Atrophy	Mild

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 207	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54693

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|---------------------------|--------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| | | Leukemia Mononuclear | |
| * Kidney | | Cyst | Minimal |
| | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Degeneration | Cystic, Mild |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 3-4, 5, 14] | Proteinosis | Mild |
| Lymph Node | Pancreatic | | |
| | [Leukemia Mononuclear TGLs = 4-17] | Leukemia Mononuclear | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-9] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 207	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54693

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Turbinate	Atrophy Inflammation	Minimal Chronic Active, Minimal
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma Leukemia Mononuclear	
	[Adenoma TGLs = 2-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Hemorrhage	Mild
	[Hemorrhage TGLs = 8-18]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 5-15]		
* Testes	Interstit Cell	Atrophy Hyperplasia	Minimal Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 208	TMT: 3	SEX: Male	DAY ON TEST: 675
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54694

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

INSUFFICIENT TISSUE

- * Nose

OBSERVATIONS

- | | | | |
|--------------------------|------------------------------------|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Islets, Pancreatic | | Carcinoma | |
| | [Carcinoma TGLs = 6-6] | | |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 7-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Degeneration | Cystic, Minimal |
| * Lung | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5, 16] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 208	TMT: 3	SEX: Male	DAY ON TEST: 675
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54694

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Mild
* Skin	Pinna	Neural Crest Tumor	
	[Neural Crest Tumor TGLs = 1-14]		
* Spleen		Fibrosis	Mild
	[Fibrosis TGLs = 5-17]	Leukemia Mononuclear	
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 4-9]	Atrophy	Marked
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 209	TMT: 3	SEX: Male	DAY ON TEST: 729
DOSE: 1.25 mg/m3		DISP: Terminal Sacrifice	HISTO: 54695

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone Marrow | * Brain | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Bone | Cranium | Fibrosis | Mild |
| | Cranium | Inflammation | Chronic Active, Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| * Lung | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | Respirat Epith | Necrosis | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | Pars Intermed | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	209	TMT:	3	SEX:	Male	DAY ON TEST:	729
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54695

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Hyperplasia	Marked
* Stomach, Forestomach		Inflammation	Chronic Active, Mild
* Testes	Interstit Cell	Adenoma	
		Atrophy	Marked
	[Adenoma TGLs = 2-9]		
* Thyroid Gland	C Cell	Adenoma	

ANIMAL NUM: 210	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54696

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | | |
|-------------------------|-----------------|----------|
| * Lymph Node, Bronchial | * Mammary Gland | * Thymus |
|-------------------------|-----------------|----------|

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|-------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Intestine Large, Cecum | | Histiocytic Sarcoma | |
| | [Histiocytic Sarcoma TGLs = 7-16] | | |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia | Moderate |
| | | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 6-4, 5] | Proteinosis | Mild |
| * Nose | Turbinate
Respirat Epith | Atrophy | Minimal |
| | | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 5-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Skin | | Inflammation | Moderate |
| | | Sarcoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 211	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54697

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Pituitary Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 8-7] | | |
| * Liver | | Fatty Change | Minimal |
| | [Leukemia Mononuclear TGLs = 7-6] | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Mild |
| * Lymph Node, Mandibular | | Ectasia | Marked |
| | [Ectasia TGLs = 1-9] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Mild |
| * Prostate | | Hyperplasia | Mild |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 211 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 729
HISTO: 54697

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	[Leukemia Mononuclear TGLs = 6-6] Bilateral, Interstit Cell	Adenoma Atrophy	Marked
* Thyroid Gland	[Adenoma TGLs = 4-16] [Atrophy TGLs = 5-16] C Cell	Carcinoma	
	[Carcinoma TGLs = 2-14]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 212	TMT: 3	SEX: Male	DAY ON TEST: 684
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54698

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|--------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

AUTO PRECLUDES DIAG.

- * Intestine Small, Jejunum

INSUFFICIENT TISSUE

- * Nose

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|---|--------------------------------------|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | | Leukemia Mononuclear
Pheochromocytoma Benign | |
| * Brain | | Hemorrhage
Leukemia Mononuclear | Mild |
| * Heart | | Cardiomyopathy
Leukemia Mononuclear | Minimal |
| * Kidney | | Leukemia Mononuclear
Nephropathy | Mild |
| * Liver | | Degeneration
Leukemia Mononuclear | Cystic, Minimal |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | Alveolar Epith | Alveolar/Bronchiolar Adenoma
Hyperplasia
Inflammation
Leukemia Mononuclear | Moderate
Chronic Active, Moderate |
| | Alveolus | Proteinosis | Minimal |
| | [Inflammation TGLs = 1-4, 5, 14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 212	TMT: 3	SEX: Male	DAY ON TEST: 684
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54698

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mediastinal		Leukemia Mononuclear	
* Pancreas		Atrophy	Moderate
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-15]		
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Moderate
	[Adenoma TGLs = 3-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 213	TMT: 3	SEX: Male	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54699

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|-------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 8-7] | | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Minimal |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Fibrosis | Mild |
| | [Fibrosis TGLs = 6-6] | Leukemia Mononuclear | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 213 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54699

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 4-9]

[Atrophy TGLs = 5-9]

* Thyroid Gland

C Cell

Hyperplasia

Minimal

ANIMAL NUM: 214	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54700

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Hyperplasia | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 3-4, 5, 20] | Proteinosis | Moderate |
| * Lymph Node, Mandibular | | Necrosis | Mild |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 214	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54700

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 9-10]		
* Preputial Gland	Carcinoma	
[Carcinoma TGLs = 2-16]		
* Prostate	Inflammation	Chronic Active, Minimal
* Skin	Trichoepithelioma	
[Trichoepithelioma TGLs = 1-14]		
* Spleen	Congestion	Minimal
	Leukemia Mononuclear	
[Congestion TGLs = 6-21]		
[Leukemia Mononuclear TGLs = 5-21]		
* Testes	Bilateral, Interstit Cell	Adenoma
[Adenoma TGLs = 4-9]		
Zymbal's Gland	Carcinoma	
[Carcinoma TGLs = 8-18]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 215	TMT: 3	SEX: Male	DAY ON TEST: 699
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54701

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Pancreas | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 5-7] | | |
| * Brain | | Compression | Minimal |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Necrosis | Moderate |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Minimal |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14] | | |
| | [Inflammation TGLs = 1-4, 5, 15] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Spleen | | Fibrosis | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	215	TMT:	3	SEX:	Male	DAY ON TEST:	699
		DOSE:	1.25 mg/m3	DISP:	Natural Death	HISTO:	54701

ORGAN AND ACCOUNTABLE SITE STATUS

	[Fibrosis	TGLs = 4-6]		
* Testes		Interstit Cell	Adenoma	Marked
			Atrophy	

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 216	TMT: 3	SEX: Male	DAY ON TEST: 634
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54702

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|----------------------------------|------------------|--------------------------|
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 4-7] | | |
| * Liver | Clear Cell Focus | Minimal |
| [Clear Cell Focus TGLs = 3-14] | Necrosis | |
| * Lung | Bronchiole | Mild |
| | Alveolus | Chronic Active, Moderate |
| [Inflammation TGLs = 1-4, 5] | Hyperplasia | Moderate |
| * Lymph Node, Mandibular | Inflammation | |
| * Nose | Hyperplasia | Minimal |
| * Pituitary Gland | Respirat Epith | |
| [Adenoma TGLs = 2-10] | Pars Distalis | |
| * Prostate | Adenoma | |
| * Testes | Inflammation | Chronic Active, Minimal |
| * Thyroid Gland | Atrophy | Marked |
| | C Cell | Minimal |
| | Hyperplasia | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 216 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Moribund Sacrifice

DAY ON TEST: 634
HISTO: 54702

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 217	TMT: 3	SEX: Male	DAY ON TEST: 583
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54703

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Testes |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Mediastinal

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--|--------------------------|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Minimal |
| * Brain | | Compression | Moderate |
| * Eye | | Metaplasia | Osseous, Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Basophilic Focus | |
| * Lung | | Hyperplasia | Minimal |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| Mesentery | | Necrosis | Minimal |
| | Fat | | |
| | [Necrosis TGLs = 2-15] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 217 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Moribund Sacrifice

DAY ON TEST: 583
HISTO: 54703

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 218	TMT: 3	SEX: Male	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54704

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Pituitary Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Mild |
| Ear | | Inflammation | Chronic Active, Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | [Nephropathy TGLs = 4-7] | Nephropathy | Moderate |
| * Liver | | Basophilic Focus
Clear Cell Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Moderate
Mild
Chronic Active, Moderate |
| | Alveolus | | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Atrophy
Inflammation
Metaplasia | Minimal
Chronic Active, Minimal
Respiratory, Minimal |
| | Olfactory Epi | | |
| * Preputial Gland | | Inflammation | Chronic Active, Minimal |
| * Prostate | | Hyperplasia
Inflammation | Minimal
Chronic Active, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	218	TMT:	3	SEX:	Male	DAY ON TEST:	730
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54704

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Fibrosis Leukemia Mononuclear	Minimal
	[Fibrosis TGLs = 3-14] [Leukemia Mononuclear TGLs = 2-14]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Moderate
	[Adenoma TGLs = 5-9]		
Tooth		Inflammation	Chronic Active, Moderate

ANIMAL NUM:	219	TMT:	3	SEX:	Male	DAY ON TEST:	674
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54705

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Prostate | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|---|--|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Basophilic Focus | |
| * Lung | | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Mild
Mild
Chronic Active, Moderate
Moderate |
| | Alveolar Epith
Bronchiole | | |
| | Alveolus | | |
| | [Inflammation TGLs = 2-4, 5, 18] | | |
| Lymph Node | | Ectasia
Hyperplasia | Mild
Minimal |
| | Renal
Lumbar | | |
| | [Ectasia TGLs = 6-20] | | |
| | [Hyperplasia TGLs = 7-21] | | |
| * Nose | | Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Chronic Active, Mild |
| | Olfactory Epi
Respirat Epith | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Adenoma | |
| * Preputial Gland | | Inflammation | Chronic Active, Mild |
| * Skin | | Fibroma | |
| | [Fibroma TGLs = 1-14, 15, 16] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	219	TMT:	3	SEX:	Male	DAY ON TEST:	674
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54705

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	[Hematopoietic Cell Proliferation TGLs = 4-6]	Hematopoietic Cell Proliferation	Mild
* Testes	[Adenoma TGLs = 5-9]	Adenoma	

PRIMARY CAUSE OF DEATH - Skin Fibroma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 220	TMT: 3	SEX: Male	DAY ON TEST: 667
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54706

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|---------------------------------------|------------------------|--------------------------|
| * Adrenal Cortex | Leukemia Mononuclear | |
| * Adrenal Medulla | Hyperplasia | Marked |
| | Leukemia Mononuclear | |
| * Epididymis | Mesothelioma Malignant | |
| [Mesothelioma Malignant TGLs = 6-9] | | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 10-6] | | |
| * Lung | Bronchiole | Minimal |
| | Hyperplasia | Chronic Active, Moderate |
| | Inflammation | |
| | Leukemia Mononuclear | |
| | Alveolus | Minimal |
| [Inflammation TGLs = 2-4, 5, 14] | Proteinosis | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 1-17] | | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 3-3] | | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| * Nose | Respirat Epith | Minimal |
| | Olfactory Epi | Respiratory, Minimal |
| * Pancreas | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	220	TMT:	3	SEX:	Male	DAY ON TEST:	667
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54706

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia Leukemia Mononuclear	Minimal
	[Hyperplasia TGLs = 4-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 8-15, 9-15]		
* Stomach, Forestomach		Hyperplasia Ulcer	Squamous, Mild Mild
	[Hyperplasia TGLs = 11-19]		
* Testes	Interstit Cell	Adenoma Atrophy Mesothelioma Malignant	Moderate
	[Adenoma TGLs = 5-9]		
	[Mesothelioma Malignant TGLs = 7-16]		
* Thymus		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 221	TMT: 3	SEX: Male	DAY ON TEST: 667
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54707

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|---|--|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Minimal |
| * Bone Marrow | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 5-18] | | |
| * Lung | Bronchiole
Alveolar Epith | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Minimal
Minimal
Chronic Active, Moderate

Moderate |
| | [Inflammation TGLs = 2-4, 5, 16] | | |
| * Nose | Turbinate

Olfactory Epi | Atrophy
Inflammation
Metaplasia | Minimal
Chronic Active, Mild
Respiratory, Moderate |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia
Leukemia Mononuclear | Minimal |
| | [Hyperplasia TGLs = 6-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	221	TMT:	3	SEX:	Male	DAY ON TEST:	667
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54707

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin	[Keratoacanthoma TGLs = 1-14]	Keratoacanthoma	
* Spleen	[Leukemia Mononuclear TGLs = 3-17]	Leukemia Mononuclear	
* Testes	[Adenoma TGLs = 4-9]	Bilateral, Interstit Cell	Adenoma
* Thyroid Gland		C Cell	Hyperplasia Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 222	TMT: 3	SEX: Male	DAY ON TEST: 663
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54708

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Mammary Gland | * Parathyroid Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|---------------------------|--|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 8-7] | | |
| * Epididymis | | Mesothelioma Malignant | |
| * Heart | | Cardiomyopathy | Minimal |
| | [Thrombosis TGLs = 4-6] | Thrombosis | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 3-4, 5, 15] | Leukemia Mononuclear | |
| | | Metaplasia | Osseous, Minimal |
| Lymph Node | Renal | Leukemia Mononuclear | |
| | Lumbar | Leukemia Mononuclear | |
| | Pancreatic | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 13-19] | | |
| | [Leukemia Mononuclear TGLs = 14-20] | | |
| | [Leukemia Mononuclear TGLs = 15-21] | | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 222	TMT: 3	SEX: Male	DAY ON TEST: 663
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54708

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	[Leukemia Mononuclear TGLs = 16-8]	Accumulation, Hyaline Droplet	Minimal
	Turbinate	Atrophy	Minimal
	Olfactory Epi	Metaplasia	Respiratory, Minimal
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 5-10]		
* Preputial Gland		Inflammation	Chronic Active, Minimal
	[Inflammation TGLs = 1-17]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 9-16]		
* Testes	Interstit Cell	Adenoma	Mild
		Atrophy	
		Mesothelioma Malignant	
	[Adenoma TGLs = 12-9]		
	[Atrophy TGLs = 11-9]		
	[Mesothelioma Malignant TGLs = 10-14]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 223	TMT: 3	SEX: Male	DAY ON TEST: 577
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54709

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Bronchial |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Mandibular

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Bone | Vertebra | Degeneration | Mild |
| | [Degeneration TGLs = 6-17] | | |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Mediastinum | Metaplasia | Osseous, Marked |
| | | Metaplasia | Osseous, Marked |
| | Alveolus | Proteinosis | Mild |
| | [Inflammation TGLs = 4-4, 5, 14] | | |
| | [Metaplasia TGLs = 2-16] | | |
| | [Metaplasia TGLs = 1-14] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Spleen | | Fibrosis | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	223	TMT:	3	SEX:	Male	DAY ON TEST:	577
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54709

ORGAN AND ACCOUNTABLE SITE STATUS

	[Fibrosis	TGLs = 5-18]		
* Testes	Interstit Cell	Hyperplasia	Moderate	

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 224	TMT: 3	SEX: Male	DAY ON TEST: 684
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54710

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|----------------------|--|----------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Adenoma | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Basophilic Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 6-14] | Hepatodiaphragmatic Nodule | |
| * Lung | | Hyperplasia | Mild |
| | Bronchiole | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| Mesentery | | Necrosis | Minimal |
| | Fat | | |
| | [Necrosis TGLs = 5-16] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| | Respirat Epith | Necrosis | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 224	TMT: 3	SEX: Male	DAY ON TEST: 684
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54710

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 2-10]		
* Prostate		Inflammation	Chronic Active, Moderate
* Stomach, Forestomach		Hyperplasia Ulcer	Squamous, Mild Moderate
	[Ulcer TGLs = 8-17]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Moderate
	[Adenoma TGLs = 3-9, 4-9]		
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 225	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54711

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | | |
|-------------------------|-----------------|---------------------|
| * Lymph Node, Bronchial | * Mammary Gland | * Parathyroid Gland |
|-------------------------|-----------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|----------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Lung | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Marked |
| | Respirat Epith | Necrosis | Moderate |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Skin | | Inflammation | Minimal |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 225 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 729
HISTO: 54711

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 2-9]

ANIMAL NUM: 226	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54712

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-------------------|--|--|---|
| * Adrenal Cortex | | Atrophy
Hyperplasia | Minimal
Mild |
| | [Atrophy TGLs = 10-7] | | |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Eye | | Cataract
Metaplasia | Minimal
Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus
Clear Cell Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 8-6, 9-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Marked
Minimal
Chronic Active, Moderate |
| | Alveolus | Proteinosis
Squamous Cell Carcinoma | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 4-16]
[Inflammation TGLs = 3-4, 5] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia
Inflammation | Minimal
Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	226	TMT:	3	SEX:	Male	DAY ON TEST:	729
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54712

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Moderate
	[Hyperplasia TGLs = 12-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Keratoacanthoma	
	[Keratoacanthoma TGLs = 1-14]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 7-6]		
* Testes	Interstit Cell	Adenoma	Marked
		Atrophy	Mild
	Interstit Cell	Hyperplasia	
	[Adenoma TGLs = 5-9, 6-9]		
* Thyroid Gland	C Cell	Carcinoma	
	[Carcinoma TGLs = 2-3]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 227	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54713

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Skin | * Stomach, Glandular |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|----------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| | | Thrombosis | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Fatty Change | Minimal |
| | | Leukemia Mononuclear | |
| | | Necrosis | Minimal |
| | [Leukemia Mononuclear TGLs = 1-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Minimal |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	227	TMT:	3	SEX:	Male	DAY ON TEST:	729
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54713

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Leukemia Mononuclear	
* Seminal Vesicle		Leukemia Mononuclear	
* Spleen		Leukemia Mononuclear	
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Moderate
	[Adenoma TGLs = 3-9]		
* Thymus		Leukemia Mononuclear	
* Thyroid Gland	C Cell	Adenoma	

ANIMAL NUM: 228	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54714

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland |
| * Preputial Gland | * Prostate | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Brain | | Compression | Mild |
| * Eye | | Cataract | Moderate |
| | | Metaplasia | Osseous, Minimal |
| | [Cataract TGLs = 1-13] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Skin | | Fibroma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	228	TMT:	3	SEX:	Male	DAY ON TEST:	729
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54714

ORGAN AND ACCOUNTABLE SITE STATUS

	[Fibroma	TGLs = 5-15]			
* Testes			Bilateral, Interstit Cell	Adenoma Atrophy	Mild
	[Adenoma	TGLs = 4-9]			
* Thyroid Gland			Bilateral, C Cell	Adenoma	

ANIMAL NUM: 229	TMT: 3	SEX: Male	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54715

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Moderate |
| Lymph Node | Iliac, Renal | Ectasia | Moderate |
| | [Ectasia TGLs = 5-15, 6-14] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 229 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54715

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 1-10]

* Prostate

Inflammation

Chronic Active, Mild

* Spleen

Leukemia Mononuclear

* Testes

Interstit Cell

Adenoma

Atrophy

Moderate

[Adenoma TGLs = 2-9]

* Thyroid Gland

C Cell

Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 230	TMT: 3	SEX: Male	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54716

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|-------------------------|-----------------|----------|
| * Lymph Node, Bronchial | * Mammary Gland | * Thymus |
|-------------------------|-----------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|---|---|---|
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 5-7] | | |
| Ear | | Inflammation | Chronic Active, Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | Renal Tubule | Adenoma
Nephropathy | Marked |
| | [Nephropathy TGLs = 4-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Lung | Bronchiole
Alveolar Epith | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Multiple
Minimal
Mild
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 3-4, 5, 14] | | |
| Lymph Node | Iliac, Lumbar | Ectasia | Minimal |
| | [Ectasia TGLs = 8-18, 9-19] | | |
| * Nose | Olfactory Epi
Respirat Epith | Atrophy
Hyperplasia | Minimal
Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	230	TMT:	3	SEX:	Male	DAY ON TEST:	730
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54716

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Fibrosis	Minimal
	[Fibrosis TGLs = 7-15]		
* Testes		Bilateral, Interstit Cell	Adenoma
	[Adenoma TGLs = 6-9]		
* Thyroid Gland		C Cell	Hyperplasia
			Marked

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	231	TMT:	3	SEX:	Male	DAY ON TEST:	715
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54717

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|--------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Liver |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|---------------------------|---------------------|
| * Intestine Large, Rectum | * Parathyroid Gland |
|---------------------------|---------------------|

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| | [Schwannoma Malignant TGLs = 6-17] | Schwannoma Malignant | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Nose | Turbinate | Atrophy | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Skin | | Trichoepithelioma | |
| | [Trichoepithelioma TGLs = 1-14] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Mild |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 231 TMT: 3
 DOSE: 1.25 mg/m3

SEX: Male
DISP: Moribund Sacrifice

DAY ON TEST: 715
 HISTO: 54717

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 4-9]
[Atrophy TGLs = 3-9]

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM:	232	TMT:	3	SEX:	Male	DAY ON TEST:	610
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54718

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|----------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Lung | Bronchiole | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Mild |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-17] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Mild |
| | | Ulcer | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	232	TMT:	3	SEX:	Male	DAY ON TEST:	610
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54718

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Atrophy	Marked
----------	---------	--------

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 233	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54719

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Thymus

OBSERVATIONS

- | | | | |
|-------------------|---|--|---|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Moderate |
| * Brain | [Oligodendroglioma Malignant TGLs = 6-14] | Oligodendroglioma Malignant | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | [Nephropathy TGLs = 4-7] | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Clear Cell Focus
Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Mild
Minimal
Chronic Active, Moderate |
| | Alveolus | Metaplasia
Proteinosis | Osseous, Minimal
Moderate |
| | [Inflammation TGLs = 3-4, 5, 15] | | |
| * Mammary Gland | [Galactocele TGLs = 1-18] | Galactocele | Mild |
| * Nose | Turbinate | Atrophy
Corpora Amylacea | Minimal
Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	233	TMT:	3	SEX:	Male	DAY ON TEST:	729
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54719

ORGAN AND ACCOUNTABLE SITE STATUS

		Respirat Epith	Hyperplasia	Minimal
		Olfactory Epi	Metaplasia	Respiratory, Minimal
* Pancreas			Atrophy	Minimal
* Pituitary Gland		Pars Distalis	Adenoma	
	[Adenoma	TGLs = 2-10]		
* Prostate			Hyperplasia	Minimal
* Spleen			Fibrosis	Mild
	[Fibrosis	TGLs = 5-16]	Leukemia Mononuclear	
* Testes		Interstit Cell	Adenoma	
		Interstit Cell	Atrophy	Minimal
			Hyperplasia	Mild

ANIMAL NUM:	234	TMT:	3	SEX:	Male	DAY ON TEST:	580
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54720

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Pancreas | * Parathyroid Gland | * Pituitary Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|------------|-----------------------------------|--------------------------------|--------------------------|
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| | Atrium | Congestion | Mild |
| | | Inflammation | Suppurative, Mild |
| | [Congestion TGLs = 2-6] | | |
| * Kidney | | Nephropathy | Moderate |
| | | Thrombosis | Minimal |
| | Note: bacterial emboli no code | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Necrosis | Moderate |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Suppurative, Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Moderate |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Foreign Body | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Skin | | Trichoepithelioma | |
| | [Trichoepithelioma TGLs = 1-16] | | |
| * Spleen | | Necrosis | Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	234	TMT:	3	SEX:	Male	DAY ON TEST:	580
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54720

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Hyperplasia	Minimal
----------	----------------	-------------	---------

PRIMARY CAUSE OF DEATH - Lung Inflammation

ANIMAL NUM: 235	TMT: 3	SEX: Male	DAY ON TEST: 603
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54721

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland |
| * Pituitary Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|------------------|--|--------------------------------|-----------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Brain | | Carcinoma | Metastatic (Zymbal'S Gland) |
| | [Carcinoma TGLs = 8-1] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Cyst | Mild |
| | [Cyst TGLs = 6-7] | Nephropathy | Mild |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 9-16] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 4-4, 5] | Proteinosis | Moderate |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| Penis | | Concretion | Mild |
| | [Concretion TGLs = 2-17] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	235	TMT:	3	SEX:	Male	DAY ON TEST:	603
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54721

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Testes	Interstit Cell	Adenoma	
	Interstit Cell	Atrophy	Mild
	[Adenoma TGLs = 5-9]	Hyperplasia	Moderate
* Thyroid Gland	Follicular Cel	Carcinoma	
	[Carcinoma TGLs = 3-3]		
Zymbal's Gland		Carcinoma	
	[Carcinoma TGLs = 7-14, 15]		

PRIMARY CAUSE OF DEATH - Brain Carcinoma Zymbal'S Gland
 CONTRIBUTORY CAUSE OF DEATH - Zymbal's Gland Carcinoma

ANIMAL NUM:	236	TMT:	3	SEX:	Male	DAY ON TEST:	596
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54722

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Glandular | * Thyroid Gland | * Trachea |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|------------------------|---|------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | [Hepatodiaphragmatic Nodule TGLs = 2-6] | Hepatodiaphragmatic Nodule | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Seminal Vesicle | | Inflammation | Chronic Active, Mild |
| * Stomach, Forestomach | | Inflammation | Chronic Active, Moderate |
| | | Squamous Cell Papilloma | |
| * Testes | Interstit Cell | Hyperplasia | Mild |
| * Urinary Bladder | Transit Epithe | Hyperplasia | Marked |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 236 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Moribund Sacrifice

DAY ON TEST: 596
HISTO: 54722

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 237	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54723

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Marked |
| Ear | | Inflammation | Chronic Active, Minimal |
| * Epididymis | | Mesothelioma Malignant | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-18] | | |
| * Lung | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5, 15] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	237	TMT:	3	SEX:	Male	DAY ON TEST:	729
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54723

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 5-10]

* Prostate

Inflammation

Chronic Active, Mild

* Testes

Bilateral, Interstit Cell

Adenoma
Atrophy
Mesothelioma Malignant

Marked

[Adenoma TGLs = 1-16, 17]

[Mesothelioma Malignant TGLs = 2-14]

* Thyroid Gland

C Cell

Adenoma

Tooth

Inflammation

Chronic Active, Mild

ANIMAL NUM: 238	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54724

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|----------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Heart | Artery | Cardiomyopathy | Marked |
| | [Cardiomyopathy TGLs = 6-17] | Inflammation | Chronic Active, Moderate |
| * Kidney | | Accumulation, Hyaline Droplet | Mild |
| | | Cyst | Mild |
| | | Nephropathy | Marked |
| * Liver | | Basophilic Focus | |
| | | Degeneration | Cystic, Minimal |
| | | Eosinophilic Focus | |
| | | Mixed Cell Focus | |
| * Lung | Alveolar Epith | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15] | | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 238	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54724

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Foreign Body Hyperplasia Inflammation Metaplasia	Mild Moderate Chronic Active, Mild Respiratory, Moderate
* Pituitary Gland	Olfactory Epi Pars Distalis	Hyperplasia	Moderate
* Prostate		Hyperplasia	Mild
* Spleen	[Leukemia Mononuclear TGLs = 3-6]	Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell [Adenoma TGLs = 4-9, 5-18]	Adenoma Atrophy	Marked

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 239	TMT: 3	SEX: Male	DAY ON TEST: 705
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54725

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Marked |
| * Larynx | | Inflammation | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Moderate |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 3-9] | Atrophy | Moderate |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 239 TMT: 3
DOSE: 1.25 mg/m3

SEX: Male
DISP: Moribund Sacrifice

DAY ON TEST: 705
HISTO: 54725

ORGAN AND ACCOUNTABLE SITE STATUS

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 240	TMT: 3	SEX: Male	DAY ON TEST: 618
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54726

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|--------------------------|--|--|---|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Marked |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | [Nephropathy TGLs = 7-7] | Nephropathy | Marked |
| * Liver | | Basophilic Focus
Clear Cell Focus
Degeneration
Hepatodiaphragmatic Nodule | Cystic, Minimal |
| | [Hepatodiaphragmatic Nodule TGLs = 6-15] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Mild
Minimal
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 3-4, 5, 14] | | |
| * Lymph Node, Mandibular | | Congestion | Moderate |
| | [Congestion TGLs = 2-9] | | |
| * Nose | Turbinate | Atrophy
Corpora Amylacea | Minimal
Minimal |
| * Pancreas | | Atrophy | Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 240	TMT: 3	SEX: Male	DAY ON TEST: 618
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54726

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma	TGLs = 4-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin	Lip	Squamous Cell Papilloma	
[Squamous Cell Papilloma	TGLs = 1-17]		
* Stomach, Forestomach		Hyperplasia	Squamous, Moderate
		Inflammation	Chronic Active, Moderate
* Stomach, Glandular		Erosion	Minimal
* Testes	Bilateral, Interstit Cell	Adenoma	
[Adenoma	TGLs = 5-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 241	TMT: 3	SEX: Male	DAY ON TEST: 675
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54727

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Spleen | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

INSUFFICIENT TISSUE

- * Nose

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Brain | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Compression | Minimal |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Basophilic Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 7-15] | Hepatodiaphragmatic Nodule | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | Mediastinum | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Pancreas | | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	241	TMT:	3	SEX:	Male	DAY ON TEST:	675
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54727

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma	TGLs = 8-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Squamous Cell Papilloma	
[Squamous Cell Papilloma	TGLs = 1-17]		
* Stomach, Forestomach		Hyperplasia	Squamous, Moderate
* Testes	Interstit Cell	Adenoma	
		Atrophy	Marked
[Adenoma	TGLs = 5-9]		
[Atrophy	TGLs = 4-9]		

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

ANIMAL NUM: 242	TMT: 3	SEX: Male	DAY ON TEST: 562
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54728

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|------------------|--------------------------|
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Liver | | Clear Cell Focus | |
| * Lung | Bronchiole | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Foreign Body | Minimal |
| | | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 6-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Spleen | | Fibrosis | Mild |
| | [Fibrosis TGLs = 2-14, 3-15] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Moderate |
| | | Inflammation | Chronic Active, Moderate |
| * Stomach, Glandular | | Inflammation | Chronic Active, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	242	TMT:	3	SEX:	Male	DAY ON TEST:	562
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54728

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Hyperplasia	Minimal
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 243	TMT: 3	SEX: Male	DAY ON TEST: 641
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54729

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|--------------------------|-----------------------------|------------------------------|--------------------------|
| * Brain | | Compression
Hemorrhage | Mild
Mild |
| | [Hemorrhage TGLs = 5-1] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | | Proteinosis | Moderate |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | | |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Skin | | Hyperplasia | Squamous, Mild |
| | [Hyperplasia TGLs = 1-14] | | |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	243	TMT:	3	SEX:	Male	DAY ON TEST:	641
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54729

ORGAN AND ACCOUNTABLE SITE STATUS

	[Leukemia Mononuclear TGLs = 2-15]		
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
	[Hyperplasia TGLs = 6-10]		
* Testes		Bilateral, Interstit Cell	Adenoma
	[Adenoma TGLs = 3-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 244	TMT: 3	SEX: Male	DAY ON TEST: 413
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54730

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas |
| * Preputial Gland | * Prostate | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | | | |
|-------------------------|-----------------|---------------------|----------|
| * Lymph Node, Bronchial | * Mammary Gland | * Parathyroid Gland | * Thymus |
|-------------------------|-----------------|---------------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|------------------|--------------------------|
| * Brain | | Compression | Mild |
| | | Hemorrhage | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia | Moderate |
| | | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | | Hemorrhage | Moderate |
| | [Adenoma TGLs = 2-10] | | |
| * Testes | Interstit Cell | Hyperplasia | Minimal |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

CONTRIBUTORY CAUSE OF DEATH - Brain Hemorrhage

ANIMAL NUM: 245	TMT: 3	SEX: Male	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54731

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Pancreas | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-----------------|---------------------|
| * Mammary Gland | * Parathyroid Gland |
|-----------------|---------------------|

OBSERVATIONS

- | | | | |
|---------------------------|-------------------------------------|------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| Ear | | Pheochromocytoma Benign | |
| * Eye | | Inflammation | Chronic Active, Mild |
| * Heart | | Metaplasia | Osseous, Mild |
| * Kidney | | Cardiomyopathy | Minimal |
| | [Nephropathy TGLs = 9-7] | Nephropathy | Moderate |
| * Larynx | | Inflammation | Mild |
| * Liver | | Eosinophilic Focus | |
| | [Leukemia Mononuclear TGLs = 8-6] | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Moderate |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| * Nose | Olfactory Epi | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 245	TMT: 3	SEX: Male	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54731

ORGAN AND ACCOUNTABLE SITE STATUS

	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 4-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Inflammation	Moderate
		Lipoma	
		Trichoepithelioma	
	[Inflammation TGLs = 5-15]		
	[Lipoma TGLs = 2-18]		
	[Trichoepithelioma TGLs = 1-17]		
* Spleen		Leukemia Mononuclear	
		Necrosis	Minimal
	[Leukemia Mononuclear TGLs = 6-14]		
	[Necrosis TGLs = 7-14]		
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
* Testes	Interstit Cell	Adenoma	
		Atrophy	Moderate
	[Adenoma TGLs = 10-9]		

ANIMAL NUM: 246	TMT: 3	SEX: Male	DAY ON TEST: 439
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54732

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Glandular |
| * Testes | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | | |
|-------------------------|---------------------------|-----------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Mammary Gland |
|-------------------------|---------------------------|-----------------|

OBSERVATIONS

- | | | |
|--------------------------|------------------------------------|--------------------------|
| * Brain | Compression | Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Fatty Change | Mild |
| | [Fatty Change TGLs = 4-6] | |
| * Lung | Bronchiole | Minimal |
| | Alveolus | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5, 14] | Moderate |
| * Lymph Node, Mandibular | Ectasia | Mild |
| | [Ectasia TGLs = 1-9] | |
| * Nose | Turbinate | Minimal |
| | Respirat Epith | Mild |
| | Olfactory Epi | Basal Cell, Minimal |
| | Olfactory Epi | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Respiratory, Minimal |
| | [Adenoma TGLs = 3-10] | |
| * Preputial Gland | Inflammation | Chronic Active, Minimal |
| | [Inflammation TGLs = 5-15] | |
| * Prostate | Inflammation | Chronic Active, Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	246	TMT:	3	SEX:	Male	DAY ON TEST:	439
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54732

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach

Hyperplasia

Squamous, Moderate

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 247	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54733

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Pituitary Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Cataract | Moderate |
| | | Metaplasia | Osseous, Minimal |
| | [Cataract TGLs = 3-13] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 9-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Artery, Mediastinum | Inflammation | Chronic Active, Mild |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 6-4, 5] | | |
| Lymph Node | Renal | Ectasia | Moderate |
| | [Ectasia TGLs = 10-21] | | |
| * Mammary Gland | | Hyperplasia | Moderate |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | | Corpora Amylacea | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 247	TMT: 3	SEX: Male	DAY ON TEST: 729
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54733

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Inflammation Necrosis Ectasia	Chronic Active, Minimal Minimal Moderate
* Preputial Gland	[Ectasia TGLs = 4-19]		
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen	[Leukemia Mononuclear TGLs = 5-18]	Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 7-9, 8-9]		
* Thyroid Gland	Follicular Cel	Carcinoma	
	[Carcinoma TGLs = 2-16]		

ANIMAL NUM: 248	TMT: 3	SEX: Male	DAY ON TEST: 719
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54734

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | Epicardium | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | Hyperplasia | Mild |
| * Islets, Pancreatic | | Hyperplasia | Mild |
| * Kidney | [Nephropathy TGLs = 5-7] | Nephropathy | Marked |
| * Liver | | Necrosis | Mild |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | Alveolar Epith | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5, 15] | Proteinosis | Moderate |
| Lymph Node | Renal | Ectasia | Moderate |
| | [Ectasia TGLs = 6-16] | | |
| * Nose | Turbinates | Atrophy | Minimal |
| | Respiratory Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Adenoma | |
| | | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 248	TMT: 3	SEX: Male	DAY ON TEST: 719
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54734

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma	TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Mild
* Stomach, Forestomach		Hyperplasia	Squamous, Moderate
* Stomach, Glandular		Ulcer	Mild
[Ulcer	TGLs = 7-17]		
* Testes	Interstit Cell	Adenoma	
[Atrophy	TGLs = 4-9]	Atrophy	Marked

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

ANIMAL NUM: 249	TMT: 3	SEX: Male	DAY ON TEST: 663
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54735

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Heart | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Glandular | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-----------------|----------|
| * Mammary Gland | * Thymus |
|-----------------|----------|

OBSERVATIONS

- | | | |
|--------------------------|--|--------------------------|
| * Brain | Compression | Mild |
| Ear | Inflammation | Chronic Active, Moderate |
| * Kidney | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | |
| * Liver | Basophilic Focus | |
| | Hepatodiaphragmatic Nodule | |
| | Regeneration | Minimal |
| | [Hepatodiaphragmatic Nodule TGLs = 4-16, 5-17] | |
| | [Regeneration TGLs = 6-18] | |
| * Lung | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Minimal |
| | Hyperplasia | Chronic Active, Moderate |
| | Inflammation | Moderate |
| | Alveolus | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 9-15] | |
| | [Inflammation TGLs = 2-4, 5] | |
| * Lymph Node, Mandibular | Hyperplasia | Minimal |
| * Nose | Turbinate | Minimal |
| | Respirat Epith | Minimal |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 8-10] | |
| * Prostate | Inflammation | Chronic Active, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	249	TMT:	3	SEX:	Male	DAY ON TEST:	663
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54735

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin		Inflammation	Moderate
	[Inflammation TGLs = 1-14]		
* Stomach, Forestomach		Hyperplasia Ulcer	Squamous, Mild Mild
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 3-9]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 250	TMT: 3	SEX: Male	DAY ON TEST: 593
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54736

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Brain | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Pituitary Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | |
|---------------------------|--|--------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| * Bone Marrow | Leukemia Mononuclear | |
| * Kidney | Leukemia Mononuclear | |
| * Larynx | Inflammation | Minimal |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | |
| * Lung | Bronchiole | Minimal |
| | Hyperplasia | |
| | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5, 15] | |
| Lymph Node | Pancreatic, Renal | Leukemia Mononuclear |
| | [Leukemia Mononuclear TGLs = 5-17, 6-18] | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-3] | |
| * Nose | Olfactory Epi | Minimal |
| * Pancreas | Atrophy | Mild |
| * Prostate | Inflammation | Chronic Active, Moderate |
| * Spleen | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-14] | |
| * Testes | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	250	TMT:	3	SEX:	Male	DAY ON TEST:	593
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54736

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 401	TMT: 5	SEX: Male	DAY ON TEST: 719
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54587

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|--------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Jejunum | * Larynx | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Heart | | Cardiomyopathy | Mild |
| * Intestine Small, Ileum | | Inflammation | Suppurative, Minimal |
| * Islets, Pancreatic | | Adenoma | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 2-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Skin | | Hyperplasia | Squamous, Marked |
| | [Hyperplasia TGLs = 1-14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	401	TMT:	5	SEX:	Male	DAY ON TEST:	719
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54587

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Fibrosis	Mild
	[Fibrosis TGLs = 4-7]		
* Testes		Bilateral, Interstit Cell	Adenoma
	[Adenoma TGLs = 6-9, 7-9]	Atrophy	Marked

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 402	TMT: 5	SEX: Male	DAY ON TEST: 705
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54588

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Liver | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Parathyroid Gland |
| * Preputial Gland | * Prostate | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | | |
|-------------------------|---------------------------|-----------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Mammary Gland |
|-------------------------|---------------------------|-----------------|

OBSERVATIONS

- | | | | |
|----------------------|--------------------------------|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Adenoma | |
| * Kidney | [Nephropathy TGLs = 6-7] | Nephropathy | Moderate |
| * Larynx | | Foreign Body | Minimal |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |
| * Skin | | Keratoacanthoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	402	TMT:	5	SEX:	Male	DAY ON TEST:	705
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54588

ORGAN AND ACCOUNTABLE SITE STATUS

Trichoepithelioma

[Keratoacanthoma TGLs = 1-14]

[Trichoepithelioma TGLs = 2-16]

* Stomach, Forestomach

Hyperplasia
Ulcer

Squamous, Mild
Moderate

* Testes

Interstit Cell

Adenoma
Atrophy

Mild

[Adenoma TGLs = 5-9]

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 403	TMT: 5	SEX: Male	DAY ON TEST: 667
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54589

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|----------------|--------------------------|
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Liver | | Regeneration | Mild |
| | [Regeneration TGLs = 5-6] | | |
| * Lung | | Bronchiole | Moderate |
| | | Alveolar Epith | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Alveolus | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Turbinate | Minimal |
| | | Respirat Epith | Moderate |
| | | Olfactory Epi | Chronic Active, Moderate |
| | | Olfactory Epi | Respiratory, Moderate |
| | [Inflammation TGLs = 6-11] | Necrosis | Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | Adenoma | |
| * Prostate | | Inflammation | Chronic Active, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	403	TMT:	5	SEX:	Male	DAY ON TEST:	667
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54589

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach		Hyperplasia Ulcer	Squamous, Mild Mild
* Testes	Interstitial Cell	Adenoma Atrophy	Marked
[Atrophy TGLs = 3-9]			

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 404	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54590

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|----------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Accumulation, Hyaline Droplet | Mild |
| | [Nephropathy TGLs = 3-7, 6-14] | Nephropathy | Marked |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 5-4, 5] | Proteinosis | Moderate |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | | Hyperplasia | Marked |
| | Pars Distalis | | |
| | [Hyperplasia TGLs = 1-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 404	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54590

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Hyperplasia	Reticulum Cell, Marked
	[Hyperplasia TGLs = 2-6]		
* Testes		Bilateral, Interstit Cell	Adenoma
	[Adenoma TGLs = 4-9]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 405	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54591

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| * Lung | [Hepatodiaphragmatic Nodule TGLs = 4-14] | Alveolar/Bronchiolar Carcinoma | Multiple |
| | | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Mild |
| | Bronchiole | Inflammation | Chronic Active, Marked |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| | [Hyperplasia TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Skin | | Inflammation | Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 405 TMT: 5
 DOSE: 2.5 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 729
HISTO: 54591

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes [Inflammation TGLs = 1-16]

Atrophy

Marked

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 406	TMT: 5	SEX: Male	DAY ON TEST: 683
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54592

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Bone Marrow | | Leukemia Mononuclear | |
| * Brain | | Hemorrhage | Mild |
| | | Leukemia Mononuclear | |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear | |
| | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 1-4, 5, 14] | Proteinosis | Moderate |
| Mesentery | | Lipoma | |
| | [Lipoma TGLs = 4-17] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	406	TMT:	5	SEX:	Male	DAY ON TEST:	683
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54592

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Turbinate	Atrophy	Minimal
		Foreign Body	Mild
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Moderate
	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-15]		
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
* Testes		Atrophy	Minimal
	Interstit Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 407	TMT: 5	SEX: Male	DAY ON TEST: 729
DOSE: 2.5 mg/m3		DISP: Terminal Sacrifice	HISTO: 54593

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Nose | | Hyperplasia | Minimal |
| | Respirat Epith | Metaplasia | Respiratory, Minimal |
| | Olfactory Epi | | |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 6-15] | | |
| * Testes | | Adenoma | |
| | Bilateral, Interstit Cell | Atrophy | Marked |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 407 TMT: 5
 DOSE: 2.5 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 729
HISTO: 54593

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 5-9]
* Thyroid Gland C Cell Carcinoma
[Carcinoma TGLs = 1-14]

ANIMAL NUM: 408	TMT: 5	SEX: Male	DAY ON TEST: 652
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54594

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | Atrium | Cardiomyopathy | Mild |
| | [Congestion TGLs = 8-6] | Congestion | Mild |
| * Islets, Pancreatic | | Carcinoma | |
| | [Carcinoma TGLs = 7-17] | | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Lung | Bronchiole | Alveolar/Bronchiolar Carcinoma | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 5-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 6-4, 5, 14] | | |
| * Mammary Gland | | Galactocele | Marked |
| | [Galactocele TGLs = 2-19] | | |
| * Nose | Respirat Epith | Accumulation, Hyaline Droplet | Minimal |
| | Olfactory Epi | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Respiratory, Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 408	TMT: 5	SEX: Male	DAY ON TEST: 652
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54594

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
* Prostate		Inflammation	Chronic Active, Minimal
* Skin	[Keratoacanthoma TGLs = 1-18]	Keratoacanthoma	
* Testes	Arteriole	Inflammation	Chronic Active, Mild
	[Inflammation TGLs = 4-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	409	TMT:	5	SEX:	Male	DAY ON TEST:	721
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54595

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Brain | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Lymph Node, Bronchial |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|----------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| | Bilateral | Pheochromocytoma Benign | |
| * Bone Marrow | | Necrosis | Mild |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| | | Thrombosis | Minimal |
| | [Thrombosis TGLs = 2-16] | | |
| * Islets, Pancreatic | | Adenoma | |
| | | Hyperplasia | Marked |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | | Regeneration | Marked |
| | [Leukemia Mononuclear TGLs = 7-6] | | |
| | [Regeneration TGLs = 8-14] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Minimal |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 409	TMT: 5	SEX: Male	DAY ON TEST: 721
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54595

ORGAN AND ACCOUNTABLE SITE STATUS

	Alveolus	Proteinosis	Mild
	[Inflammation TGLs = 3-4, 5]		
Lymph Node	Iliac	Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 9-21]		
* Lymph Node, Mandibular		Leukemia Mononuclear	
Mesentery	Fat	Infiltration Cellular	Mild
	[Infiltration Cellular TGLs = 10-22]	Necrosis	Minimal
	[Necrosis TGLs = 4-20]		
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Moderate
	Olfactory Epi	Metaplasia	Respiratory, Mild
	Olfactory Epi	Necrosis	Mild
	Respirat Epith	Necrosis	Mild
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Moderate
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
		Necrosis	Minimal
	[Leukemia Mononuclear TGLs = 5-18]		
	[Necrosis TGLs = 6-17]		
* Testes		Atrophy	Marked
	Interstit Cell	Hyperplasia	Minimal
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 410	TMT: 5	SEX: Male	DAY ON TEST: 688
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54596

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|----------------------|---------------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Islets, Pancreatic | | Hyperplasia | Minimal |
| * Kidney | [Nephropathy TGLs = 4-7] | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Necrosis | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| Lymph Node | Pancreatic | Infiltration Cellular | Histiocyte, Moderate |
| | [Infiltration Cellular TGLs = 5-16] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| | Olfactory Epi | Necrosis | Minimal |
| | Respirat Epith | Necrosis | Minimal |
| * Pancreas | | Atrophy | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	410	TMT:	5	SEX:	Male	DAY ON TEST:	688
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54596

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma	TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Mild
* Skin		Hyperplasia	Squamous, Mild
		Inflammation	Mild
[Hyperplasia	TGLs = 1-15]		
[Inflammation	TGLs = 9-14]		
* Spleen		Leukemia Mononuclear	
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
* Testes	Interstit Cell	Adenoma	
		Atrophy	Minimal
	Interstit Cell	Hyperplasia	Minimal
[Adenoma	TGLs = 7-9]		
[Hyperplasia	TGLs = 6-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 411	TMT: 5	SEX: Male	DAY ON TEST: 730
DOSE: 2.5 mg/m3		DISP: Terminal Sacrifice	HISTO: 54597

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Seminal Vesicle | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|--|-----------------------------------|--------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | [Clear Cell Focus TGLs = 6-15] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-14] | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 5-18] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 8-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	411	TMT:	5	SEX:	Male	DAY ON TEST:	730
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54597

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Fibrosis Inflammation	Mild Chronic Active, Minimal
* Salivary Glands		Carcinoma	
	[Carcinoma TGLs = 1-16]		
* Skin		Hyperplasia	Squamous, Moderate
	[Hyperplasia TGLs = 7-19]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 4-9]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 412	TMT: 5	SEX: Male	DAY ON TEST: 609
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54598

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Pituitary Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Glandular | * Testes | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|-------------------------|---------------------------|-----------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Mammary Gland |
|-------------------------|---------------------------|-----------------|

AUTO PRECLUDES DIAG.

- * Nose

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|--|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Heart | | Cardiomyopathy
Inflammation | Minimal
Suppurative, Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith | Hyperplasia
Inflammation
Inflammation
Proteinosis | Minimal
Suppurative, Moderate
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Pancreas | | Atrophy | Minimal |
| * Stomach, Forestomach | | Hyperplasia
Ulcer | Squamous, Mild
Minimal |

PRIMARY CAUSE OF DEATH - Lung Inflammation

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 413	TMT: 5	SEX: Male	DAY ON TEST: 703
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54599

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|-------------------------|---------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Rectum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-----------------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Intestine Large, Cecum | Epithelium | Hyperplasia | Minimal |
| * Intestine Large, Colon | Epithelium | Hyperplasia | Minimal |
| * Intestine Small, Duodenum | | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 9-8] | | |
| * Intestine Small, Ileum | Epithelium | Hyperplasia | Minimal |
| * Intestine Small, Jejunum | Epithelium | Hyperplasia | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Basophilic Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 6-18] | Hepatodiaphragmatic Nodule | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5, 17] | | |
| * Nose | Turbinate | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	413	TMT:	5	SEX:	Male	DAY ON TEST:	703
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54599

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Hyperplasia Inflammation	Moderate Chronic Active, Mild
	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 2-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Keratoacanthoma	
	[Keratoacanthoma TGLs = 8-14]		
* Stomach, Forestomach		Hyperplasia Ulcer	Squamous, Mild Mild
	[Ulcer TGLs = 10-20]		
* Testes	Interstit Cell	Adenoma Atrophy	Marked
	[Atrophy TGLs = 4-9, 5-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 414	TMT: 5	SEX: Male	DAY ON TEST: 628
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54600

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 5-18] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5, 19] | Proteinosis | Moderate |
| Lymph Node | Renal | Ectasia | Mild |
| | [Ectasia TGLs = 6-22] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 3-21] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Prostate | | Inflammation | Chronic Active, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	414	TMT:	5	SEX:	Male	DAY ON TEST:	628
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54600

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin		Fibroma	
	[Fibroma TGLs = 1-14, 15, 16]		
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Mild
	[Adenoma TGLs = 4-9]		
* Thyroid Gland	C Cell	Hyperplasia	Mild

PRIMARY CAUSE OF DEATH - Skin Fibroma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 415	TMT: 5	SEX: Male	DAY ON TEST: 646
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54601

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|--|------------------------------|--------------------------|
| * Adrenal Cortex | | Necrosis | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| | | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 3-7] | | |
| * Brain | | Compression | Mild |
| * Eye | | Cataract | Moderate |
| | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 2-7] | | |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-14] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Hyperplasia | Mild |
| | Respirat Epith | Hyperplasia | Basal Cell, Minimal |
| | Olfactory Epi | Inflammation | Chronic Active, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	415	TMT:	5	SEX:	Male	DAY ON TEST:	646
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54601

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Olfactory Epi	Metaplasia	Respiratory, Minimal
* Pituitary Gland	Pars Distalis	Atrophy	Minimal
[Adenoma TGLs = 5-10]		Adenoma	
* Stomach, Forestomach		Hyperplasia	Squamous, Mild
		Ulcer	Mild
* Testes		Atrophy	Minimal
	Interstit Cell	Hyperplasia	Minimal
* Thyroid Gland	C Cell	Hyperplasia	Mild

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 416	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54602

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|--------------------------|--|--|--|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Marked |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Liver | | Basophilic Focus
Clear Cell Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-14] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Moderate
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Lymph Node, Mandibular | | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 1-15] | | |
| * Nose | | Atrophy
Hyperplasia | Minimal
Moderate |
| | Turbinate
Respirat Epith | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	416	TMT:	5	SEX:	Male	DAY ON TEST:	729
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54602

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi	Inflammation Metaplasia	Chronic Active, Moderate Respiratory, Minimal
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Mild
	[Inflammation TGLs = 7-16]		
* Spleen		Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 6-9]		

ANIMAL NUM: 417	TMT: 5	SEX: Male	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54603

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Liver | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|---------------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Alveolar/Bronchiolar Carcinoma | Metastatic |
| | | Cardiomyopathy | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 5-16] | | |
| | [Cardiomyopathy TGLs = 6-6, 16] | | |
| * Islets, Pancreatic | | Carcinoma | |
| | [Carcinoma TGLs = 11-19] | | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 8-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-14, 15] | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Lymph Node, Mediastinal | | Hyperplasia | Lymphoid, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	417	TMT:	5	SEX:	Male	DAY ON TEST:	730
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54603

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	[Hyperplasia TGLs = 4-3]	Turbinate Respirat Epith	Atrophy Hyperplasia Inflammation Metaplasia	Minimal Minimal Chronic Active, Minimal Respiratory, Minimal
* Pancreas		Olfactory Epi	Atrophy	Mild
* Pituitary Gland		Pars Distalis	Adenoma	
	[Adenoma TGLs = 7-10]			
* Prostate			Inflammation	Chronic Active, Mild
	[Inflammation TGLs = 10-18]			
* Skin			Fibroma	
	[Fibroma TGLs = 1-17]			
* Testes		Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 9-9]			

ANIMAL NUM: 418	TMT: 5	SEX: Male	DAY ON TEST: 688
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54604

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Kidney | [Nephropathy TGLs = 6-7] | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| | | Metaplasia | Squamous, Minimal |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-18] | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Respiratory, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 418	TMT: 5	SEX: Male	DAY ON TEST: 688
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54604

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Fibroma	
	[Fibroma TGLs = 8-15]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 7-17]		
* Testes		Atrophy	Marked
	Interstit Cell	Hyperplasia	Minimal
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 419	TMT: 5	SEX: Male	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54605

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Larynx | * Lymph Node, Mandibular | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Mesenteric

OBSERVATIONS

- | | | | |
|---------------------------|--------------------------------|--------------------------------|-------------------------------------|
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Brain | | Compression | Minimal |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | | Accumulation, Hyaline Droplet | Mild |
| | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| | Alveolus | Leukemia Mononuclear | |
| | | Proteinosis | Mild |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Lymph Node, Bronchial | | Histiocytic Sarcoma | Metastatic (Uncertain Primary Site) |
| * Lymph Node, Mediastinal | | Histiocytic Sarcoma | Metastatic (Uncertain Primary Site) |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Corpora Amylacea | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	419	TMT:	5	SEX:	Male	DAY ON TEST:	730
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54605

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Olfactory Epi Pars Distalis	Necrosis Adenoma	Minimal
[Adenoma TGLs = 5-10]			
* Preputial Gland		Inflammation	Chronic Active, Minimal
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Hyperplasia	Squamous, Moderate
[Hyperplasia TGLs = 1-16]			
* Spleen		Leukemia Mononuclear	
* Testes	Interstit Cell	Adenoma Atrophy	Minimal
* Thyroid Gland	C Cell	Hyperplasia	Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 420	TMT: 5	SEX: Male	DAY ON TEST: 725
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54606

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | | | |
|----------------------|-------------------------|-----------------|---------------------|
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Mammary Gland | * Parathyroid Gland |
| * Thymus | | | |

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 8-7] | | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 7-6] | | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Minimal |
| Lymph Node | Pancreatic | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	420	TMT:	5	SEX:	Male	DAY ON TEST:	725
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54606

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mediastinal		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 3-14]		
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
	Olfactory Epi	Metaplasia	Respiratory, Minimal
* Pancreas		Leukemia Mononuclear	
* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
* Prostate		Inflammation	Chronic Active, Moderate
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-14]		
* Testes	Interstit Cell	Adenoma	
		Atrophy	Minimal
		Necrosis	Mild
	[Adenoma TGLs = 9-9]		
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 421	TMT: 5	SEX: Male	DAY ON TEST: 618
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54607

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|--------------------------|--|--|---|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Larynx | | Foreign Body Inflammation | Minimal
Minimal |
| * Liver | | Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-15] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear | Marked
Moderate
Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Nose | | Atrophy | Minimal |
| | Turbinate
Respirat Epith | Hyperplasia
Inflammation
Metaplasia | Minimal
Chronic Active, Minimal
Respiratory, Mild |
| | Olfactory Epi | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Prostate | | Inflammation | Chronic Active, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	421	TMT:	5	SEX:	Male	DAY ON TEST:	618
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54607

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Leukemia Mononuclear
	[Leukemia Mononuclear TGLs = 4-6]	
* Testes	Interstit Cell	Adenoma
	[Adenoma TGLs = 6-9]	
* Thyroid Gland	C Cell	Carcinoma
	[Carcinoma TGLs = 1-14]	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 422	TMT: 5	SEX: Male	DAY ON TEST: 625
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54608

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|----------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Liver | | Fatty Change | Minimal |
| | [Hepatodiaphragmatic Nodule TGLs = 3-7] | Hepatodiaphragmatic Nodule | |
| * Lung | | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| Mesentery | | Necrosis | Minimal |
| | [Necrosis TGLs = 6-14] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinates | Atrophy | Minimal |
| | Olfactory Epi | Corpora Amylacea | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	422	TMT:	5	SEX:	Male	DAY ON TEST:	625
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54608

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 5-10]

* Prostate		Inflammation	Chronic Active, Mild
* Skin		Inflammation	Moderate
	[Inflammation TGLs = 1-14]		
* Testes	Interstit Cell	Hyperplasia	Mild
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 423	TMT: 5	SEX: Male	DAY ON TEST: 582
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54609

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mediastinal | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|-------------------|--|--------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| | Pheochromocytoma Benign | |
| * Brain | Compression | Mild |
| | Hemorrhage | Moderate |
| | Leukemia Mononuclear | |
| | [Hemorrhage TGLs = 4-1] | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Minimal |
| | [Leukemia Mononuclear TGLs = 8-15, 9-7] | |
| * Larynx | Inflammation | Minimal |
| * Liver | Hepatodiaphragmatic Nodule | |
| | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 7-14] | |
| | [Leukemia Mononuclear TGLs = 6-6] | |
| * Lung | Bronchiole | Minimal |
| | Alveolar Epith | Marked |
| | | Chronic Active, Moderate |
| | Alveolus | Mild |
| | Hyperplasia | |
| | Hyperplasia | |
| | Inflammation | |
| | Leukemia Mononuclear | |
| | Proteinosis | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 423	TMT: 5	SEX: Male	DAY ON TEST: 582
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54609

ORGAN AND ACCOUNTABLE SITE STATUS

	[Inflammation TGLs = 2-4, 5]		
* Lymph Node, Mandibular		Leukemia Mononuclear	
* Lymph Node, Mesenteric		Leukemia Mononuclear	
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Mild
	Olfactory Epi	Inflammation	Chronic Active, Minimal
		Metaplasia	Respiratory, Minimal
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Inflammation	Mild
		Keratoacanthoma	
	[Inflammation TGLs = 10-7]		
	[Keratoacanthoma TGLs = 1-15]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 5-14]		
* Stomach, Glandular		Erosion	Mild
	[Erosion TGLs = 11-14]		
* Testes	Interstit Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 424	TMT: 5	SEX: Male	DAY ON TEST: 548
	DOSE: 2.5 mg/m3	DISP: Accidentally Killed	HISTO: 54610

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|-------------------------------|----------------------|
| * Bone | Cranium | Fracture | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 3-4, 5, 14] | Proteinosis | Moderate |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | | Hemorrhage | Moderate |
| | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| | [Hemorrhage TGLs = 4-11, 12] | | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 5-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | [Adenoma TGLs = 6-9] | | |
| * Thyroid Gland | C Cell | Adenoma | |

PRIMARY CAUSE OF DEATH - Bone Cranium Fracture

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 425	TMT: 5	SEX: Male	DAY ON TEST: 654
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54611

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|--------------------------|---------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Pituitary Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-----------------------------|--|---|--|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Moderate |
| * Heart | | Cardiomyopathy | Mild |
| * Intestine Small, Duodenum | | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 5-8] | | |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 2-7] | | |
| * Larynx | | Inflammation | Mild |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Moderate
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 1-4, 5, 14] | | |
| * Nose | | Atrophy
Atrophy
Corpora Amylacea
Hyperplasia | Minimal
Minimal
Minimal
Minimal |
| | Turbinate
Olfactory Epi
Respirat Epith | | |
| * Preputial Gland | | Inflammation | Chronic Active, Minimal |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	425	TMT:	5	SEX:	Male	DAY ON TEST:	654
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54611

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Bilateral, Interstit Cell	Inflammation	Chronic Active, Mild
	[Adenoma TGLs = 4-9]	Adenoma	Marked
		Atrophy	

PRIMARY CAUSE OF DEATH - Kidney Nephropathy

ANIMAL NUM: 426	TMT: 5	SEX: Male	DAY ON TEST: 698
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54612

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-----------------|-------------------|
| * Mammary Gland | * Preputial Gland |
|-----------------|-------------------|

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| | | Schwannoma Malignant | |
| * Islets, Pancreatic | | Hyperplasia | Mild |
| * Kidney | | Accumulation, Hyaline Droplet | Marked |
| | | Nephropathy | Marked |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-15, 2-17] | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 10-14] | | |
| | [Inflammation TGLs = 8-4, 5] | | |
| Mesentery | Fat | Necrosis | Mild |
| | [Necrosis TGLs = 3-7] | | |
| * Nose | Turbinat | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	426	TMT:	5	SEX:	Male	DAY ON TEST:	698
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54612

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi	Metaplasia	Respiratory, Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Inflammation	Moderate
	[Inflammation TGLs = 9-14]		
* Spleen		Fibrosis	Moderate
	[Fibrosis TGLs = 6-16]	Leukemia Mononuclear	
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Moderate
	[Adenoma TGLs = 4-9]		
	[Atrophy TGLs = 5-9]		
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 427	TMT: 5	SEX: Male	DAY ON TEST: 583
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54613

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|------------------------|---------------------------------|-----------------------------------|--------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Liver | | Fatty Change | Moderate |
| * Lung | | Hyperplasia | Mild |
| | Bronchiole | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinates | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 2-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Skin | | Keratoacanthoma | |
| | [Keratoacanthoma TGLs = 1-14] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Moderate |
| | [Ulcer TGLs = 5-10] | Ulcer | Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	427	TMT:	5	SEX:	Male	DAY ON TEST:	583
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54613

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Glandular		Inflammation	Chronic Active, Mild
* Testes		Atrophy	Minimal
	Interstit Cell	Hyperplasia	Minimal
* Thyroid Gland	C Cell	Hyperplasia	Moderate

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 428	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54614

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | | | |
|-------------------------|-----------------|-------------------|----------------------|
| * Lymph Node, Bronchial | * Mammary Gland | * Pituitary Gland | * Stomach, Glandular |
|-------------------------|-----------------|-------------------|----------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Inflammation | Chronic Active, Mild |
| | | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Spleen | | Leukemia Mononuclear | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Marked |
| | [Adenoma TGLs = 3-9, 4-9] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	428	TMT:	5	SEX:	Male	DAY ON TEST:	729
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54614

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland

C Cell

Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 429	TMT: 5	SEX: Male	DAY ON TEST: 689
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54615

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|---------------------------|-----------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

AUTO PRECLUDES DIAG.

- * Intestine Small, Ileum

INSUFFICIENT TISSUE

- * Nose

OBSERVATIONS

- | | | |
|-------------------|--|--------------------------|
| * Adrenal Cortex | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| | Pheochromocytoma Benign | |
| | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Benign TGLs = 6-7] | |
| | [Pheochromocytoma Malignant TGLs = 4-16] | |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | |
| * Lung | Alveolar Epith | Moderate |
| | Bronchiole | Moderate |
| | Hyperplasia | Chronic Active, Moderate |
| | Inflammation | |
| | Leukemia Mononuclear | |
| | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5, 14] | |
| * Pancreas | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 429	TMT: 5	SEX: Male	DAY ON TEST: 689
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54615

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 5-15]		
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 8-9]		

PRIMARY CAUSE OF DEATH - Adrenal Medulla Pheochromocytoma Malignant

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 430	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54616

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Minimal |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Intestine Large, Colon | | Carcinoma | |
| | [Carcinoma TGLs = 8-16] | | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Clear Cell Focus | |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-6] | | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	430	TMT:	5	SEX:	Male	DAY ON TEST:	729
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54616

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi	Inflammation Metaplasia	Chronic Active, Moderate Respiratory, Mild
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 1-10]		
* Prostate		Inflammation Pheochromocytoma Malignant	Chronic Active, Moderate Metastatic (Adrenal Medulla)
	[Pheochromocytoma Malignant TGLs = 7-15]		
* Spleen		Fibrosis Leukemia Mononuclear	Moderate
	[Fibrosis TGLs = 4-14]		
	[Leukemia Mononuclear TGLs = 3-14]		
* Testes	Interstit Cell	Adenoma Atrophy	Marked
* Thyroid Gland	C Cell	Carcinoma	

ANIMAL NUM: 431	TMT: 5	SEX: Male	DAY ON TEST: 598
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54617

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| | | Inflammation | Suppurative, Mild |
| * Kidney | | Nephropathy | Mild |
| | [Nephropathy TGLs = 5-7] | | |
| * Liver | | Necrosis | Mild |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Mediastinum | Inflammation | Suppurative, Mild |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5, 19] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |
| * Preputial Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-18; 2-14, 15] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Skin | | Inflammation | Mild |
| | [Inflammation TGLs = 1-18] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	431	TMT:	5	SEX:	Male	DAY ON TEST:	598
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54617

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Hyperplasia	Mild
* Thyroid Gland	C Cell	Adenoma	
[Adenoma TGLs = 3-3]			

PRIMARY CAUSE OF DEATH	- Liver	Necrosis
CONTRIBUTORY CAUSE OF DEATH	- Heart	Inflammation

ANIMAL NUM: 432	TMT: 5	SEX: Male	DAY ON TEST: 716
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54618

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|-----------------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Intestine Small, Duodenum | | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 8-8] | Necrosis | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Corpora Amylacea | Mild |
| | | Foreign Body | Minimal |
| | Respirat Epith | Hyperplasia | Marked |
| | Sinus | Inflammation | Suppurative, Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| | Olfactory Epi | Necrosis | Mild |
| | Respirat Epith | Necrosis | Mild |
| | [Inflammation TGLs = 10-11] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 432	TMT: 5	SEX: Male	DAY ON TEST: 716
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54618

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Mild
* Skin		Keratoacanthoma	
	[Keratoacanthoma TGLs = 1-16]		
* Spleen		Fibrosis	Minimal
	[Fibrosis TGLs = 6-14]		
* Stomach, Forestomach		Hyperplasia	Squamous, Mild
		Ulcer	Marked
	[Ulcer TGLs = 9-10]		
* Stomach, Glandular		Ulcer	Moderate
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Marked
	[Adenoma TGLs = 5-9]		
	[Atrophy TGLs = 4-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 433	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54619

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|--|---|---|
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 2-14] | | |
| * Eye | | Cataract
Metaplasia | Mild
Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Mild
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia
Inflammation
Metaplasia | Minimal
Mild
Chronic Active, Minimal
Respiratory, Moderate |
| | Olfactory Epi | | |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Testes | Bilateral, Interstit Cell | Adenoma
Atrophy | Moderate |
| | [Adenoma TGLs = 3-9, 4-9] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 434	TMT: 5	SEX: Male	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54620

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|-------------|-------------------------|-----------------|
| * Esophagus | * Lymph Node, Bronchial | * Mammary Gland |
|-------------|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|---|---|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 5-7] | | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Skin | Sebaceous GI | Adenoma | |
| | [Adenoma TGLs = 1-14] | | |
| * Testes | Interstit Cell | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	434	TMT:	5	SEX:	Male	DAY ON TEST:	730
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54620

ORGAN AND ACCOUNTABLE SITE STATUS

		Atrophy	Mild
[Adenoma	TGLs = 6-9]		
* Thyroid Gland	C Cell	Adenoma	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 435	TMT: 5	SEX: Male	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54621

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 7-7] | | |
| * Eye | | Cataract | Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 6-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Hyperplasia | Moderate |
| Mesentery | Fat | Necrosis | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 435	TMT: 5	SEX: Male	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54621

ORGAN AND ACCOUNTABLE SITE STATUS

	[Necrosis TGLs = 4-14]		
* Nose		Accumulation, Hyaline Droplet	Minimal
	Turbinate	Atrophy	Minimal
	Olfactory Epi	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 1-10]		
* Preputial Gland		Inflammation	Chronic Active, Marked
	[Inflammation TGLs = 8-15]		
* Prostate		Inflammation	Chronic Active, Mild
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-14]		
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Marked
	[Adenoma TGLs = 5-9]		

ANIMAL NUM: 436	TMT: 5	SEX: Male	DAY ON TEST: 618
DOSE: 2.5 mg/m3		DISP: Moribund Sacrifice	HISTO: 54622

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|--------------------------|---------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-----------------------------|--------------------------------|-------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| * Intestine Small, Duodenum | | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 5-8] | | |
| * Islets, Pancreatic | | Adenoma | |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 2-7] | | |
| * Liver | | Fatty Change | Minimal |
| | | Necrosis | Minimal |
| * Lung | | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Moderate |
| * Stomach, Forestomach | | Ulcer | Marked |
| | [Ulcer TGLs = 6-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 436	TMT: 5	SEX: Male	DAY ON TEST: 618
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54622

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Glandular [Ulcer TGLs = 7-14]	Ulcer	Moderate
* Testes [Atrophy TGLs = 4-9]	Atrophy	Moderate

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 437	TMT: 5	SEX: Male	DAY ON TEST: 680
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54623

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-------------------|-------------------------|---------------------------|-------------------|
| * Bone | * Brain | * Epididymis | * Esophagus |
| * Harderian Gland | * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Mammary Gland |
| * Pituitary Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|----------------------|------------|---------------------|
| * Islets, Pancreatic | * Pancreas | * Parathyroid Gland |
|----------------------|------------|---------------------|

AUTO PRECLUDES DIAG.

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Larynx | * Nose |

OBSERVATIONS

- | | | | |
|--------------------------|--|-------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Bone Marrow | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear | |
| | | Nephropathy | Moderate |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| Lymph Node | Pancreatic, Renal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-16, 8-14] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-9] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	437	TMT:	5	SEX:	Male	DAY ON TEST:	680
		DOSE:	2.5 mg/m3	DISP:	Natural Death	HISTO:	54623

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mesenteric	Leukemia Mononuclear	
* Prostate	Inflammation	Chronic Active, Mild
* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 4-14]		
* Testes	Adenoma	
Interstit Cell	Atrophy	Mild
[Adenoma TGLs = 6-9]		
[Atrophy TGLs = 5-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 438	TMT: 5	SEX: Male	DAY ON TEST: 652
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54624

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Spleen |
| * Testes | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-----------------|----------|
| * Mammary Gland | * Thymus |
|-----------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5, 16] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Metaplasia | Respiratory, Minimal |
| | Olfactory Epi | | |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |
| * Prostate | | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| * Skin | | Basal Cell Carcinoma | |
| | [Basal Cell Carcinoma TGLs = 1-14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	438	TMT:	5	SEX:	Male	DAY ON TEST:	652
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54624

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach	Hyperplasia	Squamous, Mild
* Stomach, Glandular	Erosion	Mild

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 439	TMT: 5	SEX: Male	DAY ON TEST: 472
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54625

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Testes | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

AUTO PRECLUDES DIAG.

- * Nose

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia | Mild |
| | | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 3-14] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 440	TMT: 5	SEX: Male	DAY ON TEST: 535
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54626

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Testes | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Esophagus

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| Mesentery | | Necrosis | Minimal |
| | Fat | | |
| | [Necrosis TGLs = 4-14] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Olfactory Epi | Hyperplasia | Minimal |
| | Respirat Epith | | |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 2-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	440	TMT:	5	SEX:	Male	DAY ON TEST:	535
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54626

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 441	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54627

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | | | |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | Pelvis | Inflammation | Suppurative, Mild |
| | | Nephropathy | Marked |
| * Liver | | Mixed Cell Focus | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | Alveolar Epith | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Moderate |
| | | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Marked |
| | [Inflammation TGLs = 6-15] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 441	TMT: 5	SEX: Male	DAY ON TEST: 729
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54627

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach		Hyperplasia Ulcer	Squamous, Moderate Moderate
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Moderate
	[Adenoma TGLs = 5-9]		
* Urinary Bladder	Transit Epithe	Hyperplasia Inflammation	Moderate Moderate

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 442	TMT: 5	SEX: Male	DAY ON TEST: 654
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54628

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Marked |
| | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | | Regeneration | Mild |
| | [Hepatodiaphragmatic Nodule TGLs = 5-14] | | |
| | [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Mild |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	442	TMT:	5	SEX:	Male	DAY ON TEST:	654
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54628

ORGAN AND ACCOUNTABLE SITE STATUS

	[Adenoma TGLs = 6-10]		
* Skin		Trichoepithelioma	
	[Trichoepithelioma TGLs = 1-14]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 3-14]		
* Testes	Interstit Cell	Hyperplasia	Mild

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 443	TMT: 5	SEX: Male	DAY ON TEST: 730
DOSE: 2.5 mg/m3		DISP: Terminal Sacrifice	HISTO: 54629

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 7-7] | | |
| * Brain | | Compression | Minimal |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 6-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | | Necrosis | Mild |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 443	TMT: 5	SEX: Male	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54629

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 1-10]		
* Spleen		Fibrosis	Mild
	[Fibrosis TGLs = 3-6]	Leukemia Mononuclear	
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 2-9]	Atrophy	Marked

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 444	TMT: 5	SEX: Male	DAY ON TEST: 716
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54630

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|--------------------------|----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-----------------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Moderate |
| * Intestine Small, Duodenum | | Inflammation | Chronic Active, Minimal |
| | [Inflammation TGLs = 7-8] | | |
| * Kidney | | Accumulation, Hyaline Droplet | Moderate |
| | Renal Tubule | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Nephropathy | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 8-16] | | |
| | [Nephropathy TGLs = 9-7, 16] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | Alveolar Epith | Alveolar/Bronchiolar Carcinoma | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Hyperplasia | Chronic Active, Moderate |
| | Alveolus | Inflammation | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 4-14] | Proteinosis | |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-9] | | |
| * Nose | Respirat Epith | Hyperplasia | Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 444	TMT: 5	SEX: Male	DAY ON TEST: 716
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54630

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Inflammation	Chronic Active, Moderate
		Necrosis	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 10-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Hyperplasia	Squamous, Moderate
		Inflammation	Moderate
	[Hyperplasia TGLs = 2-19]		
	[Inflammation TGLs = 1-18]		
* Spleen		Leukemia Mononuclear	
* Testes	Interstit Cell	Adenoma	
		Atrophy	Marked
	[Atrophy TGLs = 6-9]		
* Urinary Bladder		Inflammation	Moderate

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Hyperplasia

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 445	TMT: 5	SEX: Male	DAY ON TEST: 678
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54631

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Mammary Gland |
| * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

AUTO PRECLUDES DIAG.

- | | |
|--------------------------|----------------------------|
| * Intestine Small, Ileum | * Intestine Small, Jejunum |
|--------------------------|----------------------------|

INSUFFICIENT TISSUE

- * Nose

OBSERVATIONS

- | | | | |
|--------------------------|---------------------------------------|-------------------------|----------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | | Thrombosis | Mild |
| * Kidney | | Congestion | Minimal |
| | | Nephropathy | Mild |
| | [Congestion TGLs = 7-15] | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | | Inflammation | Chronic Active, Mild |
| | Alveolus | Proteinosis | Mild |
| | [Inflammation TGLs = 4-4, 5, 14] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 10-14] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	445	TMT:	5	SEX:	Male	DAY ON TEST:	678
		DOSE:	2.5 mg/m3	DISP:	Natural Death	HISTO:	54631

ORGAN AND ACCOUNTABLE SITE STATUS

* Preputial Gland	Ectasia	Moderate
[Ectasia TGLs = 2-9]		
* Prostate	Inflammation	Chronic Active, Moderate
* Skin	Inflammation	Moderate
[Inflammation TGLs = 1-16]		
* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 6-15]		
* Testes	Adenoma	Mild
	Atrophy	Mild
	Hyperplasia	
[Adenoma TGLs = 9-9]		
[Atrophy TGLs = 8-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 446	TMT: 5	SEX: Male	DAY ON TEST: 611
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54632

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Bronchial | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Pituitary Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|---------------------------|--|----------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| * Brain | [Leukemia Mononuclear TGLs = 3-1, 14] | Leukemia Mononuclear | |
| * Eye | [Cataract TGLs = 1-13] | Cataract | Marked |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear | |
| | | Nephropathy | Mild |
| * Larynx | | Inflammation | Mild |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Mild |
| | Alveolus | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-4, 5, 15] | Proteinosis | Moderate |
| * Lymph Node, Mandibular | | Ectasia | Moderate |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	446	TMT:	5	SEX:	Male	DAY ON TEST:	611
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54632

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	Olfactory Epi	Metaplasia	Respiratory, Mild
		Fibrosis	Minimal
		Leukemia Mononuclear	
	[Fibrosis TGLs = 6-16]		
	[Leukemia Mononuclear TGLs = 5-16]		
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 4-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 447	TMT: 5	SEX: Male	DAY ON TEST: 704
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54633

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|--------------------------|--|---|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear
Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 7-7] | | |
| * Brain | | Compression
Hemorrhage | Mild
Minimal |
| * Eye | | Cataract
Metaplasia | Marked
Osseous, Minimal |
| | [Cataract TGLs = 2-13] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Multiple
Marked
Mild
Chronic Active, Moderate |
| | Alveolar Epith
Bronchiole | | |
| | Alveolus | | |
| | [Inflammation TGLs = 1-4, 5, 14] | | Moderate |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 447	TMT: 5	SEX: Male	DAY ON TEST: 704
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54633

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 3-10]	Hemorrhage	Moderate
* Prostate	Inflammation	Chronic Active, Minimal
* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 5-15]		
* Stomach, Forestomach	Hyperplasia	Squamous, Minimal
* Testes	Adenoma	
	Atrophy	Marked
[Adenoma TGLs = 4-9]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 448	TMT: 5	SEX: Male	DAY ON TEST: 729
DOSE: 2.5 mg/m3		DISP: Terminal Sacrifice	HISTO: 54634

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Larynx |
| * Liver | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|----------------------|--|--|---|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Brain | | Compression
Hemorrhage | Moderate
Mild |
| * Eye | | Cataract
Metaplasia | Mild
Osseous, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Adenoma
Carcinoma | |
| | [Carcinoma TGLs = 6-16] | | |
| * Kidney | | Nephropathy | Moderate |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma
Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Moderate
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate
Respirat Epith
Olfactory Epi | Atrophy
Hyperplasia
Inflammation
Metaplasia | Minimal
Mild
Chronic Active, Mild
Respiratory, Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	448	TMT:	5	SEX:	Male	DAY ON TEST:	729
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54634

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Mild
* Spleen		Fibrosis	Moderate
	[Fibrosis TGLs = 5-6]		
* Stomach, Forestomach		Ulcer	Moderate
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Moderate
	[Adenoma TGLs = 4-9]		

ANIMAL NUM:	449	TMT:	5	SEX:	Male	DAY ON TEST:	705
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54635

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Spleen |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-------------------|---|---|--------------------------|
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 6-7] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-14] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith
Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Hyperplasia | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 9-5] | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 8-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 449	TMT: 5	SEX: Male	DAY ON TEST: 705
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54635

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate	Inflammation	Chronic Active, Mild
* Skin	Inflammation	Moderate
[Inflammation TGLs = 1-16]		
* Stomach, Forestomach	Inflammation	Chronic Active, Moderate
* Testes	Bilateral, Interstit Cell	
[Adenoma TGLs = 3-9]	Adenoma Atrophy	Moderate

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 450	TMT: 5	SEX: Male	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54636

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | [Nephropathy TGLs = 4-7] | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | [Leukemia Mononuclear TGLs = 2-6] | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Moderate |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Corpora Amylacea | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	450	TMT:	5	SEX:	Male	DAY ON TEST:	730
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54636

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Mild
* Spleen		Leukemia Mononuclear	
* Testes	Interstit Cell	Adenoma	Mild
	Interstit Cell	Atrophy	Minimal
		Hyperplasia	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 601	TMT: 7	SEX: Male	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54487

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Pituitary Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|------------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Islets, Pancreatic | | Adenoma | |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-17] | Hepatodiaphragmatic Nodule | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5, 16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Skin | | Trichoepithelioma | |
| | [Trichoepithelioma TGLs = 1-14] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	601	TMT:	7	SEX:	Male	DAY ON TEST:	730
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54487

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Marked
[Adenoma	TGLs = 4-9]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 602	TMT: 7	SEX: Male	DAY ON TEST: 691
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54488

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Liver |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|----------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Nose | | Atrophy | Minimal |
| | Turbinates | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	602	TMT:	7	SEX:	Male	DAY ON TEST:	691
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54488

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Testes		Atrophy	Mild
	Interstit Cell	Hyperplasia	Mild

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 603	TMT: 7	SEX: Male	DAY ON TEST: 628
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54489

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Mammary Gland | * Parathyroid Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|---------------------------|--|---|--|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule
Hyperplasia | Minimal
Minimal |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Intestine Small, Ileum | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear
Metaplasia
Nephropathy | Osseous, Mild
Mild |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Bronchiole
Alveolar Epith | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Moderate
Moderate
Chronic Active, Mild |
| | Alveolus | | Moderate |
| | [Inflammation TGLs = 2-4, 5, 15] | | |
| Lymph Node | Iliac, Renal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-19, 7-20] | | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 10-9] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 9-3] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-8] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 603	TMT: 7	SEX: Male	DAY ON TEST: 628
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54489

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Turbinate Respirat Epith	Atrophy Hyperplasia Inflammation	Minimal Minimal Chronic Active, Minimal
	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pancreas		Leukemia Mononuclear	
* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
* Preputial Gland		Inflammation	Chronic Active, Moderate
	[Inflammation TGLs = 1-18]		
* Prostate		Inflammation Leukemia Mononuclear	Chronic Active, Minimal
* Skin		Cyst Epithelial Inclusion	Moderate
	[Cyst Epithelial Inclusion TGLs = 5-14]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-16]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Minimal
	[Adenoma TGLs = 3-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 604	TMT: 7	SEX: Male	DAY ON TEST: 516
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54490

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |
| | [Hyperplasia TGLs = 3-10] | | |
| * Skin | | Fibrous Histiocytoma | |
| | [Fibrous Histiocytoma TGLs = 1-14, 15, 16] | | |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	604	TMT:	7	SEX:	Male	DAY ON TEST:	516
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54490

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Atrophy Hyperplasia	Minimal Minimal
----------	----------------	------------------------	--------------------

PRIMARY CAUSE OF DEATH - Skin Fibrous Histiocytoma

ANIMAL NUM: 605	TMT: 7	SEX: Male	DAY ON TEST: 552
DOSE: 5.0 mg/m3		DISP: Natural Death	HISTO: 54491

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------|----------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Brain | | Hemorrhage | Mild |
| | [Hemorrhage TGLs = 8-1] | | |
| * Eye | | Cataract | Moderate |
| | | Metaplasia | Osseous, Minimal |
| | [Cataract TGLs = 1-13] | | |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear | |
| | | Nephropathy | Minimal |
| * Liver | | Degeneration | Cystic, Minimal |
| | | Eosinophilic Focus | |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Mild |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Mild |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-5] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 605	TMT: 7	SEX: Male	DAY ON TEST: 552
	DOSE: 5.0 mg/m3	DISP: Natural Death	HISTO: 54491

ORGAN AND ACCOUNTABLE SITE STATUS

	[Inflammation TGLs = 2-4, 5]		
Lymph Node	Pancreatic, Renal	Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 9-15, 10-16]		
* Lymph Node, Mandibular		Leukemia Mononuclear	
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Mild
		Inflammation	Chronic Active, Minimal
	Olfactory Epi	Metaplasia	Respiratory, Mild
	Olfactory Epi	Necrosis	Minimal
	Respirat Epith	Necrosis	Minimal
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-14]		
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 5-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 606	TMT: 7	SEX: Male	DAY ON TEST: 646
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54492

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 4-14] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | | Regeneration | Mild |
| | [Hepatodiaphragmatic Nodule TGLs = 7-15] | | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| | [Regeneration TGLs = 6-6] | | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| * Pancreas | | Atrophy | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	606	TMT:	7	SEX:	Male	DAY ON TEST:	646
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54492

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
	[Hyperplasia TGLs = 8-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 3-15]		
* Testes	Interstit Cell	Adenoma	
	[Adenoma TGLs = 2-9]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 607	TMT: 7	SEX: Male	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54493

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland |
| * Pancreas | * Parathyroid Gland | * Preputial Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | [Nephropathy TGLs = 5-7] | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Fatty Change | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5, 14] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |
| * Spleen | | Fibrosis | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	607	TMT:	7	SEX:	Male	DAY ON TEST:	730
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54493

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	[Fibrosis TGLs = 4-15]	Atrophy	Marked
	[Atrophy TGLs = 3-9]		
* Thyroid Gland	C Cell	Adenoma	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 608	TMT: 7	SEX: Male	DAY ON TEST: 717
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54494

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|--|--|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | [Leukemia Mononuclear TGLs = 9-6] | Leukemia Mononuclear | |
| * Lung | Alveolar Epith
Bronchiole | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear | Multiple
Marked
Moderate
Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14]
[Inflammation TGLs = 3-4, 5] | | |
| * Lymph Node, Mandibular | | Ectasia | Mild |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia
Inflammation | Minimal
Moderate
Chronic Active, Moderate |
| | Olfactory Epi
Respirat Epith | Metaplasia
Necrosis | Respiratory, Mild
Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 608	TMT: 7	SEX: Male	DAY ON TEST: 717
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54494

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	[Adenoma TGLs = 10-10]	Leukemia Mononuclear Necrosis	Mild
	[Leukemia Mononuclear TGLs = 4-15]		
	[Necrosis TGLs = 5-15]		
* Testes	Interstit Cell	Adenoma Atrophy Necrosis	Marked Mild
	[Adenoma TGLs = 7-9]		
	[Atrophy TGLs = 8-9]		
	[Necrosis TGLs = 6-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 609	TMT: 7	SEX: Male	DAY ON TEST: 679
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54495

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|----------------------|---|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | | Nephropathy | Mild |
| | [Nephropathy TGLs = 4-7] | | |
| * Larynx | | Hyperkeratosis | Mild |
| * Liver | | Basophilic Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-7] | Hepatodiaphragmatic Nodule | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Marked |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 609	TMT: 7	SEX: Male	DAY ON TEST: 679
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54495

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 5-10]		
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-6]		
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
* Testes		Atrophy	Minimal
	Interstit Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 610	TMT: 7	SEX: Male	DAY ON TEST: 698
	DOSE: 5.0 mg/m3	DISP: Natural Death	HISTO: 54496

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|-------------|-----------------|----------|
| * Esophagus | * Mammary Gland | * Thymus |
|-------------|-----------------|----------|

AUTO PRECLUDES DIAG.

- * Intestine Small, Jejunum

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 4-7] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| | | Metaplasia | Squamous, Mild |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Marked |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Foreign Body | Moderate |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| | Olfactory Epi | Necrosis | Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 610	TMT: 7	SEX: Male	DAY ON TEST: 698
	DOSE: 5.0 mg/m3	DISP: Natural Death	HISTO: 54496

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Respirat Epith	Necrosis	Mild
		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 3-10]		
* Preputial Gland		Inflammation	Chronic Active, Mild
* Skin		Basal Cell Adenoma	
		Inflammation	Moderate
	[Basal Cell Adenoma TGLs = 2-15]		
	[Inflammation TGLs = 5-16]		
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Minimal
	[Adenoma TGLs = 6-9]		

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

ANIMAL NUM: 611	TMT: 7	SEX: Male	DAY ON TEST: 723
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54497

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mesenteric |
| * Mammary Gland | * Pancreas | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|---------------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 2-4, 5, 14] | Proteinosis | Moderate |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-9] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	611	TMT:	7	SEX:	Male	DAY ON TEST:	723
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54497

ORGAN AND ACCOUNTABLE SITE STATUS

	[Adenoma TGLs = 3-10]		
* Prostate		Inflammation	Chronic Active, Moderate
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 5-15]		
* Testes	Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 4-9]		
* Thyroid Gland	C Cell	Hyperplasia	Moderate

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 612	TMT: 7	SEX: Male	DAY ON TEST: 713
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54498

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Marked |
| | [Inflammation TGLs = 2-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	612	TMT:	7	SEX:	Male	DAY ON TEST:	713
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54498

ORGAN AND ACCOUNTABLE SITE STATUS

* Preputial Gland		Carcinoma	
	[Carcinoma TGLs = 3-14]		
* Prostate		Inflammation	Chronic Active, Mild
* Testes	Interstit Cell	Adenoma	
		Necrosis	Mild
	[Necrosis TGLs = 5-9]		

PRIMARY CAUSE OF DEATH - Preputial Gland Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 613	TMT: 7	SEX: Male	DAY ON TEST: 722
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54499

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|--------------------------|---------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-----------------------------|--|------------------------------|------------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 6-7, 7-7] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Intestine Small, Duodenum | | Necrosis | Moderate |
| | [Necrosis TGLs = 9-8] | | |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Necrosis | Mild |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5, 16] | Proteinosis | Marked |
| Lymph Node | Renal | Pheochromocytoma Malignant | Metastatic (Adrenal Medulla) |
| | [Pheochromocytoma Malignant TGLs = 8-20] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Marked |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| | Olfactory Epi | Necrosis | Moderate |
| * Pancreas | | Atrophy | Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 613	TMT: 7	SEX: Male	DAY ON TEST: 722
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54499

ORGAN AND ACCOUNTABLE SITE STATUS

Peritoneum	Inflammation	Chronic Active, Mild
* Pituitary Gland Pars Distalis	Adenoma	
[Adenoma TGLs = 4-10]		
* Skin	Trichoepithelioma	
[Trichoepithelioma TGLs = 1-14]		
* Spleen	Hematopoietic Cell Proliferation	Minimal
* Testes	Atrophy	Marked
	Interstit Cell	Minimal
	Necrosis	Moderate
[Atrophy TGLs = 5-9]		

PRIMARY CAUSE OF DEATH - Intestine Small, Duodenum Necrosis

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	614	TMT:	7	SEX:	Male	DAY ON TEST:	729
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54500

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Preputial Gland | * Prostate |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Kidney | Renal Tubule | Carcinoma | |
| | | Nephropathy | Moderate |
| | [Carcinoma TGLs = 4-14] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Carcinoma | Metastatic (Kidney) |
| | | Clear Cell Focus | |
| | [Carcinoma TGLs = 7-23] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | | Carcinoma | Metastatic (Kidney) |
| | Mediastinum | Carcinoma | Metastatic (Kidney) |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Marked |
| | [Carcinoma TGLs = 1-22] | | |
| | [Inflammation TGLs = 2-4, 5, 20] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 614	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54500

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Olfactory Epi	Metaplasia	Respiratory, Mild
[Carcinoma TGLs = 6-18]		Carcinoma	Metastatic (Kidney)
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Seminal Vesicle		Carcinoma	Metastatic (Kidney)
Skeletal Muscle		Carcinoma	Metastatic (Kidney)
[Carcinoma TGLs = 5-16]			
* Testes	Interstit Cell	Adenoma	
[Adenoma TGLs = 3-9]		Atrophy	Minimal

ANIMAL NUM: 615	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54501

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Eye | | Cataract | Minimal |
| * Heart | Artery | Cardiomyopathy | Mild |
| | | Inflammation | Chronic Active, Mild |
| * Kidney | Artery | Inflammation | Chronic Active, Moderate |
| | | Nephropathy | Mild |
| * Liver | | Atrophy | Minimal |
| | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | [Atrophy TGLs = 4-16] | | |
| * Lung | Bronchiole | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-5, 2-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5, 14] | | |
| Mesentery | Artery | Inflammation | Chronic Active, Moderate |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	615	TMT:	7	SEX:	Male	DAY ON TEST:	729
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54501

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Mild
	Artery	Mineralization	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
* Stomach, Forestomach		Hyperplasia	Squamous, Mild
	[Hyperplasia TGLs = 5-10]		
* Stomach, Glandular		Inflammation	Chronic Active, Minimal
* Testes		Atrophy	Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 616	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54502

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | | | |
|-------------------------|-----------------|---------------------|----------|
| * Lymph Node, Bronchial | * Mammary Gland | * Parathyroid Gland | * Thymus |
|-------------------------|-----------------|---------------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|--|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 7-7] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy
Chemodectoma Malignant | Mild
Metastatic (Heart) |
| | Note: No primary chemodectoma diagnosis available for heart in TDMSE | | |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Atrophy
Clear Cell Focus | Mild |
| | [Atrophy TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Marked
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Hyperplasia TGLs = 1-14] | | |
| | [Inflammation TGLs = 4-4, 5; 3-15] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 616 **TMT:** 7
 DOSE: 5.0 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 729
HISTO: 54502

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Atrophy	Mild
* Pituitary Gland	Angiectasis	Moderate
* Spleen	Fibrosis	Minimal
[Fibrosis TGLs = 5-6, 16]		
* Testes	Adenoma	
	Interstit Cell	
	Atrophy	Marked
* Thyroid Gland	C Cell	Mild
[Hyperplasia TGLs = 2-3]	Hyperplasia	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 617	TMT: 7	SEX: Male	DAY ON TEST: 572
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54503

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|---------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus
Clear Cell Focus | |
| | [Clear Cell Focus TGLs = 4-7] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Moderate
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| Lymph Node | | Renal | |
| | [Hemorrhage TGLs = 5-7] | Hemorrhage | Minimal |
| * Nose | | Turbinate
Respirat Epith | Minimal
Mild |
| | Olfactory Epi | Inflammation
Metaplasia | Chronic Active, Moderate
Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	617	TMT:	7	SEX:	Male	DAY ON TEST:	572
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54503

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Preputial Gland		Carcinoma	
	[Carcinoma TGLs = 1-14, 15, 16]		
* Testes	Interstit Cell	Adenoma	Mild
	[Adenoma TGLs = 3-9]	Atrophy	

PRIMARY CAUSE OF DEATH - Preputial Gland Carcinoma

ANIMAL NUM: 618	TMT: 7	SEX: Male	DAY ON TEST: 689
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54504

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Kidney | | Carcinoma | Metastatic (Lung) |
| | | Fibrosis | Mild |
| | | Nephropathy | Mild |
| | [Carcinoma TGLs = 6-19] | | |
| | [Fibrosis TGLs = 5-18] | | |
| * Larynx | | Inflammation | Mild |
| * Liver | | Inflammation | Chronic Active, Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | | Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Marked |
| | [Carcinoma TGLs = 3-15] | | |
| | [Inflammation TGLs = 3-4, 5, 14] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |
| * Prostate | | Inflammation | Chronic Active, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	618	TMT:	7	SEX:	Male	DAY ON TEST:	689
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54504

ORGAN AND ACCOUNTABLE SITE STATUS

Skeletal Muscle [Carcinoma TGLs = 1-17, 2-16]	Carcinoma	Metastatic (Lung)
* Testes	Atrophy	Minimal
* Thyroid Gland	C Cell Hyperplasia	Mild

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 619	TMT: 7	SEX: Male	DAY ON TEST: 717
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54505

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Urinary Bladder |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 9-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | [Clear Cell Focus TGLs = 8-6] | Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-14] | | |
| | [Inflammation TGLs = 4-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Foreign Body | Mild |
| | Respirat Epith | Hyperplasia | Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	619	TMT:	7	SEX:	Male	DAY ON TEST:	717
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54505

ORGAN AND ACCOUNTABLE SITE STATUS

		Olfactory Epi	Inflammation	Chronic Active, Moderate
		Pars Distalis	Metaplasia	Respiratory, Moderate
* Pituitary Gland			Adenoma	
	[Adenoma	TGLs = 5-10]		
* Prostate			Inflammation	Chronic Active, Mild
* Testes		Bilateral, Interstit Cell	Adenoma	
			Atrophy	Moderate
	[Adenoma	TGLs = 10-9]		
* Thyroid Gland		C Cell	Carcinoma	
	[Carcinoma	TGLs = 2-3]		
* Trachea			Inflammation	Suppurative, Minimal
			Metaplasia	Squamous, Minimal
Zymbal's Gland			Carcinoma	
	[Carcinoma	TGLs = 6-15, 7-17]		

PRIMARY CAUSE OF DEATH - Zymbal's Gland Carcinoma

ANIMAL NUM: 620	TMT: 7	SEX: Male	DAY ON TEST: 691
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54506

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | |
|-------------------|--|--------------------------|
| * Adrenal Cortex | Accessory Adrenal Cortical Nodule | Minimal |
| | Hyperplasia | Minimal |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| * Brain | Edema | Moderate |
| | Infiltration Cellular | Mononuclear CI, Minimal |
| * Eye | Metaplasia | Osseous, Minimal |
| * Kidney | Nephropathy | Minimal |
| * Larynx | Inflammation | Minimal |
| * Liver | Regeneration | Moderate |
| * Lung | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia |
| | Alveolar Epith | Moderate |
| | Alveolus | Inflammation |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5, 14, 15] | Moderate |
| * Nose | Turbinate | Atrophy |
| | | Corpora Amylacea |
| | Respirat Epith | Hyperplasia |
| | | Inflammation |
| | Olfactory Epi | Metaplasia |
| | Respirat Epith | Necrosis |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	620	TMT:	7	SEX:	Male	DAY ON TEST:	691
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54506

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 3-16]		
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
* Testes		Atrophy	Minimal
	Interstit Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 621	TMT: 7	SEX: Male	DAY ON TEST: 619
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54507

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Spleen |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|---------------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Alveolar/Bronchiolar Carcinoma | Metastatic |
| | | Cardiomyopathy | Minimal |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 11-23] | | |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-16,17; 3-18; 4-20; 5-6; 6-6; 7-21,22; 8-6; 12-24] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Marked |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14, 15] | | |
| | [Inflammation TGLs = 10-4, 5] | | |
| * Lymph Node, Mediastinal | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	621	TMT:	7	SEX:	Male	DAY ON TEST:	619
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54507

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Stomach, Forestomach		Hyperplasia Inflammation	Squamous, Mild Chronic Active, Mild
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy Necrosis	Mild Mild
	[Adenoma TGLs = 9-9]		

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 622	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54508

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Thymus | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 2-7] | | |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Adenoma | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 5-4, 5, 14] | | |
| Lymph Node | Renal | Ectasia | Mild |
| | [Ectasia TGLs = 6-16] | | |
| * Nose | Turbinates | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	622	TMT:	7	SEX:	Male	DAY ON TEST:	729
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54508

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Minimal
* Stomach, Glandular		Ulcer	Moderate
* Testes		Atrophy	Moderate
	Interstit Cell	Hyperplasia	Moderate
	[Atrophy TGLs = 4-9]		
* Thyroid Gland	C Cell	Hyperplasia	Marked

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 623	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54509

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-------------------|
| * Lymph Node, Bronchial | * Preputial Gland |
|-------------------------|-------------------|

OBSERVATIONS

- | | | | |
|----------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Marked |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 623 TMT: 7
DOSE: 5.0 mg/m3

SEX: Male
DISP: Terminal Sacrifice

DAY ON TEST: 729
HISTO: 54509

ORGAN AND ACCOUNTABLE SITE STATUS

Atrophy
Necrosis

Minimal
Mild

[Adenoma TGLs = 4-9]
[Necrosis TGLs = 3-9]

* Thyroid Gland C Cell

Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 624	TMT: 7	SEX: Male	DAY ON TEST: 470
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54510

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Testes | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|------------------------------------|---|--|
| * Brain | | Compression | Moderate |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | [Nephropathy TGLs = 2-7] | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | Bronchiole
Alveolar Epith | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Mild
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 1-4, 5, 14] | | |
| * Lymph Node, Mandibular | | Hyperplasia | Mild |
| | [Hyperplasia TGLs = 4-9] | | |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia
Inflammation
Metaplasia | Minimal
Mild
Chronic Active, Moderate
Respiratory, Mild |
| | Olfactory Epi | | |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	624	TMT:	7	SEX:	Male	DAY ON TEST:	470
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54510

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 625	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54511

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Mesothelioma Malignant | |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Epididymis | | Mesothelioma Malignant | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-18] | Hepatodiaphragmatic Nodule | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15, 16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Corpora Amylacea | Mild |
| | Olfactory Epi | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| | | Metaplasia | Respiratory, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	625	TMT:	7	SEX:	Male	DAY ON TEST:	729
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54511

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
* Preputial Gland		Atrophy	Moderate
* Testes		Atrophy	Marked
		Mesothelioma Malignant	
	[Atrophy TGLs = 3-9]		

ANIMAL NUM: 626	TMT: 7	SEX: Male	DAY ON TEST: 689
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54512

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Prostate | * Salivary Glands | * Seminal Vesicle |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|-----------------------------------|--------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| | | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 9-7] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Necrosis | Mild |
| | [Necrosis TGLs = 5-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | | Corpora Amylacea | Mild |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 626	TMT: 7	SEX: Male	DAY ON TEST: 689
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54512

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
	[Hyperplasia TGLs = 7-10]		
* Skin		Trichoepithelioma	
	[Trichoepithelioma TGLs = 1-14]		
* Testes	Interstit Cell	Adenoma	
	Interstit Cell	Hyperplasia	Mild
	[Adenoma TGLs = 4-9]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - UNCERTAIN

ANIMAL NUM: 627	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54513

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|--|---|--|
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 7-7] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy
Schwannoma Malignant | Mild |
| | [Schwannoma Malignant TGLs = 11-17] | | |
| * Kidney | | Cyst
Nephropathy | Mild
Moderate |
| | [Cyst TGLs = 6-7]
[Nephropathy TGLs = 5-7] | | |
| * Liver | | Basophilic Focus
Mixed Cell Focus
Regeneration | Minimal |
| | [Basophilic Focus TGLs = 12-18]
[Regeneration TGLs = 4-18] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Multiple
Marked
Marked
Chronic Active, Moderate
Moderate |
| | Alveolar Epith
Bronchiole | | |
| | Alveolus | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-16]
[Inflammation TGLs = 3-4, 5] | | |
| Lymph Node | Pancreatic | Ectasia | Moderate |
| | [Ectasia TGLs = 8-19] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	627	TMT:	7	SEX:	Male	DAY ON TEST:	729
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54513

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Respirat Epith Olfactory Epi	Hyperplasia Metaplasia	Mild Respiratory, Mild
* Pituitary Gland	Pars Distalis	Hyperplasia	Moderate
* Preputial Gland		Carcinoma	
	[Carcinoma TGLs = 1-14]		
* Prostate		Inflammation	Chronic Active, Mild
* Testes	Interstit Cell	Adenoma Atrophy	Marked
	[Adenoma TGLs = 9-9]		
	[Atrophy TGLs = 10-9]		

ANIMAL NUM: 628	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54514

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-----------------|-------------------|
| * Mammary Gland | * Pituitary Gland |
|-----------------|-------------------|

OBSERVATIONS

- | | | |
|--------------------------------------|---|--|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| * Eye | Metaplasia | Osseous, Mild |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| * Liver | Leukemia Mononuclear
Regeneration | Moderate |
| [Regeneration TGLs = 10-15] | | |
| * Lung | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Multiple
Marked
Marked
Chronic Active, Moderate
Moderate |
| [Inflammation TGLs = 2-4, 5; 3-14] | | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 9-3] | | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 8-8] | | |
| * Nose | Turbinate
Respirat Epith | Minimal
Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 628	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54514

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi Respirat Epith	Inflammation Metaplasia Necrosis	Chronic Active, Moderate Respiratory, Mild Mild
* Pancreas		Atrophy	Minimal
* Skin	[Basal Cell Adenoma TGLs = 1-19]	Basal Cell Adenoma	
* Spleen	[Leukemia Mononuclear TGLs = 6-16] [Necrosis TGLs = 7-17]	Leukemia Mononuclear Necrosis	Mild
* Testes	Interstit Cell [Adenoma TGLs = 4-9] [Atrophy TGLs = 5-9]	Adenoma Atrophy	Mild
* Thyroid Gland	C Cell	Hyperplasia	Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 629	TMT: 7	SEX: Male	DAY ON TEST: 715
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54515

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Seminal Vesicle | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5, 14] | Proteinosis | Moderate |
| * Nose | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Inflammation | Chronic Active, Moderate |
| | Respirat Epith | Metaplasia | Respiratory, Moderate |
| | | Necrosis | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Preputial Gland | | Inflammation | Chronic Active, Minimal |
| * Prostate | | Inflammation | Chronic Active, Mild |
| * Skin | | Inflammation | Moderate |
| | [Inflammation TGLs = 5-17] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 629	TMT: 7	SEX: Male	DAY ON TEST: 715
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54515

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Adenoma Atrophy	Mild
	[Adenoma TGLs = 3-9]		
* Urinary Bladder		Inflammation	Moderate
	[Inflammation TGLs = 4-16]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 630	TMT: 7	SEX: Male	DAY ON TEST: 660
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54516

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Lymph Node, Mandibular | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Islets, Pancreatic

OBSERVATIONS

- | | | | |
|---------------------------|--------------------------------------|----------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Marked |
| | | Leukemia Mononuclear | |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Mild |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | | Cyst | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | | Metaplasia | Squamous, Marked |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 14] | | |
| | [Metaplasia TGLs = 3-14] | | |
| Lymph Node | Pancreatic | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 9-15] | | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 630	TMT: 7	SEX: Male	DAY ON TEST: 660
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54516

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mesenteric [Leukemia Mononuclear TGLs = 12-16]	Leukemia Mononuclear	
* Nose Respirat Epith Olfactory Epi	Hyperplasia Inflammation Metaplasia	Mild Chronic Active, Moderate Respiratory, Mild
* Pancreas	Leukemia Mononuclear	
* Pituitary Gland Pars Distalis [Adenoma TGLs = 4-10]	Adenoma Leukemia Mononuclear	
* Skin [Inflammation TGLs = 1-7]	Inflammation	Moderate
* Spleen [Leukemia Mononuclear TGLs = 7-17] [Necrosis TGLs = 8-17]	Leukemia Mononuclear Necrosis	Mild
* Stomach, Forestomach	Hyperplasia	Squamous, Minimal
* Testes Interstit Cell [Adenoma TGLs = 10-9] [Atrophy TGLs = 11-9]	Adenoma Atrophy	Marked
* Thyroid Gland Follicle [Cyst TGLs = 13-3]	Cyst	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 631	TMT: 7	SEX: Male	DAY ON TEST: 478
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54517

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Glandular | * Testes | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 9-7] | | |
| * Liver | | Fatty Change
Leukemia Mononuclear | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-5, 2-4, 3-4, 4-4, 5-4, 6-4, 7-4] | Proteinosis | Moderate |
| * Nose | | Turbinate | Minimal |
| | Respirat Epith | Atrophy
Corpora Amylacea | Mild |
| | Olfactory Epi | Hyperplasia | Mild |
| | Olfactory Epi | Inflammation | Chronic Active, Moderate |
| | Respirat Epith | Metaplasia | Respiratory, Mild |
| | [Inflammation TGLs = 11-11] | Necrosis | Mild |
| * Pituitary Gland | Pars Distalis | Necrosis | Mild |
| | | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 631	TMT: 7	SEX: Male	DAY ON TEST: 478
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54517

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 8-10]		
* Prostate	Inflammation	Chronic Active, Mild
[Inflammation TGLs = 10-14]		
* Spleen	Leukemia Mononuclear	
* Stomach, Forestomach	Hyperplasia Ulcer	Squamous, Mild Moderate

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 632	TMT: 7	SEX: Male	DAY ON TEST: 652
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54518

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Eye |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Seminal Vesicle | * Spleen |
| * Stomach, Glandular | * Testes | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | | | |
|-------------|-------------------------|--------------------------|-----------------|
| * Esophagus | * Lymph Node, Bronchial | * Lymph Node, Mesenteric | * Mammary Gland |
|-------------|-------------------------|--------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| | [Hemorrhage TGLs = 6-1] | Hemorrhage | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | | Alveolar/Bronchiolar Carcinoma | Moderate |
| | | Hyperplasia | Marked |
| | | Hyperplasia | Chronic Active, Moderate |
| | | Inflammation | Moderate |
| | | Proteinosis | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |
| * Prostate | | Inflammation | Chronic Active, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 632	TMT: 7	SEX: Male	DAY ON TEST: 652
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54518

ORGAN AND ACCOUNTABLE SITE STATUS

* Salivary Glands	Degeneration	Mild
* Skin	Keratoacanthoma	
[Keratoacanthoma TGLs = 1-14]		
* Stomach, Forestomach	Hyperplasia Ulcer	Squamous, Mild Moderate

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 633	TMT: 7	SEX: Male	DAY ON TEST: 729
DOSE: 5.0 mg/m3		DISP: Terminal Sacrifice	HISTO: 54519

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 2-4, 5, 15] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | | Metaplasia | Respiratory, Mild |
| | Olfactory Epi | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Testes | Bilateral, Interstit Cell | Adenoma | |
| | | Atrophy | Marked |
| | [Adenoma TGLs = 4-9] | | |
| * Thyroid Gland | C Cell | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 634	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54520

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 2-4, 5, 15] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Testes | | Atrophy | Moderate |
| | Interstit Cell | Hyperplasia | Marked |
| | [Atrophy TGLs = 3-9] | | |

ANIMAL NUM: 635	TMT: 7	SEX: Male	DAY ON TEST: 730
DOSE: 5.0 mg/m3		DISP: Terminal Sacrifice	HISTO: 54521

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Larynx |
| * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Intestine Large, Rectum

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | | Nephropathy | Moderate |
| * Lung | Bronchiole | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| | Respirat Epith | Necrosis | Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	635	TMT:	7	SEX:	Male	DAY ON TEST:	730
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54521

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Mild
[Adenoma	TGLs = 3-9]		

ANIMAL NUM: 636	TMT: 7	SEX: Male	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54522

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland |
| * Pituitary Gland | * Preputial Gland | * Salivary Glands | * Seminal Vesicle |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|----------------------|---|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 10-7] | | |
| * Heart | | Cardiomyopathy
Schwannoma Malignant | Mild |
| * Islets, Pancreatic | | Hyperplasia | Mild |
| * Kidney | | Accumulation, Hyaline Droplet
Nephropathy | Moderate
Moderate |
| * Liver | | Basophilic Focus
Hemangiosarcoma
Regeneration | Marked |
| | [Hemangiosarcoma TGLs = 4-15, 5-17, 6-20, 7-19, 8-21, 9-22]
[Regeneration TGLs = 6-20] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Marked
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 2-4, 5]
[Proteinosis TGLs = 1-14] | | |
| * Nose | Turbinate | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 636	TMT: 7	SEX: Male	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54522

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Hyperplasia	Mild
		Inflammation	Chronic Active, Moderate
	Olfactory Epi	Metaplasia	Respiratory, Mild
* Prostate		Inflammation	Chronic Active, Minimal
* Testes	Bilateral, Interstit Cell	Adenoma	
		Atrophy	Marked
	[Adenoma TGLs = 3-9]		
* Thyroid Gland	C Cell	Adenoma	

ANIMAL NUM: 637	TMT: 7	SEX: Male	DAY ON TEST: 561
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54523

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Epididymis | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|--------------------------|--------------------------------------|--|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Brain | [Hemorrhage TGLs = 2-1, 3-1] | Hemorrhage | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear
Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| * Liver | [Leukemia Mononuclear TGLs = 4-6] | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Moderate
Marked
Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear
Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5, 14] | | |
| Lymph Node | Pancreatic | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-15] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 8-8] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	637	TMT:	7	SEX:	Male	DAY ON TEST:	561
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54523

ORGAN AND ACCOUNTABLE SITE STATUS

	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Mild
	Olfactory Epi	Metaplasia	Respiratory, Moderate
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Moderate
		Leukemia Mononuclear	
* Spleen		Leukemia Mononuclear	
		Necrosis	Mild
	[Leukemia Mononuclear TGLs = 5-15]		
	[Necrosis TGLs = 6-15]		
* Stomach, Forestomach		Hyperplasia	Squamous, Mild
* Testes	Interstit Cell	Hyperplasia	Moderate
		Necrosis	Mild

PRIMARY CAUSE OF DEATH - Brain Hemorrhage
 CONTRIBUTORY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 638	TMT: 7	SEX: Male	DAY ON TEST: 646
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54524

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Parathyroid Gland |
| * Preputial Gland | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|---------------------------|---|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Leukemia Mononuclear | |
| | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Alveolar Epith | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| Lymph Node | Renal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-14, 8-7] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-3] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	638	TMT:	7	SEX:	Male	DAY ON TEST:	646
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54524

ORGAN AND ACCOUNTABLE SITE STATUS

	[Leukemia Mononuclear TGLs = 7-8, 15]		
* Nose	Turbinate Respirat Epith	Atrophy Hyperplasia Inflammation	Minimal Mild Chronic Active, Moderate
	Olfactory Epi	Metaplasia	Respiratory, Moderate
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma Leukemia Mononuclear	
* Prostate		Inflammation	Chronic Active, Moderate
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 5-15]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Minimal
	[Adenoma TGLs = 4-9]		
* Thymus		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-3]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 639	TMT: 7	SEX: Male	DAY ON TEST: 611
DOSE: 5.0 mg/m3		DISP: Moribund Sacrifice	HISTO: 54525

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|-------------------------|---------------------|-----------------|
| * Lymph Node, Bronchial | * Parathyroid Gland | * Thyroid Gland |
|-------------------------|---------------------|-----------------|

OBSERVATIONS

- | | | | |
|---------------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-15] | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | Bronchiole | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Alveolus | Hyperplasia | Marked |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 7-16, 8-17] | Inflammation | Chronic Active, Moderate |
| | [Hyperplasia TGLs = 9-18, 10-19, 11-20] | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5; 4-4, 5] | | |
| * Lymph Node, Mediastinal | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| * Nose | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Inflammation | Chronic Active, Mild |
| * Pituitary Gland | Pars Distalis | Metaplasia | Respiratory, Moderate |
| | [Adenoma TGLs = 6-10] | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	639	TMT:	7	SEX:	Male	DAY ON TEST:	611
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54525

ORGAN AND ACCOUNTABLE SITE STATUS

* Prostate		Inflammation	Chronic Active, Mild
* Spleen		Hematopoietic Cell Proliferation	Mild
* Testes	Interstit Cell	Adenoma	
		Atrophy	Mild
	[Adenoma TGLs = 5-9]		
* Thymus		Alveolar/Bronchiolar Carcinoma	Metastatic (Lung)
	[Alveolar/Bronchiolar Carcinoma TGLs = 1-14]		

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 640	TMT: 7	SEX: Male	DAY ON TEST: 491
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54526

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|----------------------|-------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Minimal |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 5-10] | | |
| * Prostate | | Hyperplasia | Minimal |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	640	TMT:	7	SEX:	Male	DAY ON TEST:	491
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54526

ORGAN AND ACCOUNTABLE SITE STATUS

			Necrosis	Mild
	[Leukemia Mononuclear	TGLs = 2-14]		
	[Necrosis	TGLs = 3-14]		
* Testes	Interstit Cell		Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 641	TMT: 7	SEX: Male	DAY ON TEST: 702
DOSE: 5.0 mg/m3		DISP: Moribund Sacrifice	HISTO: 54527

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Prostate | * Salivary Glands | * Seminal Vesicle | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|--------------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| | | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 7-7] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Mediastinum | Leukemia Mononuclear | |
| | Alveolus | Leukemia Mononuclear | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-9] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	641	TMT:	7	SEX:	Male	DAY ON TEST:	702
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54527

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi Respirat Epith	Metaplasia Necrosis	Respiratory, Mild Mild
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia Leukemia Mononuclear	Moderate
* Spleen	[Leukemia Mononuclear TGLs = 5-15]	Leukemia Mononuclear	
* Testes	Interstit Cell	Atrophy Hyperplasia	Marked Mild
* Thymus		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 642	TMT: 7	SEX: Male	DAY ON TEST: 688
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54528

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Parathyroid Gland |
| * Preputial Gland | * Prostate | * Salivary Glands | * Seminal Vesicle |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Mammary Gland

OBSERVATIONS

- | | | | |
|--------------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 12-7] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 10-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 9-6] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-15] | | |
| * Lymph Node, Mesenteric | | Infiltration Cellular | Histiocyte, Mild |
| | [Infiltration Cellular TGLs = 11-8] | | |
| * Nose | Turbinate | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 642	TMT: 7	SEX: Male	DAY ON TEST: 688
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54528

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Hyperplasia Inflammation	Marked Chronic Active, Moderate
	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 4-10]		
* Skin		Inflammation	Moderate
	[Inflammation TGLs = 1-16]		
* Spleen		Fibrosis Leukemia Mononuclear	Mild
	[Fibrosis TGLs = 8-14]		
	[Leukemia Mononuclear TGLs = 7-14]		
* Testes	Interstit Cell	Adenoma Atrophy Necrosis	Marked Mild
	[Adenoma TGLs = 6-9]		
	[Atrophy TGLs = 5-9]		
* Thyroid Gland	Bilateral, C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 643	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54529

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| * Eye | | Cataract | Moderate |
| | | Metaplasia | Osseous, Mild |
| | [Cataract TGLs = 1-13] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Adenoma | |
| | | Hyperplasia | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 5-16] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | | Alveolar/Bronchiolar Carcinoma | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 4-4, 5, 15] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | | Metaplasia | Respiratory, Mild |
| | Olfactory Epi | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	643	TMT:	7	SEX:	Male	DAY ON TEST:	729
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54529

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Respirat Epith	Necrosis	Mild
* Pituitary Gland	Pars Distalis	Atrophy	Mild
[Hyperplasia	TGLs = 6-10]	Hyperplasia	Moderate
* Prostate		Inflammation	Chronic Active, Minimal
* Skin		Hyperplasia	Squamous, Moderate
[Hyperplasia	TGLs = 2-14, 3-18]		
* Testes		Atrophy	Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 644	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54530

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Preputial Gland | * Prostate | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 7-15] | | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 6-18] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 2-4, 5, 17] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | | Metaplasia | Respiratory, Mild |
| | Olfactory Epi | Necrosis | Mild |
| | Respirat Epith | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Spleen | | Fibrosis | Mild |
| | [Fibrosis TGLs = 5-6] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 644	TMT: 7	SEX: Male	DAY ON TEST: 729
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54530

ORGAN AND ACCOUNTABLE SITE STATUS

* Testes	Interstit Cell	Adenoma Atrophy	Marked
[Adenoma TGLs = 3-9]			
[Atrophy TGLs = 4-9]			

ANIMAL NUM: 645	TMT: 7	SEX: Male	DAY ON TEST: 696
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54531

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Epididymis | * Esophagus | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|-------------------------|-----------------|-------------------|
| * Lymph Node, Bronchial | * Mammary Gland | * Preputial Gland |
|-------------------------|-----------------|-------------------|

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|-------------------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 6-7] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | Renal Tubule | Carcinoma | Multiple |
| | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 5-15] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Mediastinum | Carcinoma | Metastatic (Uncertain Primary Site) |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| Mesentery | | Leukemia Mononuclear | |
| * Nose | Turbinate | Atrophy | Mild |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Hyperplasia | Basal Cell, Minimal |
| | | Inflammation | Chronic Active, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	645	TMT:	7	SEX:	Male	DAY ON TEST:	696
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54531

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pituitary Gland	Pars Distalis	Atrophy	Minimal
[Adenoma TGLs = 3-10]		Adenoma	
* Prostate		Inflammation	Chronic Active, Minimal
* Spleen		Leukemia Mononuclear	
* Testes		Atrophy	Marked
[Atrophy TGLs = 4-9]			
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 646	TMT: 7	SEX: Male	DAY ON TEST: 618
DOSE: 5.0 mg/m3		DISP: Moribund Sacrifice	HISTO: 54532

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Skin | * Spleen | * Stomach, Glandular |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|---------------------------|---|--|--|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Moderate |
| * Bone | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14] | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| * Heart | [Alveolar/Bronchiolar Carcinoma TGLs = 13-18] | Alveolar/Bronchiolar Carcinoma | Metastatic |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Fatty Change
Regeneration | Minimal
Minimal |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma
Alveolar/Bronchiolar Carcinoma | Metastatic (Lung)
Multiple |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Marked
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-19] | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-15; 4-5; 5-16; 7-4; 8-4; 9-4,5;] | | |
| * Lymph Node, Mediastinal | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia
Inflammation | Mild
Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 646	TMT: 7	SEX: Male	DAY ON TEST: 618
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54532

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Prostate		Inflammation	Chronic Active, Minimal
Skeletal Muscle		Alveolar/Bronchiolar Carcinoma	Metastatic (Lung)
* Stomach, Forestomach		Hyperplasia	Squamous, Minimal
* Testes	Bilateral, Interstit Cell	Adenoma	
		Necrosis	Mild
	[Adenoma TGLs = 11-9]		
* Thymus		Alveolar/Bronchiolar Carcinoma	Metastatic (Lung)
	[Alveolar/Bronchiolar Carcinoma TGLs = 10-17]		
* Thyroid Gland	Bilateral, C Cell	Adenoma	
	[Adenoma TGLs = 12-3]		

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

ANIMAL NUM: 647	TMT: 7	SEX: Male	DAY ON TEST: 702
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54533

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone Marrow | * Epididymis | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Preputial Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|----------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Bone | Maxilla | Inflammation | Chronic Active, Minimal |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Carcinoma | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 8-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | [Fatty Change TGLs = 7-6] | Fatty Change | Minimal |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Moderate |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 647	TMT: 7	SEX: Male	DAY ON TEST: 702
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54533

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Olfactory Epi Pars Distalis	Metaplasia Adenoma	Respiratory, Moderate
[Adenoma TGLs = 3-10]			
* Prostate		Inflammation	Chronic Active, Marked
* Seminal Vesicle		Inflammation	Chronic Active, Moderate
[Inflammation TGLs = 4-10]			
* Testes	Interstit Cell	Adenoma Atrophy	Moderate
[Atrophy TGLs = 5-9, 6-9]			
* Thyroid Gland	C Cell	Adenoma	

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 648	TMT: 7	SEX: Male	DAY ON TEST: 590
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54534

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Preputial Gland | * Salivary Glands |
| * Seminal Vesicle | * Stomach, Forestomach | * Stomach, Glandular | * Testes |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|-----------------|
| * Lymph Node, Bronchial | * Mammary Gland |
|-------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-19] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5, 18] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| Skeletal Muscle | | Fibrous Histiocytoma | Metastatic (Skin) |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	648	TMT:	7	SEX:	Male	DAY ON TEST:	590
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54534

ORGAN AND ACCOUNTABLE SITE STATUS

[Fibrous Histiocytoma TGLs = 1-14, 15, 16]

* Skin	Fibrous Histiocytoma	
* Spleen	Hematopoietic Cell Proliferation	Mild

PRIMARY CAUSE OF DEATH - Skeletal Muscle Fibrous Histiocytoma Skin

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 649	TMT: 7	SEX: Male	DAY ON TEST: 660
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54535

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Preputial Gland | * Prostate |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Infarct | Mild |
| | | Nephropathy | Minimal |
| | [Infarct TGLs = 8-15] | | |
| * Liver | | Leukemia Mononuclear | |
| | | Regeneration | Moderate |
| | [Leukemia Mononuclear TGLs = 7-6] | | |
| | [Regeneration TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5, 14] | | |
| * Lymph Node, Mandibular | | Ectasia | Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 649	TMT: 7	SEX: Male	DAY ON TEST: 660
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54535

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Respirat Epith	Hyperplasia Inflammation	Moderate Chronic Active, Moderate
	Olfactory Epi	Metaplasia	Respiratory, Moderate
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
	[Hyperplasia TGLs = 9-10]		
* Spleen		Leukemia Mononuclear Necrosis	Mild
	[Leukemia Mononuclear TGLs = 2-16]		
	[Necrosis TGLs = 3-16, 4-16]		
* Testes	Bilateral, Interstit Cell	Adenoma Atrophy	Mild
	[Adenoma TGLs = 5-9]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 650	TMT: 7	SEX: Male	DAY ON TEST: 572
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54536

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Epididymis |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Preputial Gland |
| * Salivary Glands | * Seminal Vesicle | * Skin | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | | |
|-------------------------|--------------------------|-----------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Mammary Gland |
|-------------------------|--------------------------|-----------------|

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Marked |
| | | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Minimal |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Moderate |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | | Metaplasia | Respiratory, Moderate |
| * Pituitary Gland | Olfactory Epi | | |
| | Pars Distalis | Adenoma | |
| * Prostate | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 650	TMT: 7	SEX: Male	DAY ON TEST: 572
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54536

ORGAN AND ACCOUNTABLE SITE STATUS

[Leukemia Mononuclear TGLs = 2-14]

* Stomach, Forestomach

Hyperplasia

Squamous, Minimal

* Testes

Interstit Cell

Atrophy
Hyperplasia

Minimal
Mild

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 101	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54437

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Liver | * Lung | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|----------------------------|----------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Adrenal Medulla | Hyperplasia | Moderate |
| * Brain | Compression | Minimal |
| * Clitoral Gland | Carcinoma | |
| [Carcinoma TGLs = 2-14] | | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| [Nephropathy TGLs = 6-7] | | |
| * Mammary Gland | Hyperplasia | Minimal |
| Mesentery Fat | Necrosis | Minimal |
| [Necrosis TGLs = 5-16] | | |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Adenoma | |
| Pars Distalis | | |
| [Adenoma TGLs = 3-10] | | |
| * Thyroid Gland | Carcinoma | |
| C Cell | | |
| [Carcinoma TGLs = 1-3] | | |
| * Uterus | Necrosis | Mild |
| [Necrosis TGLs = 4-17] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 102	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54438

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Nose | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|---------------|-------------------------|-------------------------|
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 103	TMT: 2	SEX: Female	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54439

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Nose | * Ovary |
| * Pancreas | * Parathyroid Gland | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Mediastinal

OBSERVATIONS

- | | | |
|-------------------|---|-------------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation | Minimal |
| * Liver | Clear Cell Focus | |
| | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-24] | |
| * Lung | Alveolar/Bronchiolar Adenoma | |
| | Inflammation | Chronic Active, Minimal |
| | [Alveolar/Bronchiolar Adenoma TGLs = 4-5] | |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 1-10] | |
| * Salivary Glands | Atrophy | Mild |
| * Skin | Squamous Cell Papilloma | |
| | [Squamous Cell Papilloma TGLs = 2-25] | |
| * Thyroid Gland | C Cell | |
| | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 104	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54440

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|----------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Bone | Maxilla | Inflammation | Chronic Active, Moderate |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Mild |
| * Liver | | Angiectasis | Mild |
| | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| | | Regeneration | Mild |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| | [Regeneration TGLs = 4-17] | | |
| * Lung | | Leukemia Mononuclear | |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Ovary | | Cyst | Minimal |
| | | Inflammation | Chronic Active, Marked |
| | [Cyst TGLs = 2-9] | | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |
| * Spleen | | Leukemia Mononuclear | |
| * Uterus | Endometrium | Hyperplasia | Cystic, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 105 TMT: 2 DOSE: Control

SEX: Female DISP: Moribund Sacrifice

DAY ON TEST: 654 HISTO: 54441

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- * Adrenal Medulla
- * Clitoral Gland
- * Intestine Large, Colon
- * Islets, Pancreatic
- * Lymph Node, Mediastinal
- * Salivary Glands
- * Stomach, Glandular
- * Urinary Bladder
- * Bone
- * Esophagus
- * Intestine Large, Rectum
- * Liver
- * Mammary Gland
- * Skin
- * Thymus
- * Uterus
- * Bone Marrow
- * Heart
- * Intestine Small, Duodenum
- * Lung
- * Ovary
- * Spleen
- * Thyroid Gland
- * Brain
- * Intestine Large, Cecum
- * Intestine Small, Ileum
- * Lymph Node, Mandibular
- * Parathyroid Gland
- * Stomach, Forestomach
- * Trachea

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- * Adrenal Cortex Atrophy Moderate
- * Eye Cataract Mild
- Metaplasia Osseous, Minimal
- * Harderian Gland Inflammation Chronic Active, Marked
- * Intestine Small, Jejunum Carcinoma
- [Carcinoma TGLs = 4-8]
- * Kidney Nephropathy Minimal
- * Larynx Foreign Body Mild
- Metaplasia Squamous, Minimal
- * Lymph Node, Mesenteric Infiltration Cellular Histiocyte, Mild
- [Infiltration Cellular TGLs = 5-8]
- * Nose Inflammation Chronic Active, Minimal
- * Pancreas Atrophy Minimal
- * Pituitary Gland Pars Distalis Adenoma
- [Adenoma TGLs = 3-10]

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 106	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54442

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lung | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | |
|-------------------|--|-------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Minimal |
| | Metaplasia | Squamous, Minimal |
| * Liver | Basophilic Focus | |
| | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-15] | |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-16] | |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | |
| * Thyroid Gland | C Cell | |
| | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 107	TMT: 2	SEX: Female	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54443

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Nose |
| * Ovary | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--------------------|---------|
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Skin | | Basal Cell Adenoma | |
| | [Basal Cell Adenoma TGLs = 1-17] | | |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |
| * Uterus | | Hemangiosarcoma | |
| | [Hemangiosarcoma TGLs = 3-16] | Polyp Stromal | |
| | [Polyp Stromal TGLs = 2-15] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 108	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54444

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|-----------------------------|--------------------------------------|----------------------------------|
| * Adrenal Medulla | | Hyperplasia
Infiltration Cellular | Moderate
Mononuclear CI, Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | Artery | Cardiomyopathy
Inflammation | Mild
Chronic Active, Moderate |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus
Inflammation | Chronic Active, Mild |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 2-14] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| | [Hyperplasia TGLs = 1-10] | | |
| * Uterus | | Polyp Stromal | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 109	TMT: 2	SEX: Female	DAY ON TEST: 511
	DOSE: Control	DISP: Natural Death	HISTO: 54445

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lung | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose | * Ovary |
| * Pancreas | * Salivary Glands | * Spleen | * Stomach, Forestomach |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | |
|---|--|------------------------------|
| * Adrenal Cortex | Degeneration
Hemorrhage
Necrosis | Moderate
Moderate
Mild |
| [Hemorrhage TGLs = 9-7] | | |
| * Eye | Cataract | Mild |
| [Cataract TGLs = 1-13] | | |
| * Harderian Gland | Inflammation | Chronic Active, Marked |
| [Inflammation TGLs = 10-13] | | |
| * Heart | Cardiomyopathy
Congestion | Mild
Mild |
| [Congestion TGLs = 7-14] | | |
| * Kidney | Nephropathy | Moderate |
| * Liver | Fatty Change | Minimal |
| * Mammary Gland | Galactocele | Moderate |
| [Galactocele TGLs = 2-15, 3-16, 4-17, 5-18] | | |
| * Pituitary Gland | Adenoma | |
| [Adenoma TGLs = 11-10] | | |
| * Skin | Lipoma | |
| [Lipoma TGLs = 6-19] | | |
| * Stomach, Glandular | Erosion | Moderate |
| * Thyroid Gland | Follicular Cel
Carcinoma | |
| [Carcinoma TGLs = 8-3] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	109	TMT:	2	SEX:	Female	DAY ON TEST:	511
		DOSE:	Control	DISP:	Natural Death	HISTO:	54445

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 110	TMT: 2	SEX: Female	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54446

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Liver | * Lung | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|-----------------------------------|------------------------------|---------------------------------|
| * Bone | Femur
Maxilla | Hyperostosis
Inflammation | Minimal
Chronic Active, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Mammary Gland | | Fibroadenoma | Multiple |
| | [Fibroadenoma TGLs = 2-14, 3-9] | | |
| * Nose | Turbinate | Hyperostosis | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 1-10] | | |
| * Thyroid Gland | C Cell | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 111	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54447

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Liver |
| * Lung | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|---------------------------|---------------------|
| * Lymph Node, Mediastinal | * Parathyroid Gland |
|---------------------------|---------------------|

OBSERVATIONS

- | | | |
|-------------------------|-------------------------------|------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Adrenal Medulla | Degeneration | Cystic, Moderate |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Nose | Accumulation, Hyaline Droplet | Moderate |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| [Adenoma TGLs = 1-10] | | |
| * Thyroid Gland | Adenoma | |
| * Uterus | Polyp Stromal | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 112	TMT: 2	SEX: Female	DAY ON TEST: 611
	DOSE: Control	DISP: Natural Death	HISTO: 54448

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|----------------------------|--------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lung |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

AUTO PRECLUDES DIAG.

- * Intestine Small, Ileum

OBSERVATIONS

- | | | |
|------------------------|-------------------------|----------------|
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Minimal |
| * Liver | Fatty Change | Minimal |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 1-10] | |
| * Stomach, Forestomach | Hyperplasia | Squamous, Mild |
| | Ulcer | Mild |
| | [Ulcer TGLs = 2-10] | |
| * Stomach, Glandular | Edema | Mild |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 113	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54449

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Medulla | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | |
|-------------------------------------|----------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Bone | Fracture | Mild |
| * Clitoral Gland | Carcinoma | |
| [Carcinoma TGLs = 1-14,15] | | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation | Minimal |
| * Liver | Clear Cell Focus | |
| | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Hyperplasia | Moderate |
| Pars Distalis | | |
| [Hyperplasia TGLs = 2-10] | | |
| * Spleen | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 114	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54450

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Nose | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | |
|------------------------|---|-------------------------|
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation | Minimal |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | |
| * Spleen | Infiltration Cellular | Histiocyte, Mild |
| | [Infiltration Cellular TGLs = 3-6] | |
| * Stomach, Forestomach | Squamous Cell Papilloma | |
| Tongue | Squamous Cell Papilloma | |
| | [Squamous Cell Papilloma TGLs = 1-14] | |
| * Uterus | Inflammation | Suppurative, Mild |

ANIMAL NUM: 115	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54451

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|-------------------|-------------------------------------|--------------------------|
| * Adrenal Cortex | Accessory Adrenal Cortical Nodule | Minimal |
| | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Brain | Compression | Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation | Mild |
| * Liver | Clear Cell Focus | |
| | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | |
| * Lung | Leukemia Mononuclear | |
| Mesentery | Necrosis | Minimal |
| | Fat | |
| | [Necrosis TGLs = 5-7] | |
| * Nose | Accumulation, Hyaline Droplet | Minimal |
| | Foreign Body | Minimal |
| | Hyperplasia | Mild |
| | Inflammation | Chronic Active, Moderate |
| | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Adenoma | |
| | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | |
| * Spleen | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	115	TMT:	2	SEX:	Female	DAY ON TEST:	732
		DOSE:	Control	DISP:	Terminal Sacrifice	HISTO:	54451

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland	C Cell	Hyperplasia	Moderate
-----------------	--------	-------------	----------

ANIMAL NUM: 116	TMT: 2	SEX: Female	DAY ON TEST: 234
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54452

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-------------------|------------------------|--------------------------|---------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Rectum |
| * Kidney | * Larynx | * Lymph Node, Mandibular | * Mammary Gland |
| * Nose | * Parathyroid Gland | * Pituitary Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland |
| * Trachea | | | |

MISSING

- | | | | |
|------------------|-----------------------------|-------------------------|----------|
| * Clitoral Gland | * Intestine Small, Duodenum | * Lymph Node, Bronchial | * Thymus |
|------------------|-----------------------------|-------------------------|----------|

OBSERVATIONS

- | | | |
|-----------------------------------|------------|---------------------------------|
| * Adrenal Cortex | Carcinoma | Metastatic (Islets, Pancreatic) |
| [Carcinoma TGLs = 7-7] | | |
| * Heart | Carcinoma | Metastatic (Islets, Pancreatic) |
| [Carcinoma TGLs = 3-6] | | |
| * Intestine Large, Cecum | Carcinoma | Metastatic (Islets, Pancreatic) |
| * Intestine Large, Colon | Carcinoma | Metastatic (Islets, Pancreatic) |
| * Intestine Small, Ileum | Carcinoma | Metastatic (Islets, Pancreatic) |
| * Intestine Small, Jejunum | Carcinoma | Metastatic (Islets, Pancreatic) |
| * Islets, Pancreatic | Carcinoma | |
| [Carcinoma TGLs = 9-14] | | |
| * Liver | Carcinoma | Metastatic (Islets, Pancreatic) |
| Serosa | Thrombosis | Mild |
| [Carcinoma TGLs = 13-6] | | |
| [Thrombosis TGLs = 6-6] | | |
| * Lung | Carcinoma | Metastatic (Islets, Pancreatic) |
| Lymph Node | Carcinoma | Metastatic (Islets, Pancreatic) |
| Lumbar, Renal | | |
| [Carcinoma TGLs = 12-18, 14-15] | | |
| * Lymph Node, Mediastinal | Carcinoma | Metastatic (Islets, Pancreatic) |
| [Carcinoma TGLs = 4-3] | | |
| * Lymph Node, Mesenteric | Carcinoma | Metastatic (Islets, Pancreatic) |
| Mesentery | Carcinoma | Metastatic (Islets, Pancreatic) |
| [Carcinoma TGLs = 11-17] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	116	TMT:	2	SEX:	Female	DAY ON TEST:	234
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54452

ORGAN AND ACCOUNTABLE SITE STATUS

* Ovary		Carcinoma	Metastatic (Islets, Pancreatic)
	[Carcinoma TGLs = 10-9]		
* Pancreas		Carcinoma	Metastatic (Islets, Pancreatic)
Peritoneum		Carcinoma	Metastatic (Islets, Pancreatic)
Skeletal Muscle		Carcinoma	Metastatic (Islets, Pancreatic)
	[Carcinoma TGLs = 2-16]		
* Spleen		Carcinoma	Metastatic (Islets, Pancreatic)
	[Carcinoma TGLs = 8-14]		
* Urinary Bladder		Carcinoma	Metastatic (Islets, Pancreatic)
* Uterus		Carcinoma	Metastatic (Islets, Pancreatic)

PRIMARY CAUSE OF DEATH - Islets, Pancreatic Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 117	TMT: 2	SEX: Female	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54453

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lung | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|------------------------------|------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Clitoral Gland | | Hyperplasia | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14] | | |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 118	TMT: 2	SEX: Female	DAY ON TEST: 550
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54454

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lung |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | |
|-------------------|-------------------------|----------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Brain | Compression | Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Necrosis | Minimal |
| | Regeneration | Minimal |
| * Nose | Corpora Amylacea | Minimal |
| * Ovary | Cyst | Mild |
| | [Cyst TGLs = 4-9] | |
| * Pituitary Gland | Pars Distalis | Adenoma |
| | [Adenoma TGLs = 3-10] | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 119	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54455

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | |
|-------------------|--|-------------------------|
| * Adrenal Cortex | Accessory Adrenal Cortical Nodule
Hyperplasia | Minimal
Mild |
| * Brain | Compression | Moderate |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Basophilic Focus | |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | Carcinoma
Fibroadenoma | |
| | [Carcinoma TGLs = 1-16, 17] | |
| | [Fibroadenoma TGLs = 2-14, 15] | |
| Mesentery | Fat
Necrosis | Minimal |
| | [Necrosis TGLs = 3-7] | |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis
Adenoma | |
| | [Adenoma TGLs = 4-10] | |
| * Uterus | Endometrium
Hyperplasia | Cystic, Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 120	TMT: 2	SEX: Female	DAY ON TEST: 683
	DOSE: Control	DISP: Natural Death	HISTO: 54456

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Nose | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | |
|---------------------------|--|----------------------|
| * Adrenal Cortex | Leukemia Mononuclear | |
| * Adrenal Medulla | Hyperplasia | Minimal |
| | Leukemia Mononuclear | |
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Minimal |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Mild |
| * Larynx | Inflammation | Minimal |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-6] | |
| * Lung | Alveolar Epith | Minimal |
| | Hyperplasia | |
| | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-4, 5] | |
| Lymph Node | Pancreatic, Renal | Leukemia Mononuclear |
| | [Leukemia Mononuclear TGLs = 11-16, 13-18] | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-9] | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 14-8] | |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-14, 3-20, 4-19] | |
| * Ovary | Leukemia Mononuclear | |
| * Pancreas | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	120	TMT:	2	SEX:	Female	DAY ON TEST:	683
		DOSE:	Control	DISP:	Natural Death	HISTO:	54456

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 6-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 8-15, 9-17, 10-18]		
* Thymus		Leukemia Mononuclear	
* Thyroid Gland	C Cell	Hyperplasia	Minimal
* Uterus		Leukemia Mononuclear	
	[Polyp Stromal TGLs = 12-19, 15-17]	Polyp Stromal	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 121	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54457

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Nose | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | |
|-------------------|------------------------------|-------------------------|
| * Adrenal Medulla | Pheochromocytoma Benign | |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| * Liver | Clear Cell Focus | |
| | Fatty Change | Minimal |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15] | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 122	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54458

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Nose | * Ovary | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|----------------------|------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Bone | Femur | Hyperostosis | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Fatty Change | Minimal |
| | | Leukemia Mononuclear | |
| * Lung | | Leukemia Mononuclear | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 3-15] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 1-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-6] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 123	TMT: 2	SEX: Female	DAY ON TEST: 674
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54459

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Esophagus |
| * Eye | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lung |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-----------------------------|--------------|---------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Brain | | Compression | Mild |
| * Clitoral Gland | | Hyperplasia | Mild |
| | [Hyperplasia TGLs = 3-9] | | |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Atrophy | Mild |
| | [Fatty Change TGLs = 2-6] | Fatty Change | Mild |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 124	TMT: 2	SEX: Female	DAY ON TEST: 646
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54460

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lung |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | |
|-------------------|--|-------------------------|
| * Adrenal Cortex | Accessory Adrenal Cortical Nodule | Minimal |
| | Hyperplasia | Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Minimal |
| * Larynx | Inflammation | Minimal |
| * Liver | Basophilic Focus | |
| | Necrosis | Minimal |
| Lymph Node | Renal | |
| | Ectasia | Mild |
| | [Ectasia TGLs = 6-7] | |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 2-18] | |
| Mesentery | Fat | |
| | Necrosis | Minimal |
| | [Necrosis TGLs = 3-18] | |
| * Nose | Accumulation, Hyaline Droplet | Minimal |
| | Corpora Amylacea | Minimal |
| | Respirat Epith | Mild |
| | Hyperplasia | Chronic Active, Minimal |
| | Inflammation | |
| * Pituitary Gland | Pars Distalis | Hyperplasia |
| | | Moderate |
| * Spleen | Hematopoietic Cell Proliferation | Mild |
| | [Hematopoietic Cell Proliferation TGLs = 4-18] | |
| * Uterus | Endometrium | Hyperplasia |
| | | Cystic, Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	124	TMT:	2	SEX:	Female	DAY ON TEST:	646
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54460

ORGAN AND ACCOUNTABLE SITE STATUS

[Inflammation TGLs = 5-10, 16]	Inflammation Polyp Stromal	Chronic Active, Moderate
----------------------------------	-------------------------------	--------------------------

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Hyperplasia

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 125	TMT: 2	SEX: Female	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54461

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|--------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lung | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Nose | * Ovary |
| * Pancreas | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-----------------------------|---------------------|
| * Intestine Small, Duodenum | * Parathyroid Gland |
|-----------------------------|---------------------|

OBSERVATIONS

- | | | |
|--|----------------------|----------|
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Basophilic Focus | |
| * Pituitary Gland | Adenoma | |
| [Adenoma Pars Distalis
TGLs = 1-10] | | |
| * Spleen | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 126	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54462

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | | |
|-------------------|-----------------------------|----------------------------------|----------|
| * Bone | Femur | Hyperostosis | Moderate |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-26] | | |
| * Nose | Turbinates | Hyperostosis | Moderate |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| | [Hyperplasia TGLs = 3-10] | | |
| * Spleen | | Hematopoietic Cell Proliferation | Minimal |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 127	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54463

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Thymus

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | | Necrosis | Minimal |
| | [Hepatodiaphragmatic Nodule TGLs = 1-25] | | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |
| | [Hyperplasia TGLs = 2-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| * Thyroid Gland | C Cell | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 128	TMT: 2	SEX: Female	DAY ON TEST: 691
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54464

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Mammary Gland | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | |
|-------------------------------------|----------------------|----------------------|
| * Adrenal Cortex | Leukemia Mononuclear | |
| * Adrenal Medulla | Hyperplasia | Marked |
| | Leukemia Mononuclear | |
| * Brain | Compression | Minimal |
| * Eye | Cataract | Marked |
| | Metaplasia | Osseous, Minimal |
| [Cataract TGLs = 1-13] | | |
| * Heart | Leukemia Mononuclear | |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Minimal |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| * Nose | Inflammation | Chronic Active, Mild |
| * Ovary | Cyst | Moderate |
| [Cyst TGLs = 2-9] | | |
| * Pituitary Gland Pars Distalis | Adenoma | |
| [Adenoma TGLs = 6-10] | | |
| * Spleen | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	128	TMT:	2	SEX:	Female	DAY ON TEST:	691
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54464

ORGAN AND ACCOUNTABLE SITE STATUS

	[Leukemia Mononuclear	TGLs = 4-14]		
* Thyroid Gland	Follicular Cel		Hyperplasia	Minimal
* Uterus			Leiomyoma	
	[Leiomyoma	TGLs = 3-10]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 129	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54465

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Mediastinal

OBSERVATIONS

- | | | |
|--------------------------------------|--------------------------------------|------------------------------|
| Ear | Inflammation | Chronic Active, Moderate |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Minimal |
| * Liver | Basophilic Focus
Mixed Cell Focus | |
| * Lung | Inflammation | Chronic Active, Minimal |
| Mesentery | Necrosis | Minimal |
| | Fat | |
| [Necrosis TGLs = 3-16, 4-17, 5-18] | | |
| * Nose | Foreign Body
Inflammation | Mild
Chronic Active, Mild |
| | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Hyperplasia | Mild |
| | Hyperplasia | Squamous, Moderate |
| * Skin | | |
| [Hyperplasia TGLs = 1-15] | | |
| * Uterus | Polyp Stromal | |
| [Polyp Stromal TGLs = 2-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 130	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54466

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|-------------------|------------------------------|------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Mild |
| * Liver | | Basophilic Focus | |
| | | Fatty Change | Mild |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15] | | |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Thyroid Gland | C Cell | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 131	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54467

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Nose | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | | |
|-------------------------|---------------------------|----------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Thymus |
|-------------------------|---------------------------|----------|

OBSERVATIONS

- | | | |
|-------------------------------------|-----------------------------------|------------------|
| * Adrenal Cortex | Accessory Adrenal Cortical Nodule | Minimal |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Eye | Metaplasia | Osseous, Minimal |
| * Kidney | Nephropathy | Mild |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | Leukemia Mononuclear | |
| * Ovary | Cyst | Mild |
| [Cyst TGLs = 2-14] | | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland Pars Distalis | Adenoma | |
| [Adenoma TGLs = 1-10] | | |
| * Spleen | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 4-6] | | |
| * Uterus | Polyp Stromal | |
| [Polyp Stromal TGLs = 3-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 132	TMT: 2	SEX: Female	DAY ON TEST: 722
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54468

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | |
|-----------------------------|------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Brain | Compression | Mild |
| * Clitoral Gland | Carcinoma | |
| [Carcinoma TGLs = 1-14] | | |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Mild |
| * Lung | Inflammation | Chronic Active, Minimal |
| [Inflammation TGLs = 2-4] | | |
| * Nose | Corpora Amylacea | Minimal |
| | Foreign Body | Minimal |
| | Respirat Epith | Minimal |
| | Hyperplasia | Chronic Active, Mild |
| | Inflammation | |
| * Pituitary Gland | Adenoma | |
| Pars Distalis | | |
| [Adenoma TGLs = 4-10] | | |
| * Stomach, Forestomach | Hyperplasia | Squamous, Minimal |
| Tooth | Inflammation | Chronic Active, Mild |
| * Uterus | Angiectasis | Marked |
| | Cyst | Marked |
| | Endometrium | Cystic, Minimal |
| | Hyperplasia | Moderate |
| | Necrosis | |
| [Cyst TGLs = 3-15] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	132	TMT:	2	SEX:	Female	DAY ON TEST:	722
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54468

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Uterus Cyst

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 133	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54469

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Nose | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|--------------------------------------|----------------------|-------------------------|
| * Brain | Compression | Mild |
| * Clitoral Gland | Adenoma | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Intestine Small, Ileum | Carcinoma | |
| [Carcinoma TGLs = 3-14] | | |
| * Kidney | Nephropathy | Minimal |
| * Liver | Clear Cell Focus | |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | Fibroadenoma | |
| [Fibroadenoma TGLs = 1-15] | Hyperplasia | Marked |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| Pars Distalis | | |
| [Adenoma TGLs = 2-10] | | |
| * Skin | Schwannoma Malignant | |
| [Schwannoma Malignant TGLs = 1-15] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 134	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54470

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lung | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Nose | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|----------------------|------------------------------|-------------------------|----------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Infiltration Cellular | Mononuclear CI, Mild |
| Ear | | Inflammation | Chronic Active, Mild |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 3-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Fatty Change | Mild |
| | | Necrosis | Minimal |
| | [Necrosis TGLs = 2-6] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 4-15] | | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |
| | [Hyperplasia TGLs = 1-10] | | |
| * Stomach, Glandular | | Edema | Moderate |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

ANIMAL NUM: 135	TMT: 2	SEX: Female	DAY ON TEST: 316
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54471

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|--------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Kidney | * Larynx |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose | * Ovary |
| * Pancreas | * Parathyroid Gland | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|--------------------------|---|-------------------------------------|--|
| * Adrenal Medulla | Bilateral | Hyperplasia
Sarcoma | Minimal
Metastatic (Skin) |
| * Heart | | Sarcoma | Metastatic (Skin) |
| * Intestine Small, Ileum | | Sarcoma | Metastatic (Skin) |
| * Liver | | Fatty Change
Necrosis
Sarcoma | Mild
Minimal
Metastatic (Skin) |
| | [Sarcoma TGLs = 12-6, 17; 13-17; 14-6] | | |
| * Lung | Mediastinum | Sarcoma
Sarcoma | Metastatic (Skin)
Metastatic (Skin) |
| | [Sarcoma TGLs = 3-5; 4-4; 5-4; 6-14; 7-15; 8-16; 15-4, 5, 16] | | |
| Lymph Node | Deep Cervical | Sarcoma | Metastatic (Skin) |
| | [Sarcoma TGLs = 2-7] | | |
| * Lymph Node, Bronchial | | Sarcoma | Metastatic (Skin) |
| * Lymph Node, Mandibular | | Sarcoma | Metastatic (Skin) |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 11-20] | | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Salivary Glands | | Sarcoma | Metastatic (Skin) |
| | [Sarcoma TGLs = 9-18] | | |
| * Skin | | Sarcoma | |
| | [Sarcoma TGLs = 10-19] | | |
| * Spleen | | Sarcoma | Metastatic (Skin) |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	135	TMT:	2	SEX:	Female	DAY ON TEST:	316
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54471

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Skin Sarcoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 136	TMT: 2	SEX: Female	DAY ON TEST: 530
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54472

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Pancreas | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | |
|-------------------------|------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Brain | Compression | Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Clear Cell Focus | |
| | Fatty Change | Minimal |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | |
| [Adenoma TGLs = 1-10] | Adenoma | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 137	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54473

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Ovary | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | | |
|-------------------------|---------------------------|---------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Parathyroid Gland |
|-------------------------|---------------------------|---------------------|

OBSERVATIONS

- | | | |
|------------------------------|---|------------------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia | Minimal |
| * Brain | Compression | Minimal |
| * Eye | Metaplasia | Osseous, Mild |
| * Harderian Gland | Inflammation | Chronic Active, Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Basophilic Focus
Clear Cell Focus | |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | Fibroadenoma | |
| [Fibroadenoma TGLs = 1-14] | | |
| * Mesentery | Fat | |
| [Necrosis TGLs = 3-16] | Necrosis | Minimal |
| * Nose | Accumulation, Hyaline Droplet
Inflammation | Minimal
Chronic Active, Minimal |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis
Hyperplasia | Marked |
| [Hyperplasia TGLs = 4-10] | | |
| * Thyroid Gland | Bilateral, C Cell
Adenoma | |
| [Adenoma TGLs = 2-3] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 138	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54474

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lung | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Nose | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|-------------------|--|------------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Hyperplasia
Pheochromocytoma Benign | Mild |
| * Brain | Compression | Minimal |
| * Eye | Cataract
Metaplasia | Moderate
Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| * Liver | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-15] | |
| * Mammary Gland | Hyperplasia | Mild |
| | [Hyperplasia TGLs = 3-16] | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| | Pars Distalis
[Adenoma TGLs = 1-10] | |
| * Skin | Fibroma | |
| | [Fibroma TGLs = 2-17, 18] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 139 TMT: 2
DOSE: Control

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54475

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- * Adrenal Cortex
- * Clitoral Gland
- * Intestine Large, Cecum
- * Intestine Small, Ileum
- * Lymph Node, Mandibular
- * Ovary
- * Salivary Glands
- * Stomach, Glandular
- * Urinary Bladder
- * Bone
- * Esophagus
- * Intestine Large, Colon
- * Intestine Small, Jejunum
- * Lymph Node, Mediastinal
- * Pancreas
- * Skin
- * Thymus
- * Uterus
- * Bone Marrow
- * Eye
- * Intestine Large, Rectum
- * Islets, Pancreatic
- * Lymph Node, Mesenteric
- * Parathyroid Gland
- * Spleen
- * Thyroid Gland
- * Brain
- * Harderian Gland
- * Intestine Small, Duodenum
- * Larynx
- * Mammary Gland
- * Pituitary Gland
- * Stomach, Forestomach
- * Trachea

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- * Adrenal Medulla [Pheochromocytoma Benign TGLs = 1-7] Pheochromocytoma Benign
- * Heart Cardiomyopathy Minimal
- * Kidney Nephropathy Marked
- * Liver Basophilic Focus
Clear Cell Focus
- * Lung Inflammation Chronic Active, Minimal
- * Nose Inflammation Chronic Active, Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 140	TMT: 2	SEX: Female	DAY ON TEST: 732
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54476

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lung | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | |
|-------------------|-------------------------------------|----------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| * Eye | Metaplasia | Osseous, Mild |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Necrosis | Focal, Minimal |
| | Nephropathy | Moderate |
| * Larynx | Inflammation | Mild |
| * Liver | Clear Cell Focus | |
| | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 1-10] | Adenoma |
| * Spleen | | Leukemia Mononuclear |
| | [Leukemia Mononuclear TGLs = 2-6] | |
| * Uterus | | Polyp Stromal |
| | [Polyp Stromal TGLs = 3-15] | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 141	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54477

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|-----------------------------------|-------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| Ear | | Inflammation | Chronic Active, Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Clear Cell Focus | |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 2-15] | | |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Thyroid Gland | C Cell | Hyperplasia | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 142	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54478

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lung |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|---------------------------|--|----------------------|----------|
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Bone | Femur | Hyperostosis | Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lymph Node, Mediastinal | | Ectasia | Moderate |
| | [Ectasia TGLs = 6-3] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-16] | | |
| * Ovary | | Cyst | Moderate |
| | [Cyst TGLs = 3-9] | | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| | [Hyperplasia TGLs = 5-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-15, 2-15] | | |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

ANIMAL NUM: 143	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54479

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mesenteric | * Mammary Gland |
| * Nose | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|---------------------------|-------------------------------------|-------------------------|----------|
| * Adrenal Cortex | | Degeneration | Mild |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| | | Thrombosis | Minimal |
| | [Thrombosis TGLs = 3-6] | | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Fatty Change | Moderate |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Atrophy | Moderate |
| * Lymph Node, Mediastinal | | Atrophy | Mild |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 7-14] | | |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 143	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54479

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin		Cyst Epithelial Inclusion	Minimal
	[Cyst Epithelial Inclusion TGLs = 8-9]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 6-6]		
* Stomach, Forestomach		Hyperplasia	Squamous, Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 144	TMT: 2	SEX: Female	DAY ON TEST: 674
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54480

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lung |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Nose | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|-------------------|---|----------------------------|----------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Clitoral Gland | | Adenoma | |
| | | Inflammation | Suppurative, Mild |
| Ear | | Inflammation | Chronic Active, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-6] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Skin | | Fibroma | |
| | | Inflammation | Mild |
| | [Fibroma TGLs = 1-14, 15, 16] | | |
| | [Inflammation TGLs = 4-7] | | |
| * Thyroid Gland | C Cell | Adenoma | |
| * Uterus | | Polyp Stromal | |
| | [Polyp Stromal TGLs = 2-18] | | |

PRIMARY CAUSE OF DEATH - Skin Fibroma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 145	TMT: 2	SEX: Female	DAY ON TEST: 730
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54481

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | |
|------------------------------|----------------------|-------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Brain | Compression | Moderate |
| * Kidney | Nephropathy | Moderate |
| * Lung | Leukemia Mononuclear | |
| * Mammary Gland | Fibroadenoma | |
| [Fibroadenoma TGLs = 1-14] | | |
| * Mesentery | Necrosis | Minimal |
| Fat | | |
| [Necrosis TGLs = 2-17] | | |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| Pars Distalis | | |
| [Adenoma TGLs = 3-10] | | |
| * Spleen | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 146	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54482

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|------------------------|---|-------------------------|
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| * Liver | Fatty Change | Minimal |
| | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 6-6] | |
| * Lung | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-17] | |
| Mesentery | Fat | Minimal |
| | [Necrosis TGLs = 5-18] | |
| * Nose | Inflammation | Chronic Active, Minimal |
| * Pancreas | Atrophy | Mild |
| * Pituitary Gland | Adenoma | |
| | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | |
| * Stomach, Forestomach | Hyperplasia | Squamous, Minimal |
| * Uterus | Polyp Stromal | |
| | [Polyp Stromal TGLs = 3-15, 4-10] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 147	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54483

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------|----------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Eye | | Cataract | Marked |
| | [Cataract TGLs = 1-13] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Nose | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 148	TMT: 2	SEX: Female	DAY ON TEST: 663
	DOSE: Control	DISP: Natural Death	HISTO: 54484

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose |
| * Ovary | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|-------------------|--------------------------------------|------------------|
| * Adrenal Cortex | Hyperplasia | Moderate |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| * Brain | Compression | Minimal |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| | Thrombosis | Moderate |
| * Kidney | Nephropathy | Mild |
| * Larynx | Inflammation | Mild |
| * Liver | Leukemia Mononuclear | |
| | Necrosis | Moderate |
| | [Leukemia Mononuclear TGLs = 5-6] | |
| * Lung | Mediastinum | |
| | Inflammation | Mild |
| | Leukemia Mononuclear | |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15] | |
| * Pituitary Gland | Pars Distalis | |
| | [Hyperplasia TGLs = 3-10] | Moderate |
| * Spleen | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-14] | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	148	TMT:	2	SEX:	Female	DAY ON TEST:	663
		DOSE:	Control	DISP:	Natural Death	HISTO:	54484

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Heart Thrombosis
CONTRIBUTORY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 149	TMT: 2	SEX: Female	DAY ON TEST: 698
	DOSE: Control	DISP: Moribund Sacrifice	HISTO: 54485

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Nose | * Ovary |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | |
|------------------------|--|------------------|
| * Adrenal Cortex | Degeneration | Mild |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Hyperplasia | Minimal |
| | Leukemia Mononuclear | |
| * Eye | Cataract | Mild |
| | Metaplasia | Osseous, Minimal |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation | Minimal |
| * Liver | Fatty Change | Mild |
| | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | |
| * Lung | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Minimal |
| | Hyperplasia | |
| | Leukemia Mononuclear | |
| | [Alveolar/Bronchiolar Adenoma TGLs = 1-14] | |
| * Mammary Gland | Carcinoma | |
| | [Carcinoma TGLs = 3-16, 17] | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Adenoma | |
| | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | |
| * Spleen | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-19, 5-19] | |
| * Stomach, Forestomach | Hyperplasia | Squamous, Mild |
| * Thyroid Gland | Hyperplasia | Minimal |
| | C Cell | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	149	TMT:	2	SEX:	Female	DAY ON TEST:	698
		DOSE:	Control	DISP:	Moribund Sacrifice	HISTO:	54485

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 150	TMT: 2	SEX: Female	DAY ON TEST: 731
	DOSE: Control	DISP: Terminal Sacrifice	HISTO: 54486

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-----------------------------|----------------------|-------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Clitoral Gland | | Inflammation | Suppurative, Minimal |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Fatty Change | Mild |
| * Lung | | Inflammation | Chronic Active, Minimal |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-9] | | |
| * Nose | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| | Respirat Epith | Necrosis | Moderate |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Spleen | | Leukemia Mononuclear | |

ANIMAL NUM: 301 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Moribund Sacrifice

DAY ON TEST: 691
HISTO: 54737

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|---------------------------------------|-----------------------|----------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Islets, Pancreatic | | Hyperplasia | Marked |
| * Kidney | | Infarct | Moderate |
| | | Nephropathy | Minimal |
| | [Infarct TGLs = 5-14] | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Mild |
| Lymph Node | Deep Cervical | Infiltration Cellular | Minimal |
| | [Infiltration Cellular TGLs = 2-16] | | |
| * Lymph Node, Mesenteric | | Ectasia | Mild |
| | [Ectasia TGLs = 6-15] | | |
| Mesentery | Fat | Necrosis | Mild |
| | [Necrosis TGLs = 7-17] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	301	TMT:	4	SEX:	Female	DAY ON TEST:	691
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54737

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
[Hyperplasia	TGLs = 3-10]		
* Spleen		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 302	TMT: 4	SEX: Female	DAY ON TEST: 624
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54738

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|-------------------|--|--|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Minimal |
| * Brain | | Compression | Minimal |
| * Clitoral Gland | Bilateral | Adenoma | |
| | [Adenoma TGLs = 1-16] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 4-7] | | |
| * Larynx | | Inflammation | Mild |
| * Liver | | Clear Cell Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-15] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5, 14] | Proteinosis | Moderate |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 7-17] | | |
| * Nose | Olfactory Epi
Turbinate | Atrophy
Atrophy | Minimal
Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 302	TMT: 4	SEX: Female	DAY ON TEST: 624
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54738

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 5-10]		
* Stomach, Forestomach	Hyperplasia Ulcer	Squamous, Marked Marked
[Ulcer TGLs = 6-10]		

PRIMARY CAUSE OF DEATH - Stomach, Forestomach Ulcer

ANIMAL NUM: 303	TMT: 4	SEX: Female	DAY ON TEST: 716
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54739

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | |
|--|----------------------------|-------------------|
| * Adrenal Medulla | Hyperplasia | Moderate |
| * Clitoral Gland | Carcinoma | |
| [Carcinoma TGLs = 1-19] | | |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Minimal |
| | Papilloma | |
| * Larynx | Inflammation | Mild |
| | Metaplasia | Squamous, Minimal |
| * Liver | Basophilic Focus | |
| | Hepatodiaphragmatic Nodule | |
| | Necrosis | Minimal |
| | Sarcoma | Metastatic (Skin) |
| [Basophilic Focus TGLs = 7-16] | | |
| [Hepatodiaphragmatic Nodule TGLs = 8-16] | | |
| [Sarcoma TGLs = 7-6, 17, 18; 9-18, 10-17] | | |
| * Lung | Alveolar Epith | Hyperplasia |
| | Bronchiole | Hyperplasia |
| | | Inflammation |
| | Alveolus | Proteinosis |
| [Inflammation TGLs = 4-4, 5] | | |
| * Mammary Gland | Fibroadenoma | |
| [Fibroadenoma TGLs = 3-21] | | |
| Mesentery | Fibrosis | Minimal |
| Note: actually a cyst in the mesentery - no code | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	303	TMT:	4	SEX:	Female	DAY ON TEST:	716
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54739

ORGAN AND ACCOUNTABLE SITE STATUS

	[Fibrosis TGLs = 6-22]		
* Nose		Turbinate Respirat Epith	Atrophy Hyperplasia
			Minimal Minimal
* Ovary			Cyst
	[Cyst TGLs = 5-9]		
Peritoneum			Sarcoma
	[Sarcoma TGLs = 12-14]		
* Pituitary Gland		Pars Distalis	Hyperplasia
			Moderate
* Skin			Sarcoma
	[Sarcoma TGLs = 2-20]		
* Spleen			Hematopoietic Cell Proliferation
			Mild

PRIMARY CAUSE OF DEATH - Skin Sarcoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 304	TMT: 4	SEX: Female	DAY ON TEST: 590
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54740

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Kidney | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|-------------------|---|----------------------------------|--------------------------|
| * Liver | | Basophilic Focus | |
| | [Basophilic Focus TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15, 16] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | | Hyperplasia | Minimal |
| * Spleen | | Hematopoietic Cell Proliferation | Mild |
| | [Hematopoietic Cell Proliferation TGLs = 4-6] | | |

PRIMARY CAUSE OF DEATH - Mammary Gland Fibroadenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 305	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54741

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Ovary | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|------------------|-------------------------|
| * Clitoral Gland | * Lymph Node, Bronchial |
|------------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|---|--|--|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-6] | | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma
Cyst | Metastatic (Lung)
Marked |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Moderate
Mild
Chronic Active, Moderate |
| | Alveolus | Metaplasia
Proteinosis | Squamous, Marked
Moderate |
| | [Cyst TGLs = 2-14] | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15, 16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia
Inflammation | Minimal
Chronic Active, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	305	TMT:	4	SEX:	Female	DAY ON TEST:	731
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54741

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Olfactory Epi Pars Distalis	Metaplasia Hyperplasia	Respiratory, Minimal Moderate
* Spleen		Leukemia Mononuclear	
* Thyroid Gland	C Cell	Hyperplasia	Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 306	TMT: 4	SEX: Female	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54742

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|---------------------------|----------|
| * Lymph Node, Mediastinal | * Thymus |
|---------------------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------|-------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| | | Mixed Cell Focus | |
| | [Mixed Cell Focus TGLs = 5-17] | | |
| * Lung | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Marked |
| | Alveolus | Proteinosis | Moderate |
| * Mammary Gland | | Fibroadenoma | |
| | | Leukemia Mononuclear | |
| | [Fibroadenoma TGLs = 1-15, 16; 2-14] | | |
| | [Leukemia Mononuclear TGLs = 1-16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Leukemia Mononuclear | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 306 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54742

ORGAN AND ACCOUNTABLE SITE STATUS

[Hyperplasia TGLs = 3-10]

* Spleen

* Thyroid Gland

* Uterus

C Cell

[Carcinoma TGLs = 4-10]

Leukemia Mononuclear

Adenoma

Carcinoma

ANIMAL NUM: 307	TMT: 4	SEX: Female	DAY ON TEST: 646
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54743

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|---------------------------|-------------------------------------|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Mild |
| * Larynx | Respirat Epith | Hyperplasia | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 1-4, 5, 14] | Proteinosis | Minimal |
| * Lymph Node, Mediastinal | | Ectasia | Mild |
| | [Ectasia TGLs = 2-3] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 5-16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Ovary | | Cyst | Mild |
| | [Cyst TGLs = 3-9] | | |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | | Leukemia Mononuclear | |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	307	TMT:	4	SEX:	Female	DAY ON TEST:	646
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54743

ORGAN AND ACCOUNTABLE SITE STATUS

[Leukemia Mononuclear TGLs = 4-15]

* Uterus

Polyp Stromal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 308	TMT: 4	SEX: Female	DAY ON TEST: 641
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54744

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mesenteric |
| * Ovary | * Parathyroid Gland | * Pituitary Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | |
|--|----------------------------|--------------------------|
| * Adrenal Medulla | Hyperplasia | Moderate |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Thrombosis | Mild |
| [Thrombosis TGLs = 2-6] | | |
| * Kidney | Nephropathy | Minimal |
| * Liver | Hepatodiaphragmatic Nodule | |
| | Necrosis | Mild |
| [Hepatodiaphragmatic Nodule TGLs = 5-15] | | |
| [Necrosis TGLs = 4-6] | | |
| * Lung | Alveolar Epith | Mild |
| | Alveolus | Chronic Active, Moderate |
| [Inflammation TGLs = 3-4, 5, 14] | Proteinosis | Mild |
| * Lymph Node, Mandibular | Fibrosis | Minimal |
| | Necrosis | Minimal |
| * Mammary Gland | Fibroadenoma | |
| [Fibroadenoma TGLs = 1-17] | | |
| Mesentery | Fat | Minimal |
| [Necrosis TGLs = 6-16] | Necrosis | |
| * Nose | Olfactory Epi | Minimal |
| | Turbinates | Minimal |
| | Respirat Epith | Minimal |
| | Hyperplasia | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	308	TMT:	4	SEX:	Female	DAY ON TEST:	641
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54744

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Atrophy	Minimal
* Thymus	Thrombosis	Mild

PRIMARY CAUSE OF DEATH - Mammary Gland Fibroadenoma

ANIMAL NUM: 309	TMT: 4	SEX: Female	DAY ON TEST: 681
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54745

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|--------------------------|---------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-----------------------------|--------------------------------------|-------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Intestine Small, Duodenum | | Infiltration Cellular | Chronic Active, Minimal |
| | [Infiltration Cellular TGLs = 8-8] | | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Necrosis | Minimal |
| | [Necrosis TGLs = 2-6] | | |
| * Lung | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 6-15] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 5-10] | | |
| * Stomach, Forestomach | | Ulcer | Marked |
| | [Ulcer TGLs = 7-14] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	309	TMT:	4	SEX:	Female	DAY ON TEST:	681
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54745

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Stomach, Forestomach Ulcer
CONTRIBUTORY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 310	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54746

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Basophilic Focus | |
| | | Fatty Change | Minimal |
| * Lung | | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Minimal |
| | Bronchiole | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-15, 3-16] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 5-10] | | |
| * Skin | | Inflammation | Mild |
| | [Inflammation TGLs = 1-14] | | |

ANIMAL NUM: 311 **TMT:** 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54747

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone Marrow | * Brain |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--|---|
| * Bone | Femur | Hyperostosis | Moderate |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 2-14] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus
Clear Cell Focus | |
| * Lung | Bronchiole | Hyperplasia
Inflammation
Proteinosis | Minimal
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Hyperostosis | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| * Spleen | | Hematopoietic Cell Proliferation | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 312	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54748

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| Ear | | Inflammation | Chronic Active, Moderate |
| * Eye | | Cataract | Mild |
| | Antr Chamber, Postr Chamber, Retrobulbar Cornea | Hemorrhage | Mild |
| | [Hemorrhage TGLs = 4-13] | Inflammation | Chronic Active, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Mild |
| | Note: Larynx-inflammatory polyp ventral pouch | | |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | | Mixed Cell Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-14] | | |
| | [Leukemia Mononuclear TGLs = 2-6] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 312 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54748

ORGAN AND ACCOUNTABLE SITE STATUS

	Alveolus	Proteinosis	Moderate
	[Inflammation TGLs = 5-4, 5]		
* Mammary Gland		Fibroadenoma	
	[Fibroadenoma TGLs = 1-15]		
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Minimal
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Spleen		Leukemia Mononuclear	
* Thyroid Gland	C Cell	Adenoma	
* Uterus	Endometrium	Hyperplasia	Cystic, Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	313	TMT:	4	SEX:	Female	DAY ON TEST:	731
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54749

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 3-17] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| Skeletal Muscle | | Lipoma | |
| | [Lipoma TGLs = 5-16] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 313 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54749

ORGAN AND ACCOUNTABLE SITE STATUS

Zymbal's Gland
[Carcinoma TGLs = 1-14]

Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 314	TMT: 4	SEX: Female	DAY ON TEST: 732
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54750

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Mild |
| | | Leukemia Mononuclear | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 6-4, 5] | Proteinosis | Moderate |
| * Nose | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Ovary | | Leukemia Mononuclear | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| | [Hyperplasia TGLs = 1-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	314	TMT:	4	SEX:	Female	DAY ON TEST:	732
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54750

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Leukemia Mononuclear Necrosis		Minimal
	[Leukemia Mononuclear TGLs = 3-6] [Necrosis TGLs = 4-14]			
* Thyroid Gland	C Cell	Hyperplasia		Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 315	TMT: 4	SEX: Female	DAY ON TEST: 593
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54751

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

OBSERVATIONS

- | | | | |
|--|--|-----------------------------------|--------------------------------------|
| * Brain | | Compression
Hemorrhage | Minimal
Mild |
| [Hemorrhage TGLs = 7-1] | | | |
| * Clitoral Gland | | Adenoma | |
| [Adenoma TGLs = 4-9] | | | |
| * Eye | | Cataract | Marked |
| [Cataract TGLs = 1-13] | | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Hepatodiaphragmatic Nodule | |
| [Hepatodiaphragmatic Nodule TGLs = 6-14] | | | |
| * Lung | Alveolus | Inflammation
Proteinosis | Chronic Active, Moderate
Moderate |
| [Inflammation TGLs = 2-4, 5] | | | |
| * Nose | Turbinate
Olfactory Epi
Respirat Epith | Atrophy
Atrophy
Hyperplasia | Minimal
Minimal
Minimal |
| * Ovary | | Cyst | Moderate |
| [Cyst TGLs = 5-15] | | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| [Adenoma TGLs = 3-10] | | | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 315 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Natural Death

DAY ON TEST: 593
HISTO: 54751

ORGAN AND ACCOUNTABLE SITE STATUS

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 316	TMT: 4	SEX: Female	DAY ON TEST: 516
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54752

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Kidney | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Parathyroid Gland | * Pituitary Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | | |
|-----------------|--|--|---|
| * Larynx | | Inflammation
Metaplasia | Minimal
Squamous, Minimal |
| * Liver | [Angiectasis TGLs = 4-6] | Angiectasis | Minimal |
| * Lung | Alveolar Epith | Hyperplasia
Inflammation
Proteinosis | Minimal
Chronic Active, Moderate
Mild |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | [Fibroadenoma TGLs = 1-14, 15, 16, 2-18] | Fibroadenoma | Multiple |
| * Nose | Turbinate | Accumulation, Hyaline Droplet | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |

PRIMARY CAUSE OF DEATH - Mammary Gland Fibroadenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 317	TMT: 4	SEX: Female	DAY ON TEST: 732
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54753

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Mediastinal

OBSERVATIONS

- | | | | |
|-------------------|--|--|---|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Mild |
| * Liver | | Basophilic Focus
Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | | Cyst | Moderate |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Marked
Minimal
Chronic Active, Moderate |
| | Alveolus | Metaplasia
Proteinosis | Squamous, Marked
Moderate |
| | [Cyst TGLs = 2-14] | | |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Nose | | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis
[Adenoma TGLs = 4-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	317	TMT:	4	SEX:	Female	DAY ON TEST:	732
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54753

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin
[Fibroma TGLs = 1-15, 16, 17, 18]

Fibroma

* Spleen

Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 318	TMT: 4	SEX: Female	DAY ON TEST: 686
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54754

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Liver | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|---|---|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Minimal
Mild
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-15] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-16] | | |
| * Nose | Olfactory Epi
Turbinata
Respirat Epith | Atrophy
Atrophy
Hyperplasia | Minimal
Minimal
Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |

PRIMARY CAUSE OF DEATH - Clitoral Gland Carcinoma

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 318 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Moribund Sacrifice

DAY ON TEST: 686
HISTO: 54754

ORGAN AND ACCOUNTABLE SITE STATUS

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 319 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54755

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- * Bone
- * Esophagus
- * Intestine Large, Rectum
- * Islets, Pancreatic
- * Lymph Node, Mesenteric
- * Salivary Glands
- * Thymus
- * Bone Marrow
- * Harderian Gland
- * Intestine Small, Duodenum
- * Larynx
- * Ovary
- * Skin
- * Trachea
- * Brain
- * Intestine Large, Cecum
- * Intestine Small, Ileum
- * Liver
- * Pancreas
- * Stomach, Forestomach
- * Urinary Bladder
- * Clitoral Gland
- * Intestine Large, Colon
- * Intestine Small, Jejunum
- * Lymph Node, Mandibular
- * Parathyroid Gland
- * Stomach, Glandular

MISSING

- * Lymph Node, Bronchial
- * Lymph Node, Mediastinal

OBSERVATIONS

- * Adrenal Cortex Hyperplasia Marked
- * Adrenal Medulla Hyperplasia Moderate
- * Eye Metaplasia Osseous, Minimal
- * Heart Cardiomyopathy Mild
- * Kidney Nephropathy Moderate
- * Lung Bronchiole Hyperplasia Minimal
- Alveolus Inflammation Chronic Active, Moderate
- [Inflammation TGLs = 3-4, 5] Proteinosis Moderate
- * Mammary Gland Fibroadenoma
- [Fibroadenoma TGLs = 1-15, 16; 2-14]
- * Nose Corpora Amylacea
- Olfactory Epi Inflammation Chronic Active, Minimal
- Pars Distalis Necrosis Minimal
- * Pituitary Gland Adenoma
- [Adenoma TGLs = 4-10]
- * Spleen Leukemia Mononuclear
- * Thyroid Gland C Cell Adenoma
- * Uterus Leiomyoma
- [Leiomyoma TGLs = 5-10]

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 320	TMT: 4	SEX: Female	DAY ON TEST: 670
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54756

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | | |
|----------------------|-------------------------------------|----------------------|----------------------|
| * Clitoral Gland | | Adenoma | |
| * Heart | | Thrombosis | Mild |
| | [Thrombosis TGLs = 7-6] | | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Eosinophilic Focus | |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | | Bronchiole | Hyperplasia |
| | | | Inflammation |
| | | | Leukemia Mononuclear |
| | | | Proteinosis |
| | [Inflammation TGLs = 4-4, 5] | | Moderate |
| | | Alveolus | |
| | | | |
| | | Fat | |
| | [Necrosis TGLs = 3-14] | | Necrosis |
| | | | Minimal |
| * Nose | | Turbinate | Atrophy |
| | | Respirat Epith | Hyperplasia |
| | | | Minimal |
| * Pituitary Gland | | Pars Distalis | Hyperplasia |
| | [Hyperplasia TGLs = 6-10] | | Minimal |
| * Spleen | | | Leukemia Mononuclear |
| | [Leukemia Mononuclear TGLs = 2-7] | | |
| * Stomach, Glandular | | | Ulcer |
| | | | Mild |

PRIMARY CAUSE OF DEATH - Heart Thrombosis

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 321	TMT: 4	SEX: Female	DAY ON TEST: 732
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54757

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|----------------------------------|------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Brain | | Compression | Mild |
| * Clitoral Gland | | Adenoma | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | Renal Tubule | Hyperplasia | Marked |
| | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Mild |
| * Liver | | Basophilic Focus | |
| | | Mixed Cell Focus | |
| | [Mixed Cell Focus TGLs = 4-6] | | |
| * Lung | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Mammary Gland | | Carcinoma | |
| | | Fibroadenoma | |
| | [Carcinoma TGLs = 2-14] | | |
| | [Fibroadenoma TGLs = 1-15, 16] | | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	321	TMT:	4	SEX:	Female	DAY ON TEST:	732
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54757

ORGAN AND ACCOUNTABLE SITE STATUS

* Ovary	Cyst	Minimal
[Cyst TGLs = 3-9]		
* Pancreas	Atrophy	Minimal
* Pituitary Gland	Hyperplasia	Marked
[Hyperplasia TGLs = 6-10]		
* Spleen	Leukemia Mononuclear	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 322	TMT: 4	SEX: Female	DAY ON TEST: 611
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54758

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Glandular | * Thyroid Gland | * Trachea |
| * Uterus | | | |

OBSERVATIONS

- | | | |
|---|---|--|
| * Adrenal Cortex | Hyperplasia
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Eye
[Cataract TGLs = 1-13] | Cataract | Moderate |
| * Heart | Leukemia Mononuclear | |
| * Kidney | Nephropathy | Minimal |
| * Liver
[Hepatodiaphragmatic Nodule TGLs = 9-17]
[Leukemia Mononuclear TGLs = 10-6] | Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| * Lung
Alveolus
[Leukemia Mononuclear TGLs = 4-4, 5, 15, 16] | Inflammation
Leukemia Mononuclear
Proteinosis | Chronic Active, Moderate

Moderate |
| Lymph Node
Renal
[Leukemia Mononuclear TGLs = 8-19] | Leukemia Mononuclear | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular
[Leukemia Mononuclear TGLs = 2-21] | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric
[Leukemia Mononuclear TGLs = 7-20] | Leukemia Mononuclear | |
| * Mammary Gland | Galactocele | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 322	TMT: 4	SEX: Female	DAY ON TEST: 611
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54758

ORGAN AND ACCOUNTABLE SITE STATUS

Mesentery	Fat	Necrosis	Minimal
[Necrosis	TGLs = 5-22]		
* Nose	Turbinate	Atrophy	Minimal
	Olfactory Epi	Atrophy	Minimal
		Corpora Amylacea	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Minimal
* Ovary		Leukemia Mononuclear	
* Pancreas		Leukemia Mononuclear	
* Pituitary Gland		Leukemia Mononuclear	
	[Leukemia Mononuclear		
	TGLs = 11-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear		
	TGLs = 6-18]		
* Stomach, Forestomach		Hyperplasia	Squamous, Mild
* Thymus		Leukemia Mononuclear	
	[Leukemia Mononuclear		
	TGLs = 3-14]		
* Urinary Bladder		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 323	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54759

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Larynx | | Inflammation | Mild |
| * Liver | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Minimal |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-15] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Olfactory Epi | Atrophy | Mild |
| | Turbinate | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	323	TMT:	4	SEX:	Female	DAY ON TEST:	731
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54759

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Hyperplasia Inflammation	Minimal Chronic Active, Minimal
* Ovary		Leukemia Mononuclear	
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 3-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-14]		
* Thyroid Gland	C Cell	Adenoma	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 324	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54760

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|----------------------------------|------------------|--------------------------|
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Fatty Change | Minimal |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia | Marked |
| | | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Mammary Gland | | Carcinoma | |
| | | Fibroadenoma | |
| | [Carcinoma TGLs = 3-15] | | |
| | [Fibroadenoma TGLs = 4-16, 17] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Uterus | Endometrium | Hyperplasia | Cystic, Mild |
| | | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 5-14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 325	TMT: 4	SEX: Female	DAY ON TEST: 646
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54761

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | |
|--|--|---|
| * Adrenal Cortex | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | Hyperplasia
Leukemia Mononuclear
Pheochromocytoma Benign | Minimal |
| * Clitoral Gland
[Carcinoma TGLs = 1-18] | Carcinoma | |
| * Kidney | Nephropathy | Minimal |
| * Liver
[Hepatocellular Adenoma TGLs = 6-14]
[Leukemia Mononuclear TGLs = 5-6, 15]
[Regeneration TGLs = 9-15] | Hepatocellular Adenoma
Leukemia Mononuclear
Regeneration | Marked |
| * Lung
Alveolar Epith
Alveolus
[Inflammation TGLs = 3-4, 5] | Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Marked
Chronic Active, Moderate
Minimal |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal
[Leukemia Mononuclear TGLs = 2-3] | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric
[Leukemia Mononuclear TGLs = 8-8] | Leukemia Mononuclear | |
| * Mammary Gland | Hyperplasia | Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	325	TMT:	4	SEX:	Female	DAY ON TEST:	646
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54761

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Turbinate	Atrophy	Minimal
	Olfactory Epi	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 7-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-16]		
* Uterus		Polyp Stromal	

PRIMARY CAUSE OF DEATH - Clitoral Gland Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 326	TMT: 4	SEX: Female	DAY ON TEST: 708
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54762

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|-------------------------|--------------------------|
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Fatty Change | Moderate |
| | | Fibrosis | Minimal |
| | [Fatty Change TGLs = 4-14] | | |
| * Lung | | Bronchiole | Hyperplasia |
| | | Alveolar Epith | Hyperplasia |
| | | Alveolus | Inflammation |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Chronic Active, Moderate |
| | | | Moderate |
| * Nose | | Turbinate | Atrophy |
| | | Respirat Epith | Hyperplasia |
| * Pituitary Gland | | Pars Distalis | Adenoma |
| | [Adenoma TGLs = 5-10] | | |
| * Uterus | | | Polyp Stromal |
| | [Polyp Stromal TGLs = 2-15] | | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 326 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Moribund Sacrifice

DAY ON TEST: 708
HISTO: 54762

ORGAN AND ACCOUNTABLE SITE STATUS

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 327	TMT: 4	SEX: Female	DAY ON TEST: 598
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54763

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | | |
|--------------------------|--|----------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-4, 5] | Proteinosis | Minimal |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| Mesentery | Fat | Necrosis | Mild |
| | [Necrosis TGLs = 5-15] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-14] | | |

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 328	TMT: 4	SEX: Female	DAY ON TEST: 697
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54764

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |

OBSERVATIONS

- | | | | |
|--------------------------|-------------------------------------|--|--------------------------------------|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Brain | | Compression
Hemorrhage | Mild
Mild |
| | [Hemorrhage TGLs = 6-1] | | |
| * Clitoral Gland | | Adenoma | |
| | [Adenoma TGLs = 1-15] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Foreign Body
Hyperplasia
Inflammation | Mild
Mild
Mild |
| | Respirat Epith | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | | Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Moderate
Chronic Active, Moderate |
| | Alveolar Epith | | |
| | Alveolus | | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Nose | | Atrophy
Hyperplasia | Minimal
Minimal |
| | Turbinate
Respirat Epith | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Hyperplasia | Moderate |
| | Pars Distalis | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 328	TMT: 4	SEX: Female	DAY ON TEST: 697
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54764

ORGAN AND ACCOUNTABLE SITE STATUS

	[Hyperplasia TGLs = 5-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-14]		
* Stomach, Forestomach		Hyperplasia	Squamous, Mild
		Leukemia Mononuclear	
* Urinary Bladder		Leukemia Mononuclear	
* Uterus		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM:	329	TMT:	4	SEX:	Female	DAY ON TEST:	732
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54765

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Eye | | Cataract
Metaplasia | Minimal
Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | [Nephropathy TGLs = 4-7] | Nephropathy | Marked |
| * Liver | [Hepatodiaphragmatic Nodule TGLs = 2-16] | Basophilic Focus
Hepatodiaphragmatic Nodule | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Mild
Chronic Active, Moderate
Moderate |
| | Alveolus
[Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | | Adenoma
Fibroadenoma | |
| | [Adenoma TGLs = 6-17]
[Fibroadenoma TGLs = 6-17] | | |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia | Minimal
Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 329 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 732
HISTO: 54765

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 1-10]

* Thyroid Gland C Cell

Adenoma

* Uterus

Polyp Stromal

[Polyp Stromal TGLs = 5-14]

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 330 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Moribund Sacrifice

DAY ON TEST: 624
HISTO: 54766

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- * Bone
- * Esophagus
- * Intestine Large, Rectum
- * Islets, Pancreatic
- * Ovary
- * Skin
- * Trachea
- * Bone Marrow
- * Harderian Gland
- * Intestine Small, Duodenum
- * Lymph Node, Mediastinal
- * Pancreas
- * Stomach, Forestomach
- * Urinary Bladder
- * Brain
- * Heart
- * Intestine Small, Ileum
- * Lymph Node, Mesenteric
- * Parathyroid Gland
- * Stomach, Glandular
- * Clitoral Gland
- * Intestine Large, Cecum
- * Intestine Small, Jejunum
- * Mammary Gland
- * Salivary Glands
- * Thymus

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- * Adrenal Cortex Hyperplasia Mild
- * Adrenal Medulla Leukemia Mononuclear
- * Eye Cataract Marked
Metaplasia Osseous, Minimal
[Cataract TGLs = 1-13]
- * Intestine Large, Colon Hyperplasia Adenomatous, Minimal
- * Kidney Nephropathy Mild
- * Larynx Inflammation Mild
- * Liver Leukemia Mononuclear
- * Lung [Leukemia Mononuclear TGLs = 5-6]
Bronchiole Cyst Minimal
Hyperplasia Minimal
Inflammation Chronic Active, Moderate
Leukemia Mononuclear
Metaplasia Squamous, Mild
Proteinosis Moderate
Alveolus
[Inflammation TGLs = 6-4, 5]
- * Lymph Node, Mandibular Leukemia Mononuclear
- * Nose Turbinate Atrophy Minimal
Corpora Amylacea Minimal
Olfactory Epi Metaplasia Respiratory, Minimal

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	330	TMT:	4	SEX:	Female	DAY ON TEST:	624
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54766

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
	[Hyperplasia TGLs = 2-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 3-14]		
* Thyroid Gland	C Cell	Hyperplasia	Mild
* Uterus		Polyp Stromal	
	[Polyp Stromal TGLs = 4-14]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 331	TMT: 4	SEX: Female	DAY ON TEST: 732
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54767

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | |
|------------------|-------------------------|
| * Clitoral Gland | * Lymph Node, Bronchial |
|------------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Moderate
Moderate
Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Skin | | Hyperplasia | Squamous, Moderate |
| | [Hyperplasia TGLs = 1-14] | | |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 332	TMT: 4	SEX: Female	DAY ON TEST: 702
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54768

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Salivary Glands | * Spleen |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Moderate |
| * Brain | | Compression | Moderate |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 4-9] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Fatty Change | Minimal |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Minimal
Minimal
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Basophilic Focus | |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Skin | | Inflammation | Mild |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	332	TMT:	4	SEX:	Female	DAY ON TEST:	702
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54768

ORGAN AND ACCOUNTABLE SITE STATUS

Ulcer

Mild

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 333	TMT: 4	SEX: Female	DAY ON TEST: 732
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54769

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|-------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-16] | | |
| * Lung | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 2-17] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 333 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 732
HISTO: 54769

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach

Hyperplasia

Squamous, Minimal

* Thyroid Gland C Cell
[Carcinoma TGLs = 1-14]

Carcinoma

* Uterus

Inflammation

Chronic Active, Minimal

ANIMAL NUM: 334 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54770

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Mediastinal

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Clitoral Gland | | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-14] | | |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | Renal Tubule | Hyperplasia | Marked |
| | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 6-7] | | |
| * Liver | | Basophilic Focus | |
| | [Basophilic Focus TGLs = 7-18] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 4-16, 17] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 3-19] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 334	TMT: 4	SEX: Female	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54770

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Olfactory Epi	Inflammation	Chronic Active, Minimal
[Hyperplasia TGLs = 5-10]	Pars Distalis	Metaplasia	Respiratory, Minimal
		Hyperplasia	Moderate

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 335	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54771

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Uterus |

MISSING

- | | |
|------------------|-------------------------|
| * Clitoral Gland | * Lymph Node, Bronchial |
|------------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|------------------------------|--|---|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear
Pheochromocytoma Malignant | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy
Leukemia Mononuclear | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus
Clear Cell Focus
Leukemia Mononuclear
Mixed Cell Focus
Regeneration | Marked |
| | | [Clear Cell Focus TGLs = 12-6]
[Leukemia Mononuclear TGLs = 5-6]
[Mixed Cell Focus TGLs = 10-16]
[Regeneration TGLs = 8-7, 9-14, 11-15] | |
| * Lung | Alveolar Epith
Bronchiole | Cyst
Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear | Minimal
Minimal
Minimal
Chronic Active, Moderate |
| | Alveolus | Metaplasia
Proteinosis | Squamous, Moderate
Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	335	TMT:	4	SEX:	Female	DAY ON TEST:	731
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54771

ORGAN AND ACCOUNTABLE SITE STATUS

	[Leukemia Mononuclear TGLs = 3-4, 5]		
* Lymph Node, Mandibular		Leukemia Mononuclear	
* Lymph Node, Mediastinal		Leukemia Mononuclear	
* Mammary Gland		Fibroadenoma	
		Leukemia Mononuclear	
	[Fibroadenoma TGLs = 1-17, 18, 19; 2-14]		
Mesentery	Fat	Necrosis	Minimal
	[Necrosis TGLs = 6-15, 7-14]		
* Nose	Olfactory Epi	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
* Ovary		Leukemia Mononuclear	
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
* Skin	Subcut Tiss	Inflammation	Marked
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-15]		
* Thyroid Gland	C Cell	Adenoma	
* Urinary Bladder		Leukemia Mononuclear	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 336	TMT: 4	SEX: Female	DAY ON TEST: 598
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54772

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--|--|
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Carcinoma
Compression | Metastatic (Pituitary Gland)
Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation
Metaplasia | Mild
Squamous, Minimal |
| * Liver | | Fatty Change | Minimal |
| * Lung | Alveolar Epith | Hyperplasia
Inflammation
Proteinosis | Marked
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 2-15] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Carcinoma | |
| | [Carcinoma TGLs = 6-10] | | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 337	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54773

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | |
|------------------|---|-------------------------|
| * Adrenal Cortex | Hyperplasia | Mild |
| Ear | Inflammation | Chronic Active, Minimal |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| * Liver | Basophilic Focus | |
| | Hepatocellular Adenoma | |
| | [Hepatocellular Adenoma TGLs = 5-14] | |
| * Lung | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Marked |
| | Alveolus | Chronic Active, Marked |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-4] | Moderate |
| | [Inflammation TGLs = 1-4, 5] | |
| Lymph Node | Iliac | Marked |
| | [Ectasia TGLs = 6-16] | |
| * Nose | Turbinat | Minimal |
| | Respirat Epith | Minimal |
| | | Chronic Active, Minimal |
| * Ovary | Cyst | Minimal |
| | [Cyst TGLs = 4-9] | |
| * Pancreas | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	337	TMT:	4	SEX:	Female	DAY ON TEST:	731
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54773

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
[Hyperplasia	TGLs = 3-10]		
* Salivary Glands	Duct	Hyperplasia	Mild

ANIMAL NUM:	338	TMT:	4	SEX:	Female	DAY ON TEST:	730
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54774

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------|--------------------------|
| * Clitoral Gland | | Inflammation | Chronic Active, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-7] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-5, 14] | | |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| * Thyroid Gland | C Cell | Hyperplasia | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 339	TMT: 4	SEX: Female	DAY ON TEST: 732
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54775

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 8-17] | | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Cyst | Mild |
| | [Cyst TGLs = 9-7] | Nephropathy | Marked |
| | [Nephropathy TGLs = 5-7] | | |
| * Larynx | | Inflammation | Mild |
| * Liver | | Fatty Change | Mild |
| | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 7-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	339	TMT:	4	SEX:	Female	DAY ON TEST:	732
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54775

ORGAN AND ACCOUNTABLE SITE STATUS

	[Fibroadenoma TGLs = 1-19, 2-20, 3-16]		
Mesentery	Fat	Necrosis	Minimal
	[Necrosis TGLs = 10-18]		
* Nose		Accumulation, Hyaline Droplet	Minimal
	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 4-10]		
* Spleen		Leukemia Mononuclear	
* Stomach, Forestomach		Fibrosis	Minimal
		Hyperplasia	Squamous, Minimal
* Uterus		Inflammation	Suppurative, Minimal
		Polyp Stromal	
	[Polyp Stromal TGLs = 6-14]		

ANIMAL NUM: 340	TMT: 4	SEX: Female	DAY ON TEST: 732
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54776

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | | | |
|-------------------------|---------------------|----------|-----------------|
| * Lymph Node, Bronchial | * Parathyroid Gland | * Thymus | * Thyroid Gland |
|-------------------------|---------------------|----------|-----------------|

OBSERVATIONS

- | | | | |
|---|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| Blood Vessel | Aorta | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| * Brain | | Adenoma | |
| Note: pituitary adenoma with local extension into cerebellum
[Adenoma TGLs = 4-15] | | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | Bronchiole | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Minimal |
| | | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-16] | | |
| * Nose | Turbinate | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

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

Lab: BNW

ANIMAL NUM:	340	TMT:	4	SEX:	Female	DAY ON TEST:	732
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54776

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Hyperplasia Inflammation	Minimal Chronic Active, Minimal
* Ovary		Cystadenocarcinoma	
* Pancreas		Atrophy	Minimal
* Pituitary Gland		Adenoma	
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 6-15]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 341	TMT: 4	SEX: Female	DAY ON TEST: 422
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54777

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Mandibular | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Stomach, Glandular | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | | |
|-------------------------|---------------------------|----------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Thymus |
|-------------------------|---------------------------|----------|

OBSERVATIONS

- | | | | |
|--------------------------|---|----------------------------------|----------------------|
| * Intestine Large, Colon | | Hyperplasia | Adenomatous, Mild |
| * Kidney | | Nephropathy | Minimal |
| * Lung | | Inflammation | Chronic Active, Mild |
| | Alveolus | Proteinosis | Mild |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 4-10] | | |
| * Skin | | Fibrous Histiocytoma | |
| | [Fibrous Histiocytoma TGLs = 3-14, 15, 16] | | |
| * Spleen | | Hematopoietic Cell Proliferation | Minimal |
| | [Hematopoietic Cell Proliferation TGLs = 2-6] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Minimal |

PRIMARY CAUSE OF DEATH - Skin Fibrous Histiocytoma

ANIMAL NUM: 342	TMT: 4	SEX: Female	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54778

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Adrenal Cortex | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Ovary | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Bone | Femur | Hyperostosis | Moderate |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 5-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 6-15] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-7] | | |
| * Nose | Olfactory Epi Turbinate | Atrophy | Minimal |
| | | Hyperostosis | Moderate |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 342 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54778

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Hematopoietic Cell Proliferation	Minimal
* Thyroid Gland	C Cell	Hyperplasia	Mild
* Uterus		Polyp Stromal	
	[Polyp Stromal TGLs = 3-10]		

ANIMAL NUM: 343	TMT: 4	SEX: Female	DAY ON TEST: 618
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54779

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | |
|---|---------------------------|--------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Harderian Gland | Atrophy | Mild |
| * Kidney | Nephropathy | Minimal |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 10-6] | | |
| * Lung | Bronchiole
Hyperplasia | Minimal |
| | Alveolar Epith | Mild |
| | Inflammation | Chronic Active, Moderate |
| | Alveolus | |
| [Inflammation TGLs = 3-4, 5] | Leukemia Mononuclear | Mild |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 2-3] | | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| * Mammary Gland | Adenoma | |
| [Adenoma TGLs = 1-14] | | |
| Mesentery | Fat | |
| [Necrosis TGLs = 5-17, 6-15, 7-7, 9-16] | Necrosis | Minimal |
| * Nose | Turbinate | Atrophy |
| | Olfactory Epi | Atrophy |
| | Respirat Epith | Hyperplasia |
| * Ovary | Cyst | Minimal |
| [Cyst TGLs = 8-9] | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	343	TMT:	4	SEX:	Female	DAY ON TEST:	618
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54779

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Spleen	[Leukemia Mononuclear TGLs = 4-15]	Leukemia Mononuclear	
* Stomach, Forestomach		Hyperplasia Inflammation Ulcer	Squamous, Marked Chronic Active, Marked Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 344	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54780

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Clitoral Gland | | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 3-14] | | |
| Ear | | Inflammation | Chronic Active, Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |
| * Skin | | Papilloma | |
| | [Papilloma TGLs = 1-16] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	344	TMT:	4	SEX:	Female	DAY ON TEST:	731
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54780

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland	C Cell	Hyperplasia	Mild
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ANIMAL NUM: 345	TMT: 4	SEX: Female	DAY ON TEST: 731
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54781

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------------|------------------------|
| * Adrenal Cortex | | Degeneration | Moderate |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Heart | | Thrombosis | Moderate |
| | [Thrombosis TGLs = 5-6] | | |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Mild |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 6-14] | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-6] | | |
| * Lung | | Cyst | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Marked |
| | | Leukemia Mononuclear | |
| | | Metaplasia | Squamous, Mild |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 4-15] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

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

Lab: BNW

ANIMAL NUM:	345	TMT:	4	SEX:	Female	DAY ON TEST:	731
		DOSE:	1.25 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54781

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Olfactory Epi Turbinat Respirat Epith	Atrophy Atrophy Hyperplasia Inflammation	Minimal Minimal Minimal Chronic Active, Moderate
* Pituitary Gland	Olfactory Epi Respirat Epith	Necrosis Necrosis	Mild Mild
[Hyperplasia	Pars Distalis TGLs = 2-10]	Hyperplasia	Moderate
* Spleen		Leukemia Mononuclear	
* Thyroid Gland	C Cell	Hyperplasia	Marked

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 346	TMT: 4	SEX: Female	DAY ON TEST: 578
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54782

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|----------------------------------|------------------------------------|
| * Brain | [Carcinoma TGLs = 4-1] | Carcinoma | Metastatic (Pituitary Gland) |
| * Clitoral Gland | | Hyperplasia | Marked |
| * Eye | | Cataract
Metaplasia | Minimal
Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus
Regeneration | Minimal |
| * Lung | Alveolus
[Inflammation TGLs = 2-4, 5] | Inflammation
Proteinosis | Chronic Active, Moderate
Mild |
| * Mammary Gland | [Carcinoma TGLs = 1-14, 15] | Carcinoma | |
| * Nose | Turbinate | Atrophy
Inflammation | Minimal
Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis
[Carcinoma TGLs = 3-10] | Carcinoma | |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	346	TMT:	4	SEX:	Female	DAY ON TEST:	578
		DOSE:	1.25 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54782

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Carcinoma
CONTRIBUTORY CAUSE OF DEATH - Brain Carcinoma Pituitary Gland

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 347	TMT: 4	SEX: Female	DAY ON TEST: 709
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54783

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|----------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Heart | | Thrombosis | Moderate |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Mild |
| * Liver | | Fatty Change | Mild |
| | [Fatty Change TGLs = 4-6] | | |
| * Lung | | Alveolar Epith | Minimal |
| | | Bronchiole | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Minimal |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Mammary Gland | | Carcinoma | |
| | [Carcinoma TGLs = 3-14] | | |
| * Nose | | Respirat Epith | Minimal |
| * Ovary | | Necrosis | Mild |
| * Pituitary Gland | | Pars Distalis | |
| | [Adenoma TGLs = 2-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Mild |
| | | Ulcer | Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 347	TMT: 4	SEX: Female	DAY ON TEST: 709
	DOSE: 1.25 mg/m3	DISP: Natural Death	HISTO: 54783

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Glandular [Ulcer TGLs = 5-10]	Ulcer	Mild
---	-------	------

PRIMARY CAUSE OF DEATH - Heart Thrombosis

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 348	TMT: 4	SEX: Female	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54784

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Brain | | Compression | Minimal |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Fatty Change | Mild |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 3-14] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Foreign Body | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 1-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 349	TMT: 4	SEX: Female	DAY ON TEST: 684
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54785

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Eye |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Spleen | * Thymus | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|---------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Brain | | Compression | Mild |
| * Clitoral Gland | | Inflammation | Chronic Active, Minimal |
| Ear | | Inflammation | Chronic Active, Mild |
| * Kidney | [Nephropathy TGLs = 2-7] | Nephropathy | Marked |
| * Liver | | Fatty Change | Moderate |
| * Lung | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Skin | | Cyst Epithelial Inclusion | Mild |
| | [Cyst Epithelial Inclusion TGLs = 6-15] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 349	TMT: 4	SEX: Female	DAY ON TEST: 684
	DOSE: 1.25 mg/m3	DISP: Moribund Sacrifice	HISTO: 54785

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach	Hyperplasia	Squamous, Moderate
* Stomach, Glandular	Ulcer	Minimal
[Ulcer TGLs = 5-14]		
* Thyroid Gland	C Cell	Adenoma

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 350	TMT: 4	SEX: Female	DAY ON TEST: 730
	DOSE: 1.25 mg/m3	DISP: Terminal Sacrifice	HISTO: 54786

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|---|---|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Moderate |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Moderate |
| * Eye | | Cataract | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| * Lung | [Leukemia Mononuclear TGLs = 4-6]
Alveolar Epith | Hyperplasia
Inflammation
Leukemia Mononuclear | Mild
Chronic Active, Moderate |
| * Lung | Alveolus
[Leukemia Mononuclear TGLs = 1-4, 5] | Proteinosis | Minimal |
| * Nose | Olfactory Epi
Turbinata
Respirat Epith | Atrophy
Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Minimal
Chronic Active, Minimal |
| * Ovary | | Leukemia Mononuclear | |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma
Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 350 TMT: 4
DOSE: 1.25 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54786

ORGAN AND ACCOUNTABLE SITE STATUS

<p>* Spleen</p> <p>[Adenoma TGLs = 6-10]</p> <p>[Fibrosis TGLs = 3-14]</p> <p>[Leukemia Mononuclear TGLs = 2-14]</p> <p>* Urinary Bladder</p> <p>* Uterus</p> <p>[Polyp Stromal TGLs = 5-10]</p>	<p>Fibrosis</p> <p>Leukemia Mononuclear</p> <p>Leukemia Mononuclear</p> <p>Leukemia Mononuclear</p> <p>Polyp Stromal</p>	<p>Minimal</p>
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TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 501	TMT: 6	SEX: Female	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54637

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|-------------------|---------------------------------|--------------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus
Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia | Moderate |
| | | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Nose | Olfactory Epi
Respirat Epith | Atrophy | Minimal |
| | | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Ovary | | Cyst | Mild |
| | [Cyst TGLs = 2-9] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Uterus | Endometrium | Hyperplasia | Cystic, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 502	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54638

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

OBSERVATIONS

- | | | | |
|-------------------|----------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Foreign Body Inflammation | Mild
Mild |
| * Liver | | Basophilic Focus | |
| | [Basophilic Focus TGLs = 3-14] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia | Marked |
| | Alveolus | Hyperplasia | Mild |
| | [Inflammation TGLs = 4-4, 5] | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 2-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 503	TMT: 6	SEX: Female	DAY ON TEST: 677
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54639

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Bronchial |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|--------------------------|---|---|---|
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Larynx | | Foreign Body
Inflammation
Metaplasia | Mild
Mild
Squamous, Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Minimal
Moderate
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Lymph Node, Mandibular | | Ectasia | Mild |
| | [Ectasia TGLs = 1-9] | | |
| * Nose | Respirat Epith | Corpora Amylacea
Hyperplasia
Inflammation | Minimal
Minimal
Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| Tongue | | Squamous Cell Carcinoma | |
| | [Squamous Cell Carcinoma TGLs = 2-14] | | |

PRIMARY CAUSE OF DEATH - Tongue Squamous Cell Carcinoma

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 504	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54640

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | |
|------------------|---------------------------------|--------------------------|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Brain | Compression | Mild |
| * Eye | Cataract | Marked |
| | Metaplasia | Osseous, Minimal |
| | [Cataract TGLs = 1-13] | |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | |
| * Larynx | Inflammation | Mild |
| * Liver | Basophilic Focus | |
| | Mixed Cell Focus | |
| | [Basophilic Focus TGLs = 4-6] | |
| * Lung | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Mild |
| | Hyperplasia | Chronic Active, Moderate |
| | Inflammation | Moderate |
| | Alveolus | |
| | Proteinosis | |
| | [Inflammation TGLs = 8-4, 5] | |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-16] | |
| Mesentery | Fat | Minimal |
| | [Necrosis TGLs = 6-15] | |
| * Nose | Olfactory Epi | Minimal |
| | Atrophy | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	504	TMT:	6	SEX:	Female	DAY ON TEST:	731
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54640

ORGAN AND ACCOUNTABLE SITE STATUS

	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Minimal
* Ovary		Cyst	Moderate
	[Cyst TGLs = 7-9]		
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Spleen		Fibrosis	Minimal
		Hematopoietic Cell Proliferation	Minimal
	[Fibrosis TGLs = 9-14]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 505	TMT: 6	SEX: Female	DAY ON TEST: 690
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54641

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Pancreas | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

AUTO PRECLUDES DIAG.

- | | |
|--------------------------|----------------------------|
| * Intestine Small, Ileum | * Intestine Small, Jejunum |
|--------------------------|----------------------------|

INSUFFICIENT TISSUE

- * Nose

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 3-7] | | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Harderian Gland | | Hyperplasia | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Fatty Change | Mild |
| | [Fatty Change TGLs = 4-15] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5, 14] | | |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	505	TMT:	6	SEX:	Female	DAY ON TEST:	690
		DOSE:	2.5 mg/m3	DISP:	Natural Death	HISTO:	54641

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland	C Cell	Hyperplasia	Minimal
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PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 506	TMT: 6	SEX: Female	DAY ON TEST: 687
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54642

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|-------------------|--|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 1-7] | | |
| * Brain | | Compression | Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Marked |
| | [Nephropathy TGLs = 2-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | | Necrosis | Mild |
| | [Hepatodiaphragmatic Nodule TGLs = 5-14] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Metaplasia | Respiratory, Mild |
| | Olfactory Epi | | |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 507	TMT: 6	SEX: Female	DAY ON TEST: 732
DOSE: 2.5 mg/m3		DISP: Terminal Sacrifice	HISTO: 54643

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Clitoral Gland | | Adenoma | |
| | [Adenoma TGLs = 1-16] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Regeneration | Moderate |
| | [Regeneration TGLs = 5-14] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | | Alveolar/Bronchiolar Carcinoma | |
| | | Alveolar Epith | Marked |
| | | Bronchiole | Mild |
| | | Hyperplasia | Chronic Active, Moderate |
| | | Inflammation | Moderate |
| | | Proteinosis | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | | Olfactory Epi | Minimal |
| | | Turbinate | Minimal |
| | | Respirat Epith | Minimal |
| * Pancreas | | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	507	TMT:	6	SEX:	Female	DAY ON TEST:	732
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54643

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Adenoma
	[Adenoma TGLs = 6-10]	
* Uterus		Polyp Stromal
	[Polyp Stromal TGLs = 4-10]	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 508	TMT: 6	SEX: Female	DAY ON TEST: 715
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54644

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|--------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

AUTO PRECLUDES DIAG.

- * Intestine Small, Jejunum

OBSERVATIONS

- | | | |
|-------------------------------------|--|--|
| * Adrenal Cortex | Hyperplasia | Minimal |
| * Adrenal Medulla | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| * Brain | Compression | Mild |
| * Eye | Metaplasia | Osseous, Minimal |
| * Heart | Cardiomyopathy
Thrombosis | Minimal
Mild |
| * Kidney | Nephropathy | Mild |
| * Liver | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 2-6] | | |
| * Lung | Alveolar/Bronchiolar Adenoma
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Mild
Chronic Active, Moderate
Moderate |
| Alveolus | | |
| [Inflammation TGLs = 3-4, 5] | | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Mammary Gland | Fibroadenoma | |
| [Fibroadenoma TGLs = 5-15] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	508	TMT:	6	SEX:	Female	DAY ON TEST:	715
		DOSE:	2.5 mg/m3	DISP:	Natural Death	HISTO:	54644

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Olfactory Epi Respirat Epith	Atrophy Hyperplasia Inflammation Necrosis	Minimal Minimal Chronic Active, Marked Minimal
* Pituitary Gland	Respirat Epith Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 4-10]		
* Spleen	[Leukemia Mononuclear TGLs = 1-14]	Leukemia Mononuclear	
* Stomach, Glandular		Thrombosis	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 509	TMT: 6	SEX: Female	DAY ON TEST: 633
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54645

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | | |
|-------------------------|-------------------------------------|---|--|
| * Adrenal Cortex | | Degeneration
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear
Pheochromocytoma Benign | |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | Bronchiole
Alveolar Epith | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Minimal
Minimal
Chronic Active, Moderate |
| | Alveolus | | Minimal |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-3] | | |
| * Mammary Gland | | Galactocele | Minimal |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia
Inflammation
Metaplasia | Minimal
Minimal
Chronic Active, Minimal
Respiratory, Mild |
| | Olfactory Epi | | |
| * Ovary | | Inflammation | Suppurative, Moderate |
| | [Inflammation TGLs = 6-9] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	509	TMT:	6	SEX:	Female	DAY ON TEST:	633
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54645

ORGAN AND ACCOUNTABLE SITE STATUS

	[Adenoma TGLs = 3-10]	
* Spleen		Leukemia Mononuclear
	[Leukemia Mononuclear TGLs = 5-14]	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 510	TMT: 6	SEX: Female	DAY ON TEST: 688
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54646

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|-------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Islets, Pancreatic | * Liver | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

AUTO PRECLUDES DIAG.

- | | | | |
|----------------------------|--------------------------|--------------------------|--------------------------|
| * Eye | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | | | |

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|----------------|----------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Brain | | Compression | Moderate |
| | | Necrosis | Moderate |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Larynx | | Inflammation | Minimal |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 3-15, 6-16] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Ovary | | Cyst | Moderate |
| | [Cyst TGLs = 4-9] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 510	TMT: 6	SEX: Female	DAY ON TEST: 688
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54646

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen [Leukemia Mononuclear TGLs = 5-14] Leukemia Mononuclear

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 511	TMT: 6	SEX: Female	DAY ON TEST: 291
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54647

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|----------------|--------------------------|
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Fatty Change | Moderate |
| * Lung | Bronchiole | Hyperplasia | Minimal |
| | Alveolus | Inflammation | Chronic Active, Mild |
| | | Proteinosis | Mild |
| | [Inflammation TGLs = 3-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 5-7] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Marked |
| | | Inflammation | Chronic Active, Moderate |
| | [Hyperplasia TGLs = 6-10] | | |

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 512	TMT: 6	SEX: Female	DAY ON TEST: 587
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54648

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---------------------------------|------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Brain | | Compression | Mild |
| * Eye | | Cataract | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Necrosis | Mild |
| | [Basophilic Focus TGLs = 3-6] | | |
| | [Necrosis TGLs = 3-15] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	512	TMT:	6	SEX:	Female	DAY ON TEST:	587
		DOSE:	2.5 mg/m3	DISP:	Natural Death	HISTO:	54648

ORGAN AND ACCOUNTABLE SITE STATUS

* Uterus [Adenoma TGLs = 4-10] Polyp Stromal
[Polyp Stromal TGLs = 2-14]

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 513	TMT: 6	SEX: Female	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54649

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Clitoral Gland | | Adenoma | |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Salivary Glands | | Atrophy | Minimal |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 514	TMT: 6	SEX: Female	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54650

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|-------------------|----------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | [Glioma Malignant TGLs = 3-14] | Glioma Malignant | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Moderate
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | Alveolus | Galactocele | Mild |
| | [Galactocele TGLs = 1-15] | | |
| * Nose | Respirat Epith | Hyperplasia
Inflammation | Minimal
Chronic Active, Minimal |
| * Pancreas | Acinus | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| * Thyroid Gland | Bilateral, C Cell | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 515	TMT: 6	SEX: Female	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54651

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Clitoral Gland | | Adenoma | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Adenoma | Tubular |
| | [Fibroadenoma TGLs = 2-14] | Fibroadenoma | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 516	TMT: 6	SEX: Female	DAY ON TEST: 709
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54652

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|--------------------------|--|----------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Marked |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 3-16, 4-15] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | | Mixed Cell Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 6-14] | | |
| | [Mixed Cell Focus TGLs = 5-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Minimal |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	516	TMT:	6	SEX:	Female	DAY ON TEST:	709
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54652

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 517	TMT: 6	SEX: Female	DAY ON TEST: 632
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54653

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|---------------------------|
| * Adrenal Medulla | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- * Pituitary Gland

OBSERVATIONS

- | | | | |
|----------------------------|--|-------------------------------|--------------------------|
| * Adrenal Cortex | | Atrophy | Marked |
| * Bone | Femur | Hyperostosis | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Intestine Small, Jejunum | | Hemorrhage | Moderate |
| | | Inflammation | Suppurative, Marked |
| | | Necrosis | Moderate |
| | [Inflammation TGLs = 4-15] | | |
| * Kidney | | Nephropathy | Mild |
| * Liver | [Hepatodiaphragmatic Nodule TGLs = 2-14] | Hepatodiaphragmatic Nodule | |
| * Lung | Bronchiole | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinat | Hyperostosis | Mild |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Respiratory, Minimal |
| * Uterus | | Polyp Stromal | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 517 TMT: 6
DOSE: 2.5 mg/m3

SEX: Female
DISP: Moribund Sacrifice

DAY ON TEST: 632
HISTO: 54653

ORGAN AND ACCOUNTABLE SITE STATUS

[Polyp Stromal TGLs = 3-10]

PRIMARY CAUSE OF DEATH - Intestine Small, Jejunum Necrosis

ANIMAL NUM: 518	TMT: 6	SEX: Female	DAY ON TEST: 523
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54654

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|--------------------------|---|---|------------------------------------|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Marked |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-7] | | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | Alveolar Epith | Hyperplasia
Inflammation
Leukemia Mononuclear | Marked
Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| Lymph Node | Renal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-9, 8-7] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| * Nose | Olfactory Epi
Turbinat
Respirat Epith | Atrophy
Atrophy
Hyperplasia | Minimal
Minimal
Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia
Leukemia Mononuclear | Minimal |
| | [Hyperplasia TGLs = 6-10] | | |
| * Spleen | | Fibrosis | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	518	TMT:	6	SEX:	Female	DAY ON TEST:	523
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54654

ORGAN AND ACCOUNTABLE SITE STATUS

Leukemia Mononuclear

[Fibrosis TGLs = 3-14]

[Leukemia Mononuclear TGLs = 2-14]

* Uterus

Leukemia Mononuclear

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 519	TMT: 6	SEX: Female	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54655

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Mild |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 520	TMT: 6	SEX: Female	DAY ON TEST: 702
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54656

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Pancreas | * Pituitary Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|--------------------------|--------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Kidney | | Mineralization | Minimal |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Alveolar Epith | Alveolar/Bronchiolar Carcinoma | |
| | | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Spleen | | Fibrosis | Mild |
| | [Fibrosis TGLs = 3-15, 4-16] | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	520	TMT:	6	SEX:	Female	DAY ON TEST:	702
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54656

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 521	TMT: 6	SEX: Female	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54657

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone Marrow | * Brain | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| | | Pheochromocytoma Benign | |
| * Bone | Femur | Hyperostosis | Moderate |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-14] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-15] | | |
| * Nose | Turbinate | Hyperostosis | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Skin | | Trichoepithelioma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	521	TMT:	6	SEX:	Female	DAY ON TEST:	730
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54657

ORGAN AND ACCOUNTABLE SITE STATUS

[Trichoepithelioma TGLs = 1-16]

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 522	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54658

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|-------------------|---|---|--|
| * Adrenal Cortex | | Leukemia Mononuclear
Necrosis | Moderate |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Moderate
Minimal
Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear
Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | Olfactory Epi
Turbinates
Respirat Epith | Atrophy
Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Minimal
Chronic Active, Minimal |
| * Ovary | | Cyst | Mild |
| | [Cyst TGLs = 4-9] | | |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 522 TMT: 6
DOSE: 2.5 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54658

ORGAN AND ACCOUNTABLE SITE STATUS

<p>[Adenoma TGLs = 2-10]</p> <p>* Spleen</p> <p>[Hemorrhage TGLs = 5-14]</p> <p>* Thyroid Gland C Cell</p> <p>[Carcinoma TGLs = 1-3]</p>	<p>Hemorrhage</p> <p>Leukemia Mononuclear</p> <p>Carcinoma</p>	<p>Mild</p>
--	--	-------------

ANIMAL NUM: 523	TMT: 6	SEX: Female	DAY ON TEST: 661
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54659

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|---|--|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear
Pheochromocytoma Benign | Marked |
| * Eye | | Cataract | Minimal |
| * Heart | | Cardiomyopathy
Leukemia Mononuclear
Schwannoma Malignant | Minimal |
| * Kidney | [Schwannoma Malignant TGLs = 4-7] | Nephropathy | Minimal |
| * Larynx | | Inflammation | Mild |
| * Liver | | Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| * Lung | [Hepatodiaphragmatic Nodule TGLs = 6-15]
[Leukemia Mononuclear TGLs = 5-6] | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Mild
Minimal
Chronic Active, Moderate
Minimal |
| | [Inflammation TGLs = 3-4, 5] | Alveolar Epith
Bronchiole | |
| Lymph Node | Lumbar, Pancreatic, Renal | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 523	TMT: 6	SEX: Female	DAY ON TEST: 661
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54659

ORGAN AND ACCOUNTABLE SITE STATUS

[Leukemia Mononuclear	TGLs = 9-15, 10-7, 11-9]		
* Lymph Node, Mediastinal		Leukemia Mononuclear	
[Leukemia Mononuclear	TGLs = 1-14]		
* Lymph Node, Mesenteric		Leukemia Mononuclear	
[Leukemia Mononuclear	TGLs = 12-8]		
* Mammary Gland		Hyperplasia	Minimal
* Nose	Turbinate	Atrophy	Minimal
		Corpora Amylacea	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Mild
	Olfactory Epi	Metaplasia	Respiratory, Mild
* Ovary		Leukemia Mononuclear	
* Pancreas		Leukemia Mononuclear	
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
[Hyperplasia	TGLs = 2-10]		
* Spleen		Fibrosis	Minimal
		Leukemia Mononuclear	
[Fibrosis	TGLs = 8-15]		
[Leukemia Mononuclear	TGLs = 7-15]		
* Thymus		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 524	TMT: 6	SEX: Female	DAY ON TEST: 618
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54660

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Kidney | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|---------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14, 15; 2-17] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | [Thrombosis TGLs = 5-6] | Thrombosis | Moderate |
| * Larynx | | Foreign Body Inflammation | Mild |
| | | | Mild |
| * Liver | | Fatty Change | Moderate |
| | [Fatty Change TGLs = 6-6] | | |
| * Lung | | Hyperplasia | Mild |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Mild |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 524	TMT: 6	SEX: Female	DAY ON TEST: 618
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54660

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Spleen		Hematopoietic Cell Proliferation	Mild

PRIMARY CAUSE OF DEATH - Heart Thrombosis
 CONTRIBUTORY CAUSE OF DEATH - Clitoral Gland Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 525	TMT: 6	SEX: Female	DAY ON TEST: 730
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54661

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|---|--|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Clitoral Gland | | Adenoma | |
| | [Adenoma TGLs = 2-14] | | |
| * Eye | | Cataract | Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation | Mild
Moderate
Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| * Nose | Olfactory Epi
Turbinate
Respirat Epith | Atrophy
Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Minimal
Chronic Active, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-16] | | |

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 526	TMT: 6	SEX: Female	DAY ON TEST: 591
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54662

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------------|-------------------------|--------------------------|
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Cataract | Moderate |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-6] | | |
| * Lung | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Minimal |
| * Mammary Gland | | Galactocele | Moderate |
| | [Galactocele TGLs = 8-15] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 6-14] | | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinates | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Spleen | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-14] | | |
| * Uterus | Endometrium | Carcinoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	526	TMT:	6	SEX:	Female	DAY ON TEST:	591
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54662

ORGAN AND ACCOUNTABLE SITE STATUS

[Carcinoma TGLs = 4-10]

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 527	TMT: 6	SEX: Female	DAY ON TEST: 590
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54663

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear
Regeneration | Mild |
| | [Leukemia Mononuclear TGLs = 3-6, 15] | | |
| | [Regeneration TGLs = 4-15, 5-15] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Minimal
Minimal
Chronic Active, Moderate
Mild |
| | Alveolus | | |
| | [Inflammation TGLs = 1-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 6-16] | | |
| * Nose | Olfactory Epi
Respirat Epith | Accumulation, Hyaline Droplet
Atrophy
Hyperplasia | Minimal
Minimal
Minimal |
| * Ovary | | Cyst | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 527	TMT: 6	SEX: Female	DAY ON TEST: 590
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54663

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
* Spleen	[Leukemia Mononuclear TGLs = 2-14]	Leukemia Mononuclear	
* Stomach, Glandular		Erosion	Mild

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 528	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54664

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|----------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 2-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Mammary Gland | | Galactocele | Moderate |
| | [Galactocele TGLs = 4-14] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	528	TMT:	6	SEX:	Female	DAY ON TEST:	731
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54664

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	Leukemia Mononuclear	
* Stomach, Forestomach	Erosion	Mild

ANIMAL NUM:	529	TMT:	6	SEX:	Female	DAY ON TEST:	541
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54665

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Heart | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Skin | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|------------------------|--|---|---|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Kidney | Renal Tubule | Necrosis
Nephropathy | Moderate
Mild |
| | [Necrosis TGLs = 5-7] | | |
| * Lung | Bronchiole
Alveolar Epith | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Minimal
Mild
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| Lymph Node | Renal | Ectasia | Minimal |
| | [Ectasia TGLs = 8-7] | | |
| * Nose | Olfactory Epi
Turbinate
Respirat Epith | Atrophy
Atrophy
Hyperplasia | Minimal
Minimal
Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Salivary Glands | | Inflammation | Chronic Active, Moderate |
| * Spleen | | Hemorrhage
Leukemia Mononuclear | Mild |
| | [Hemorrhage TGLs = 4-14] | | |
| | [Leukemia Mononuclear TGLs = 3-14] | | |
| * Stomach, Forestomach | | Ulcer | Minimal |
| * Stomach, Glandular | | Ulcer | Moderate |
| | [Ulcer TGLs = 9-15] | | |
| * Uterus | | Polyp Stromal | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	529	TMT:	6	SEX:	Female	DAY ON TEST:	541
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54665

ORGAN AND ACCOUNTABLE SITE STATUS

[Polyp Stromal TGLs = 1-10]

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 530	TMT: 6	SEX: Female	DAY ON TEST: 589
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54666

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | |
|---|----------------------------|--------------------------|
| * Adrenal Cortex | Leukemia Mononuclear | |
| * Adrenal Medulla | Hyperplasia | Mild |
| | Leukemia Mononuclear | |
| * Eye | Cataract | Moderate |
| [Cataract TGLs = 5-13] | | |
| * Heart | Leukemia Mononuclear | |
| * Kidney | Leukemia Mononuclear | |
| | Nephropathy | Minimal |
| * Larynx | Foreign Body | Minimal |
| | Inflammation | Mild |
| * Liver | Hepatodiaphragmatic Nodule | |
| | Leukemia Mononuclear | |
| [Hepatodiaphragmatic Nodule TGLs = 9-18, 10-14] | | |
| * Lung | Hyperplasia | Mild |
| | Inflammation | Chronic Active, Moderate |
| | Leukemia Mononuclear | |
| | Proteinosis | Moderate |
| [Inflammation TGLs = 4-4, 5] | | |
| Lymph Node Iliac, Pancreatic, Renal | Leukemia Mononuclear | |
| [Leukemia Mononuclear TGLs = 6-15, 7-16, 8-17] | | |
| * Lymph Node, Bronchial | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	530	TMT:	6	SEX:	Female	DAY ON TEST:	589
		DOSE:	2.5 mg/m3	DISP:	Natural Death	HISTO:	54666

ORGAN AND ACCOUNTABLE SITE STATUS

[Leukemia Mononuclear TGLs = 2-3]

* Nose	Olfactory Epi Turbinata Respirat Epith	Atrophy Atrophy Hyperplasia	Minimal Minimal Minimal
* Ovary		Leukemia Mononuclear	
* Pituitary Gland	Pars Distalis	Hyperplasia Leukemia Mononuclear	Mild
* Spleen		Leukemia Mononuclear	
* Thymus		Leukemia Mononuclear	
* Urinary Bladder		Leukemia Mononuclear	
* Uterus		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 531	TMT: 6	SEX: Female	DAY ON TEST: 654
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54667

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Salivary Glands | * Skin |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | | |
|-------------------------|---------------------|-----------------|
| * Lymph Node, Bronchial | * Parathyroid Gland | * Thyroid Gland |
|-------------------------|---------------------|-----------------|

OBSERVATIONS

- | | | |
|-------------------|--|--------------------------|
| * Adrenal Medulla | Hyperplasia | Marked |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Leukemia Mononuclear | |
| * Liver | Basophilic Focus | |
| | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | |
| * Lung | Bronchiole | Moderate |
| | Alveolar Epith | Moderate |
| | Alveolus | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Moderate |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15; 7-17] | |
| * Nose | Corpora Amylacea | Minimal |
| | Hyperplasia | Minimal |
| | Olfactory Epi | Respiratory, Minimal |
| * Ovary | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-9] | |
| * Pancreas | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | |
| | [Adenoma TGLs = 3-10] | |
| | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	531	TMT:	6	SEX:	Female	DAY ON TEST:	654
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54667

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	Hematopoietic Cell Proliferation Leukemia Mononuclear	Mild
* Stomach, Forestomach [Hyperplasia TGLs = 5-10]	Edema Hyperplasia	Moderate Squamous, Mild

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 532	TMT: 6	SEX: Female	DAY ON TEST: 117
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54668

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Clitoral Gland | * Esophagus | * Eye | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Mammary Gland | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|---------------------------|--|-------------------------|
| * Brain | Leukemia Mononuclear | |
| * Harderian Gland | Leukemia Mononuclear | |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Leukemia Mononuclear | |
| * Larynx | Leukemia Mononuclear | |
| * Liver | Hepatodiaphragmatic Nodule | |
| | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 9-7] | |
| * Lung | Alveolar Epith | Minimal |
| | Hyperplasia | Chronic Active, Minimal |
| | Inflammation | |
| | Leukemia Mononuclear | |
| | Alveolus | Minimal |
| | [Inflammation TGLs = 1-4, 5] | |
| Lymph Node | Iliac, Pancreatic, Renal | |
| | [Leukemia Mononuclear TGLs = 3-14, 5-15, 6-16] | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 2-9] | |
| * Lymph Node, Mediastinal | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-8] | |
| * Nose | Olfactory Epi | Minimal |
| | Turbinate | Minimal |
| | Atrophy | |
| | Atrophy | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 532	TMT: 6	SEX: Female	DAY ON TEST: 117
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54668

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi	Leukemia Mononuclear Metaplasia	Respiratory, Minimal
* Ovary		Leukemia Mononuclear	
* Pancreas		Leukemia Mononuclear	
* Pituitary Gland		Leukemia Mononuclear	
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-14]		
* Thymus		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 8-3]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 533	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54669

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Liver | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-9] | | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Lung | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 4-14] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Thyroid Gland | Follicular Cel | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 534	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54670

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | |
|------------------|-------------------------|
| * Clitoral Gland | * Lymph Node, Bronchial |
|------------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Marked
Mild
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Olfactory Epi
Turbinates
Respirat Epith | Atrophy
Atrophy
Hyperplasia | Minimal
Minimal
Minimal |
| * Ovary | [Granulosa Cell Tumor Malignant TGLs = 3-14] | Granulosa Cell Tumor Malignant | |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |
| * Thyroid Gland | Bilateral, C Cell | Adenoma | |
| | [Adenoma TGLs = 1-3] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 535	TMT: 6	SEX: Female	DAY ON TEST: 593
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54671

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--|--|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear | Minimal
Mild
Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15, 16] | | |
| * Nose | Olfactory Epi
Turbinata
Respirat Epith | Atrophy
Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Minimal
Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	535	TMT:	6	SEX:	Female	DAY ON TEST:	593
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54671

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 5-6]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 536	TMT: 6	SEX: Female	DAY ON TEST: 605
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54672

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Mammary Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Parathyroid Gland

OBSERVATIONS

- | | | | |
|--------------------------|--|--|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Eye | | Cataract
Metaplasia | Minimal
Osseous, Minimal |
| * Heart | | Cardiomyopathy
Leukemia Mononuclear | Minimal |
| * Kidney | | Leukemia Mononuclear
Nephropathy | Mild |
| * Larynx | | Inflammation | Mild |
| * Liver | | Leukemia Mononuclear
Regeneration | Mild |
| | [Leukemia Mononuclear TGLs = 5-6]
[Regeneration TGLs = 8-7] | | |
| * Lung | Alveolar Epith | Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Moderate
Chronic Active, Moderate
Moderate |
| | Alveolus
[Inflammation TGLs = 1-4, 5] | | |
| Lymph Node | Renal
[Leukemia Mononuclear TGLs = 9-7] | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 536	TMT: 6	SEX: Female	DAY ON TEST: 605
	DOSE: 2.5 mg/m3	DISP: Natural Death	HISTO: 54672

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mediastinal		Leukemia Mononuclear	
* Lymph Node, Mesenteric		Leukemia Mononuclear	
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Minimal
	Olfactory Epi	Metaplasia	Respiratory, Minimal
* Ovary		Leukemia Mononuclear	
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
	[Hyperplasia TGLs = 6-10]		
* Spleen		Hemorrhage	Moderate
		Leukemia Mononuclear	
	[Hemorrhage TGLs = 3-14, 4-14]		
	[Leukemia Mononuclear TGLs = 2-14]		
* Thymus		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 537	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54673

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone Marrow | * Clitoral Gland | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|---|--|
| * Adrenal Cortex | | Degeneration
Hyperplasia | Mild
Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 7-7] | | |
| * Bone | Femur | Hyperostosis | Moderate |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Mild |
| | [Nephropathy TGLs = 8-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear
Regeneration | Moderate |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| | [Regeneration TGLs = 6-14] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Mild
Chronic Active, Marked
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 4-4, 5] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	537	TMT:	6	SEX:	Female	DAY ON TEST:	732
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54673

ORGAN AND ACCOUNTABLE SITE STATUS

Mesentery	Fat	Necrosis	Minimal
[Necrosis	TGLs = 2-15]		
* Nose	Olfactory Epi	Atrophy	Minimal
	Turbinate	Hyperostosis	Minimal
	Respirat Epith	Hyperplasia	Minimal
		Inflammation	Chronic Active, Mild
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Moderate
[Hyperplasia	TGLs = 1-10]		
* Spleen		Leukemia Mononuclear	
[Leukemia Mononuclear	TGLs = 3-16]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

ANIMAL NUM: 538	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54674

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|-------------------|---|--|--|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear
Pheochromocytoma Benign | |
| * Eye | | Cataract
Metaplasia | Mild
Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Mild |
| * Liver | | Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 1-14]
[Leukemia Mononuclear TGLs = 2-6] | | |
| * Lung | Alveolar Epith | Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Mild
Chronic Active, Moderate

Moderate |
| | Alveolus
[Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | [Fibroadenoma TGLs = 4-15] | Fibroadenoma | |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia | Minimal
Minimal |
| * Ovary | | Leukemia Mononuclear | |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 538 TMT: 6
DOSE: 2.5 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54674

ORGAN AND ACCOUNTABLE SITE STATUS

[Hyperplasia TGLs = 5-10]

* Spleen

Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 539	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54675

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Spleen | * Stomach, Glandular | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Thymus

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Moderate |
| * Clitoral Gland | | Adenoma | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Cyst | Minimal |
| | | Fatty Change | Mild |
| | | Hepatodiaphragmatic Nodule | |
| | [Cyst TGLs = 4-6] | | |
| | [Hepatodiaphragmatic Nodule TGLs = 5-15, 6-16] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | | Cyst | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Marked |
| | | Metaplasia | Squamous, Marked |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | Respirat Epith | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 539	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54675

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Olfactory Epi Pars Distalis	Metaplasia Adenoma	Respiratory, Minimal
[Adenoma TGLs = 7-10]			
* Skin		Keratoacanthoma	
[Keratoacanthoma TGLs = 8-17]			
* Stomach, Forestomach		Ulcer	Marked
[Ulcer TGLs = 9-18]			
* Thyroid Gland	C Cell	Hyperplasia	Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 540	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54676

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

MISSING

- | | |
|------------------|-------------------------|
| * Clitoral Gland | * Lymph Node, Bronchial |
|------------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Moderate
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 6-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-16, 3-17] | | |
| * Nose | Olfactory Epi
Respirat Epith | Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Chronic Active, Minimal |
| * Ovary | | Cyst | Mild |
| | [Cyst TGLs = 4-9, 5-9] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 1-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 540	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54676

ORGAN AND ACCOUNTABLE SITE STATUS

* Uterus

[Polyp Stromal TGLs = 8-10]
[Thrombosis TGLs = 7-14]

Polyp Stromal
Thrombosis

Marked

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 541	TMT: 6	SEX: Female	DAY ON TEST: 628
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54677

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone Marrow | * Brain | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Pituitary Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|--|---|---|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Mild |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Marked |
| * Bone | Femur | Hyperostosis | Moderate |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear
Regeneration | Mild |
| | [Regeneration TGLs = 10-20] | | |
| * Lung | Alveolar Epith | Hyperplasia
Inflammation
Leukemia Mononuclear | Mild
Chronic Active, Moderate |
| | [Leukemia Mononuclear TGLs = 1-14, 2-5, 3-4, 4-16, 5-4, 5, 15, 16] | | |
| Lymph Node | Deep Cervical, Lumbar | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-18, 8-19] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 9-8] | | |
| * Nose | Turbinates
Respirat Epith
Olfactory Epi | Hyperostosis
Hyperplasia
Metaplasia | Mild
Minimal
Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 541	TMT: 6	SEX: Female	DAY ON TEST: 628
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54677

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 6-17]		
Tooth	Inflammation	Chronic Active, Moderate
* Urinary Bladder	Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 542	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54678

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Harderian Gland |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Salivary Glands | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|----------------------------------|--------------------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Brain | | Carcinoma
Compression | Metastatic (Pituitary Gland)
Mild |
| * Clitoral Gland | | Hyperplasia | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus
Fatty Change | Minimal |
| * Lung | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 3-4, 5] | Proteinosis | Moderate |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Carcinoma | |
| | [Carcinoma TGLs = 4-10] | | |
| * Skin | | Inflammation | Moderate |
| | [Inflammation TGLs = 1-14] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 542 TMT: 6
DOSE: 2.5 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 732
HISTO: 54678

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen		Leukemia Mononuclear	
Tooth		Inflammation	Chronic Active, Mild
* Uterus		Polyp Stromal	
	[Polyp Stromal TGLs = 2-10]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 543	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54679

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Pancreas |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | | |
|-------------|-------------------------|---------------------|
| * Esophagus | * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--|--------------------------|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Marked |
| * Clitoral Gland | | Adenoma | |
| | [Adenoma TGLs = 4-15] | | |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus
Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Olfactory Epi | Atrophy | Minimal |
| | Turbinates | Hyperplasia | Minimal |
| | Respirat Epith | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | | Hyperplasia | Moderate |
| | Pars Distalis | | |
| | [Hyperplasia TGLs = 3-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	543	TMT:	6	SEX:	Female	DAY ON TEST:	731
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54679

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	[Leukemia Mononuclear TGLs = 5-6]	Leukemia Mononuclear	
* Uterus		Inflammation	Chronic Active, Minimal

ANIMAL NUM: 544	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54680

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|---|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Mild |
| * Eye | | Cataract
Metaplasia | Mild
Osseous, Minimal |
| * Heart | Artery | Cardiomyopathy
Inflammation | Mild
Chronic Active, Moderate |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 5-6] | | |
| * Lung | Alveolar Epith
Bronchiole | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Multiple
Marked
Moderate
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-18; 3-15, 16, 17; 6-19; 7-20] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-14] | | |
| * Nose | Turbinate | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 544	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54680

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Hyperplasia Inflammation	Minimal Chronic Active, Minimal
* Pituitary Gland [Adenoma TGLs = 1-10]	Pars Distalis	Adenoma	
* Spleen		Leukemia Mononuclear	
* Thyroid Gland	C Cell	Hyperplasia	Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 545	TMT: 6	SEX: Female	DAY ON TEST: 590
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54681

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------------|---|--|
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Mild
Chronic Active, Mild
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15, 16] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-7] | | |
| * Nose | | Corpora Amylacea
Inflammation
Metaplasia | Minimal
Chronic Active, Minimal
Respiratory, Minimal |
| | Olfactory Epi | | |
| * Ovary | | Cyst | Moderate |
| | [Cyst TGLs = 3-9] | | |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |

PRIMARY CAUSE OF DEATH - Mammary Gland Fibroadenoma

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 545 TMT: 6
DOSE: 2.5 mg/m3

SEX: Female
DISP: Moribund Sacrifice

DAY ON TEST: 590
HISTO: 54681

ORGAN AND ACCOUNTABLE SITE STATUS

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 546	TMT: 6	SEX: Female	DAY ON TEST: 618
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54682

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|------------------------------------|--------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Eosinophilic Focus | |
| | | Fatty Change | Minimal |
| * Lung | [Eosinophilic Focus TGLs = 3-14] | | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 2-15] | | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |
| * Thyroid Gland | C Cell | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	546	TMT:	6	SEX:	Female	DAY ON TEST:	618
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54682

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 547	TMT: 6	SEX: Female	DAY ON TEST: 731
DOSE: 2.5 mg/m3		DISP: Terminal Sacrifice	HISTO: 54683

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | | Hyperplasia
Leukemia Mononuclear | Marked |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Moderate
Minimal
Chronic Active, Moderate |
| | Alveolus | | Minimal |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15] | | |
| * Nose | Turbinat
Respirat Epith | Atrophy
Hyperplasia
Inflammation
Metaplasia | Minimal
Minimal
Chronic Active, Minimal
Respiratory, Mild |
| | Olfactory Epi | | |
| * Ovary | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	547	TMT:	6	SEX:	Female	DAY ON TEST:	731
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54683

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Angiectasis	Mild
	Leukemia Mononuclear	
[Angiectasis TGLs = 6-10]		
* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 4-14]		
* Thyroid Gland	C Cell	Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 548	TMT: 6	SEX: Female	DAY ON TEST: 731
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54684

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|-------------------|--|--|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus
Eosinophilic Focus | |
| | [Eosinophilic Focus TGLs = 5-6] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma
Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Mild
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14] | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15, 16] | | |
| * Nose | Olfactory Epi
Respirat Epith | Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Chronic Active, Minimal |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	548	TMT:	6	SEX:	Female	DAY ON TEST:	731
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54684

ORGAN AND ACCOUNTABLE SITE STATUS

[Hyperplasia	TGLs = 4-10]		
* Thyroid Gland	C Cell	Hyperplasia	Marked

ANIMAL NUM: 549	TMT: 6	SEX: Female	DAY ON TEST: 695
	DOSE: 2.5 mg/m3	DISP: Moribund Sacrifice	HISTO: 54685

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone Marrow | * Brain | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|------------------|-------------------------|
| * Clitoral Gland | * Lymph Node, Bronchial |
|------------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| * Bone | Femur | Hyperostosis | Moderate |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Mild |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-15, 16, 17] | | |
| * Nose | Turbinate | Hyperostosis | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Mild |
| | [Hyperplasia TGLs = 3-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	549	TMT:	6	SEX:	Female	DAY ON TEST:	695
		DOSE:	2.5 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54685

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Mammary Gland Fibroadenoma

ANIMAL NUM: 550	TMT: 6	SEX: Female	DAY ON TEST: 732
	DOSE: 2.5 mg/m3	DISP: Terminal Sacrifice	HISTO: 54686

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|--------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Islets, Pancreatic | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Salivary Glands | * Stomach, Forestomach | * Stomach, Glandular | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- | | |
|-------------------------|----------|
| * Lymph Node, Bronchial | * Thymus |
|-------------------------|----------|

OBSERVATIONS

- | | | | |
|----------------------------|-------------------------------------|----------------------------|--------------------------|
| * Adrenal Cortex | | Degeneration | Moderate |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| * Eye | | Cataract | Marked |
| | [Cataract TGLs = 2-13] | Metaplasia | Osseous, Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Intestine Large, Cecum | | Hemorrhage | Minimal |
| | [Hemorrhage TGLs = 10-16] | | |
| * Intestine Small, Jejunum | | Congestion | Minimal |
| | [Congestion TGLs = 9-8] | | |
| * Kidney | | Nephropathy | Mild |
| | [Nephropathy TGLs = 7-7] | | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia | Marked |
| | | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 8-4, 5] | Proteinosis | Mild |
| * Nose | Olfactory Epi
Turbinates | Atrophy | Minimal |
| | | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	550	TMT:	6	SEX:	Female	DAY ON TEST:	732
		DOSE:	2.5 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54686

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Hyperplasia Inflammation	Minimal Chronic Active, Minimal
* Ovary		Leukemia Mononuclear	
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis [Adenoma TGLs = 3-10]	Adenoma	
* Skin	[Squamous Cell Papilloma TGLs = 1-15]	Squamous Cell Papilloma	
* Spleen	[Fibrosis TGLs = 5-14] [Leukemia Mononuclear TGLs = 4-14]	Fibrosis Leukemia Mononuclear	Minimal
* Thyroid Gland	C Cell C Cell	Adenoma Hyperplasia	Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 701	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54537

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|-------------------|--|--|------------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 6-7] | | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 5-7] | | |
| * Liver | | Basophilic Focus
Fatty Change
Hepatodiaphragmatic Nodule | Mild |
| | [Hepatodiaphragmatic Nodule TGLs = 7-20] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-18] | Squamous Cell Carcinoma | |
| | [Squamous Cell Carcinoma TGLs = 4-19] | | |
| * Mammary Gland | | Galactocele | Moderate |
| | [Galactocele TGLs = 1-14, 2-16] | | |
| * Nose | Respirat Epith | Hyperplasia
Inflammation | Mild
Chronic Active, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	701	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54537

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pituitary Gland	Pars Distalis	Atrophy	Minimal
[Adenoma TGLs = 8-10]		Adenoma	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 702	TMT: 8	SEX: Female	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54538

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Salivary Glands |
| * Skin | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | | |
|------------------|-------------------------|---------------------|
| * Clitoral Gland | * Lymph Node, Bronchial | * Parathyroid Gland |
|------------------|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|------------------------|--------------------------------|----------------------------------|--------------------------|
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | Respirat Epith | Hyperplasia | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Adenoma | Multiple |
| | Alveolar Epith | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 2-14] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |
| * Spleen | | Hematopoietic Cell Proliferation | Minimal |
| * Stomach, Forestomach | | Squamous Cell Papilloma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	702	TMT:	8	SEX:	Female	DAY ON TEST:	730
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54538

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Glandular [Ulcer TGLs = 4-16]	Ulcer	Mild
* Thyroid Gland C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM:	703	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54539

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Larynx | | Inflammation | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-18] | | |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15, 16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| | Respirat Epith | Necrosis | Moderate |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Marked |
| | [Hyperplasia TGLs = 5-10] | | |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 703 TMT: 8
DOSE: 5.0 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54539

ORGAN AND ACCOUNTABLE SITE STATUS

* Uterus

[Inflammation TGLs = 4-19]

Inflammation
Polyp Stromal

Chronic Active, Moderate

ANIMAL NUM: 704	TMT: 8	SEX: Female	DAY ON TEST: 478
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54540

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Pancreas | * Parathyroid Gland | * Pituitary Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|------------------|--|-----------------------------------|--------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 6-16, 17] | | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Angiectasis | Mild |
| | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Regeneration | Mild |
| | [Hepatodiaphragmatic Nodule TGLs = 7-15] | | |
| * Lung | | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 1-4, 1-5, 2-5, 3-4, 4-4, 5-4] | | |
| Lymph Node | | Ectasia | Moderate |
| | Iliac | Fibrosis | Mild |
| | Inguinal | | |
| | [Ectasia TGLs = 8-18] | | |
| | [Fibrosis TGLs = 9-19] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Corpora Amylacea | Minimal |
| | Respirat Epith | Hyperplasia | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	704	TMT:	8	SEX:	Female	DAY ON TEST:	478
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54540

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	Olfactory Epi	Inflammation Metaplasia Hematopoietic Cell Proliferation	Chronic Active, Minimal Respiratory, Moderate Mild
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PRIMARY CAUSE OF DEATH - Clitoral Gland Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 705	TMT: 8	SEX: Female	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54541

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Brain | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|-------------------|--|--------------------------|
| * Adrenal Cortex | Degeneration | Mild |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| | Pheochromocytoma Benign | |
| | Pheochromocytoma Malignant | |
| * Bone Marrow | Fibrosis | Minimal |
| * Clitoral Gland | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 5-16] | |
| * Heart | Cardiomyopathy | Mild |
| * Kidney | Nephropathy | Moderate |
| * Larynx | Inflammation | Mild |
| * Liver | Basophilic Focus | |
| | Hepatodiaphragmatic Nodule | |
| | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-14] | |
| | [Leukemia Mononuclear TGLs = 2-6] | |
| * Lung | Alveolar Epith | Marked |
| | Bronchiole | Marked |
| | Inflammation | Chronic Active, Moderate |
| | Leukemia Mononuclear | |
| | Proteinosis | Moderate |
| | Alveolus | |
| | [Inflammation TGLs = 4-4, 5] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	705	TMT:	8	SEX:	Female	DAY ON TEST:	730
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54541

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mandibular		Leukemia Mononuclear	
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Mild
		Inflammation	Chronic Active, Moderate
	Olfactory Epi	Metaplasia	Respiratory, Moderate
* Pituitary Gland	Pars Distalis	Hyperplasia	Moderate
* Spleen		Fibrosis	Mild
		Leukemia Mononuclear	
	[Fibrosis TGLs = 1-15]		
	[Leukemia Mononuclear TGLs = 1-6]		

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	706	TMT:	8	SEX:	Female	DAY ON TEST:	473
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54542

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Mammary Gland | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|----------------------|----------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 10-7] | | |
| * Adrenal Medulla | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Bone Marrow | | Leukemia Mononuclear | |
| * Brain | | Hemorrhage | Minimal |
| | [Hemorrhage TGLs = 2-14] | | |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Eosinophilic Focus | |
| | | Leukemia Mononuclear | |
| | | Regeneration | Minimal |
| | [Eosinophilic Focus TGLs = 6-16] | | |
| | [Leukemia Mononuclear TGLs = 4-6, 16, 17] | | |
| | [Regeneration TGLs = 5-6, 7-17] | | |
| * Lung | | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Minimal |
| | Alveolar Epith | Inflammation | Chronic Active, Mild |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Minimal |
| | [Inflammation TGLs = 1-4, 5, 15] | | |
| | [Leukemia Mononuclear TGLs = 1-4, 5, 15] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	706	TMT:	8	SEX:	Female	DAY ON TEST:	473
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54542

ORGAN AND ACCOUNTABLE SITE STATUS

Lymph Node	Lumbar, Pancreatic, Renal	Leukemia Mononuclear	
[Leukemia Mononuclear	TGLs = 9-18, 11-20, 12-21]		
* Lymph Node, Mandibular		Leukemia Mononuclear	
[Leukemia Mononuclear	TGLs = 14-9]		
* Lymph Node, Mediastinal		Leukemia Mononuclear	
* Lymph Node, Mesenteric		Leukemia Mononuclear	
[Leukemia Mononuclear	TGLs = 13-19]		
* Nose		Accumulation, Hyaline Droplet	Minimal
	Turbinate	Atrophy	Minimal
		Corpora Amylacea	Minimal
	Respirat Epith	Hyperplasia	Mild
		Inflammation	Chronic Active, Minimal
	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Hyperplasia	Minimal
[Hyperplasia	TGLs = 3-10]		
* Spleen		Leukemia Mononuclear	
[Leukemia Mononuclear	TGLs = 8-18]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 707	TMT: 8	SEX: Female	DAY ON TEST: 600
DOSE: 5.0 mg/m3		DISP: Moribund Sacrifice	HISTO: 54543

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Heart | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Thymus

OBSERVATIONS

- | | | | |
|---------------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Moderate |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 2-14, 15] | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Lymph Node, Mediastinal | | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 5-3] | | |
| * Nose | | Accumulation, Hyaline Droplet | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 4-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	707	TMT:	8	SEX:	Female	DAY ON TEST:	600
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54543

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

ANIMAL NUM: 708	TMT: 8	SEX: Female	DAY ON TEST: 725
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54544

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Heart | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |

MISSING

- | | |
|---------------------------|-------------------------|
| * Intestine Large, Rectum | * Lymph Node, Bronchial |
|---------------------------|-------------------------|

OBSERVATIONS

- | | | | |
|--------------------------|---|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| | | Metaplasia | Squamous, Minimal |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-6] | | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | | Inflammation | Suppurative, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5, 14] | | |
| * Lymph Node, Mesenteric | | Fibrosis | Mild |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	708	TMT:	8	SEX:	Female	DAY ON TEST:	725
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54544

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi	Necrosis	Moderate
	Respirat Epith	Necrosis	Moderate
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 7-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-15]		
* Stomach, Forestomach		Hyperplasia	Squamous, Moderate
	[Ulcer TGLs = 8-10]	Ulcer	Moderate
* Thyroid Gland	C Cell	Hyperplasia	Minimal
* Uterus	Endometrium	Hyperplasia	Cystic, Moderate
	[Hyperplasia TGLs = 3-10]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 709	TMT: 8	SEX: Female	DAY ON TEST: 732
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54545

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|---|--|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Carcinoma
Compression | Metastatic (Pituitary Gland)
Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 3-7] | | |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Moderate
Marked
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Corpora Amylacea | Mild |
| | Respirat Epith | Hyperplasia
Inflammation
Metaplasia | Mild
Chronic Active, Mild
Respiratory, Moderate |
| | Olfactory Epi | | |
| * Pituitary Gland | | Carcinoma | |
| | [Carcinoma TGLs = 2-10] | | |

* PROTOCOL REQUIRED TISSUE

ANIMAL NUM: 710	TMT: 8	SEX: Female	DAY ON TEST: 731
DOSE: 5.0 mg/m3		DISP: Terminal Sacrifice	HISTO: 54546

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx |
| * Lymph Node, Bronchial | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|---------------------------|------------------------------|--|--|
| * Adrenal Cortex | | Hyperplasia
Leukemia Mononuclear | Minimal |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear
Pheochromocytoma Malignant | |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus
Leukemia Mononuclear | |
| * Lung | Alveolar Epith
Bronchiole | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear | Multiple
Marked
Marked
Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| [Inflammation | TGLs = 2-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia
Inflammation | Minimal
Mild
Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Spleen | | Leukemia Mononuclear | |
| [Leukemia Mononuclear | TGLs = 1-6] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 711	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54547

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Pancreas | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- * Thymus

OBSERVATIONS

- | | | | |
|----------------------|--------------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Islets, Pancreatic | | Adenoma | Multiple |
| | | Carcinoma | |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5; 3-16] | | |
| * Mammary Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 5-17] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	711	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54547

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland [Adenoma TGLs = 4-10]	Olfactory Epi Pars Distalis	Metaplasia Adenoma	Respiratory, Mild
--	--------------------------------	-----------------------	-------------------

ANIMAL NUM: 712	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54548

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone Marrow | * Brain | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pituitary Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Bone | Femur | Hyperostosis | Minimal |
| * Eye | | Cataract | Minimal |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| | [Cardiomyopathy TGLs = 1-14] | | |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| * Lung | Mediastinum | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 3-15] | | |
| * Nose | Turbinates | Atrophy | Minimal |
| | Respiratory Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	712	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54548

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi	Metaplasia	Respiratory, Moderate
	Respirat Epith	Necrosis	Minimal
* Pancreas		Atrophy	Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 713	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54549

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Liver | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 3-7] | | |
| * Brain | | Compression | Mild |
| * Clitoral Gland | | Cyst | Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Mild |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 4-4, 5] | | |
| * Mammary Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14, 15] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 713 TMT: 8
DOSE: 5.0 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54549

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 2-10]

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 714	TMT: 8	SEX: Female	DAY ON TEST: 691
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54550

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Clitoral Gland | | Adenoma | |
| | [Adenoma TGLs = 4-9] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Foreign Body | Mild |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 5-4, 5, 14] | | |
| * Mammary Gland | | Hyperplasia | Mild |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Olfactory Epi | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | | Necrosis | Minimal |
| | Respirat Epith | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 714	TMT: 8	SEX: Female	DAY ON TEST: 691
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54550

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 1-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-15]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM:	715	TMT:	8	SEX:	Female	DAY ON TEST:	712
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54551

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mesenteric | * Mammary Gland |
| * Parathyroid Gland | * Pituitary Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | * Uterus | | |

OBSERVATIONS

- | | | | |
|---------------------------|---|--------------------------------|----------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| | | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 5-7] | | |
| * Brain | | Hemorrhage | Mild |
| | | Leukemia Mononuclear | |
| | [Hemorrhage TGLs = 6-1] | | |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Infarct | Mild |
| | | Nephropathy | Mild |
| | [Infarct TGLs = 7-16] | | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Mild |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Minimal |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Nose | Olfactory Epi | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	715	TMT:	8	SEX:	Female	DAY ON TEST:	712
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54551

ORGAN AND ACCOUNTABLE SITE STATUS

	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Mild
		Inflammation	Chronic Active, Moderate
* Ovary		Leukemia Mononuclear	
* Pancreas		Atrophy	Minimal
* Spleen		Leukemia Mononuclear	
		Necrosis	Minimal
	[Leukemia Mononuclear TGLs = 2-15]		
	[Necrosis TGLs = 3-15]		
* Thyroid Gland	C Cell	Hyperplasia	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 716	TMT: 8	SEX: Female	DAY ON TEST: 530
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54552

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Brain |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Mandibular

OBSERVATIONS

- | | | | |
|-------------------|--|-----------------------------------|-------------------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule | Minimal |
| * Clitoral Gland | | Inflammation | Chronic Active, Mild |
| | [Inflammation TGLs = 4-9] | | |
| * Heart | Pericardium | Hyperplasia | Moderate |
| | Pericardium | Rhabdomyosarcoma | Metastatic (Uncertain Primary Site) |
| | [Rhabdomyosarcoma TGLs = 1-14, 15, 16] | | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Minimal |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Ovary | | Cyst | Minimal |
| | [Cyst TGLs = 3-9] | | |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	716	TMT:	8	SEX:	Female	DAY ON TEST:	530
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54552

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Heart Pericardium Rhabdomyosarcoma Uncertain Primary Site

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 717	TMT: 8	SEX: Female	DAY ON TEST: 506
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54553

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Clitoral Gland | * Esophagus | * Eye | * Harderian Gland |
| * Heart | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Larynx |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|------------------------|--|--------------------------------|-------------------------|
| * Brain | | Compression | Moderate |
| * Islets, Pancreatic | | Carcinoma | |
| | [Carcinoma TGLs = 5-14] | | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| | Alveolus | Proteinosis | Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-5, 2-7] | | |
| | [Inflammation TGLs = 3-14, 6-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Hyperplasia | Basal Cell, Minimal |
| | Olfactory Epi | Inflammation | Chronic Active, Minimal |
| | | Metaplasia | Respiratory, Moderate |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 4-10] | | |
| * Stomach, Forestomach | | Hyperplasia | Squamous, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	717	TMT:	8	SEX:	Female	DAY ON TEST:	506
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54553

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland C Cell Adenoma

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM:	718	TMT:	8	SEX:	Female	DAY ON TEST:	732
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54554

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|---|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | | Angiectasis | Marked |
| | Pars Distalis | Hyperplasia | Mild |
| | [Angiectasis TGLs = 2-10] | | |
| * Uterus | | Polyp Stromal | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 719	TMT: 8	SEX: Female	DAY ON TEST: 646
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54555

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone Marrow | * Clitoral Gland | * Esophagus | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Trachea |
| * Urinary Bladder | | | |

OBSERVATIONS

- | | | | |
|-------------------|---|----------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Bone | Maxilla | Inflammation | Chronic Active, Mild |
| * Brain | | Compression | Mild |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Harderian Gland | | Inflammation | Chronic Active, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| | [Nephropathy TGLs = 7-7] | | |
| * Liver | | Basophilic Focus | |
| | [Hepatodiaphragmatic Nodule TGLs = 5-7] | Hepatodiaphragmatic Nodule | |
| * Lung | Alveolar Epith | Hyperplasia | Mild |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | | Hyperplasia | Moderate |
| | [Hyperplasia TGLs = 9-16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Corpora Amylacea | Mild |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	719	TMT:	8	SEX:	Female	DAY ON TEST:	646
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54555

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin	[Adenoma TGLs = 8-10]	Inflammation	Mild
	[Inflammation TGLs = 1-14, 2-15]		
* Thyroid Gland	C Cell	Carcinoma	
	[Carcinoma TGLs = 4-3]		
* Uterus		Polyp Stromal	
	[Polyp Stromal TGLs = 6-10]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 720	TMT: 8	SEX: Female	DAY ON TEST: 732
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54556

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Necrosis | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 2-14] | | |
| | [Leukemia Mononuclear TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 4-15] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Corpora Amylacea | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 720	TMT: 8	SEX: Female	DAY ON TEST: 732
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54556

ORGAN AND ACCOUNTABLE SITE STATUS

* Ovary	Olfactory Epi	Metaplasia	Respiratory, Mild
[Cyst TGLs = 5-9]		Cyst	Mild
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma TGLs = 3-10]			
* Spleen		Leukemia Mononuclear	

ANIMAL NUM:	721	TMT:	8	SEX:	Female	DAY ON TEST:	489
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54557

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|----------------------------|---------------------------|-----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Eye | * Heart |
| * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum |
| * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|---------------------------|--|----------------------------|--------------------------|
| * Adrenal Medulla | | Hyperplasia | Mild |
| * Harderian Gland | | Inflammation | Chronic Active, Mild |
| * Kidney | | Leukemia Mononuclear | |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Hepatodiaphragmatic Nodule | |
| | | Leukemia Mononuclear | |
| | | Regeneration | Mild |
| | [Hepatodiaphragmatic Nodule TGLs = 9-14, 10-6, 11-6] | | |
| | [Regeneration TGLs = 8-6] | | |
| * Lung | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 6-4, 5] | | |
| Lymph Node | Renal | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 14-7] | | |
| * Lymph Node, Bronchial | | Leukemia Mononuclear | |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-9] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-3] | | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 15-8, 15] | | |
| * Mammary Gland | | Hyperplasia | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	721	TMT:	8	SEX:	Female	DAY ON TEST:	489
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54557

ORGAN AND ACCOUNTABLE SITE STATUS

Mesentery	[Hyperplasia TGLs = 1-15]	Leukemia Mononuclear	
	Fat	Necrosis	Minimal
* Nose	[Necrosis TGLs = 13-14]	Atrophy	Minimal
	Olfactory Epi	Hyperplasia	Mild
	Respirat Epith	Inflammation	Chronic Active, Moderate
	Respirat Epith	Necrosis	Mild
* Ovary		Leukemia Mononuclear	
* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
	[Hyperplasia TGLs = 7-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 12-14]		
* Thymus		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 4-3]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 722	TMT: 8	SEX: Female	DAY ON TEST: 732
DOSE: 5.0 mg/m3		DISP: Terminal Sacrifice	HISTO: 54558

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Clitoral Gland

OBSERVATIONS

- | | | | |
|-------------------|--|---|--|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule
Hyperplasia | Minimal
Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Leukemia Mononuclear | |
| * Lung | Bronchiole
Alveolar Epith | Alveolar/Bronchiolar Carcinoma
Hyperplasia
Hyperplasia
Inflammation
Proteinosis | Multiple
Marked
Marked
Chronic Active, Moderate
Marked |
| | Alveolus | | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 5-20]
[Inflammation TGLs = 4-4, 5, 21] | | |
| * Mammary Gland | | Carcinoma | |
| | [Carcinoma TGLs = 2-16, 3-18] | | |
| * Nose | Olfactory Epi
Turbinat
Respirat Epith | Atrophy
Atrophy
Hyperplasia
Inflammation | Minimal
Minimal
Mild
Chronic Active, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	722	TMT:	8	SEX:	Female	DAY ON TEST:	732
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54558

ORGAN AND ACCOUNTABLE SITE STATUS

* Skin	[Adenoma TGLs = 7-10]	Keratoacanthoma
	[Keratoacanthoma TGLs = 1-14]	
* Spleen	[Leukemia Mononuclear TGLs = 6-6]	Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 723	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54559

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Clear Cell Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Marked |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |
| | [Hyperplasia TGLs = 2-10] | | |

ANIMAL NUM:	724	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54560

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary | * Pancreas |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Spleen |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-16] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14] | | |
| * Nose | Olfactory Epi | Atrophy | Minimal |
| | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| | [Hyperplasia TGLs = 4-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	725	TMT:	8	SEX:	Female	DAY ON TEST:	732
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54561

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Eye | | Cataract | Mild |
| | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-14] | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 3-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	725	TMT:	8	SEX:	Female	DAY ON TEST:	732
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54561

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland

C Cell

Adenoma

ANIMAL NUM: 726	TMT: 8	SEX: Female	DAY ON TEST: 674
DOSE: 5.0 mg/m3		DISP: Moribund Sacrifice	HISTO: 54562

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|--------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Heart | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Pancreas | * Salivary Glands |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|---------------------------|-------------------------------------|---|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Marked |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear
Pheochromocytoma Benign | |
| * Clitoral Gland | | Inflammation | Suppurative, Mild |
| * Intestine Large, Rectum | | Sarcoma | Metastatic (Skin) |
| * Kidney | | Cyst | Mild |
| | [Cyst TGLs = 7-7] | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | [Leukemia Mononuclear TGLs = 5-6] | Leukemia Mononuclear | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Leukemia Mononuclear | |
| | [Inflammation TGLs = 1-4, 5, 20] | Proteinosis | Moderate |
| * Lymph Node, Mandibular | | Leukemia Mononuclear | |
| * Nose | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Hyperplasia | Basal Cell, Minimal |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	726	TMT:	8	SEX:	Female	DAY ON TEST:	674
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54562

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Moderate
	[Hyperplasia TGLs = 8-10]		
Skeletal Muscle		Sarcoma	Metastatic (Skin)
	[Sarcoma TGLs = 6-18]		
* Skin		Sarcoma	
	[Sarcoma TGLs = 4-14, 4-15, 4-16]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-21]		
* Urinary Bladder		Sarcoma	Metastatic (Skin)
* Uterus		Polyp Stromal	
	[Polyp Stromal TGLs = 3-23]		

PRIMARY CAUSE OF DEATH - Skin Sarcoma

ANIMAL NUM: 727	TMT: 8	SEX: Female	DAY ON TEST: 603
DOSE: 5.0 mg/m3		DISP: Moribund Sacrifice	HISTO: 54563

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Thymus | * Thyroid Gland | * Trachea | * Urinary Bladder |
| * Uterus | | | |

OBSERVATIONS

- | | | | |
|-------------------|---|----------------------------------|--------------------------|
| * Adrenal Cortex | | Leukemia Mononuclear
Necrosis | Mild |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| * Brain | | Compression | Minimal |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | [Leukemia Mononuclear TGLs = 2-14, 6-6] | Leukemia Mononuclear | |
| * Lung | | Cyst | Moderate |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Metaplasia | Squamous, Marked |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| Mesentery | Fat | Necrosis | Mild |
| | [Necrosis TGLs = 7-16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 5-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	727	TMT:	8	SEX:	Female	DAY ON TEST:	603
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54563

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	Leukemia Mononuclear Necrosis	Minimal
[Leukemia Mononuclear TGLs = 3-15]		
[Necrosis TGLs = 4-15]		
* Stomach, Glandular	Necrosis	Minimal

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 728	TMT: 8	SEX: Female	DAY ON TEST: 471
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54564

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Adrenal Cortex | * Adrenal Medulla | * Bone | * Bone Marrow |
| * Brain | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

OBSERVATIONS

- | | | | |
|-------------------------|--|--|--------------------------|
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Basophilic Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-4, 5] | Proteinosis | Moderate |
| | [Proteinosis TGLs = 2-4, 5] | | |
| * Lymph Node, Bronchial | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |
| * Nose | | Atrophy | Minimal |
| | Turbinat | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Hyperplasia | Mild |
| * Thymus | | Alveolar/Bronchiolar Carcinoma | Metastatic (Lung) |

PRIMARY CAUSE OF DEATH - Lung Alveolar/Bronchiolar Carcinoma

ANIMAL NUM: 729	TMT: 8	SEX: Female	DAY ON TEST: 732
DOSE: 5.0 mg/m3		DISP: Terminal Sacrifice	HISTO: 54565

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Pituitary Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|--|--|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus
Hepatodiaphragmatic Nodule
Leukemia Mononuclear | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-14] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith
Bronchiole | Hyperplasia | Marked |
| | Alveolus | Hyperplasia | Marked |
| | [Inflammation TGLs = 1-4, 5] | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pancreas | | Atrophy | Minimal |
| | [Atrophy TGLs = 2-6] | | |
| * Spleen | | Leukemia Mononuclear | |
| * Uterus | | Polyp Stromal | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	729	TMT:	8
		DOSE:	5.0 mg/m3

SEX:	Female
DISP:	Terminal Sacrifice

DAY ON TEST:	732
HISTO:	54565

ORGAN AND ACCOUNTABLE SITE STATUS

[Polyp Stromal TGLs = 4-10]

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	730	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54566

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Bronchial | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | | |

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | | Hyperplasia | Marked |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14] | | |
| Ear | | Inflammation | Chronic Active, Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | | Necrosis | Minimal |
| | [Inflammation TGLs = 5-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | | Necrosis | Mild |
| | | Pigmentation | Mild |
| | | Proteinosis | Moderate |
| | Alveolus | | |
| | [Inflammation TGLs = 3-4, 5] | | |
| | [Pigmentation TGLs = 4-4] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Hyperplasia | Basal Cell, Minimal |
| | Olfactory Epi | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 730 TMT: 8
DOSE: 5.0 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 731
HISTO: 54566

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Olfactory Epi Pars Distalis	Inflammation Metaplasia Adenoma	Chronic Active, Mild Respiratory, Mild
[Adenoma TGLs = 6-10]			
* Spleen		Leukemia Mononuclear	
* Uterus	[Polyp Stromal TGLs = 2-16]	Polyp Stromal	

ANIMAL NUM:	731	TMT:	8	SEX:	Female	DAY ON TEST:	590
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54567

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|------------------|-------------------------|
| * Clitoral Gland | * Lymph Node, Bronchial |
|------------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|---|---|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Moderate |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear
Necrosis | Minimal |
| * Lung | [Leukemia Mononuclear TGLs = 5-6] | | |
| | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Moderate
Moderate
Chronic Active, Moderate
Moderate |
| | Alveolus | | |
| | [Hyperplasia TGLs = 2-5]
[Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate
Turbinate
Respirat Epith
Olfactory Epi | Atrophy
Hyperostosis
Hyperplasia
Inflammation
Metaplasia | Minimal
Minimal
Mild
Chronic Active, Minimal
Respiratory, Minimal |
| * Ovary | | Leukemia Mononuclear | |
| * Pancreas | | Atrophy | Minimal |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	731	TMT:	8	SEX:	Female	DAY ON TEST:	590
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54567

ORGAN AND ACCOUNTABLE SITE STATUS

* Pituitary Gland	Pars Distalis	Hyperplasia	Mild
* Spleen		Fibrosis	Mild
		Leukemia Mononuclear	
	[Fibrosis TGLs = 4-14]		
	[Leukemia Mononuclear TGLs = 3-14]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 732	TMT: 8	SEX: Female	DAY ON TEST: 730
DOSE: 5.0 mg/m3		DISP: Terminal Sacrifice	HISTO: 54568

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Brain |
| * Clitoral Gland | * Esophagus | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--------------------------------|--------------------------|
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| Ear | | Inflammation | Chronic Active, Mild |
| * Eye | | Cataract | Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Leukemia Mononuclear | |
| * Lung | Bronchiole | Alveolar/Bronchiolar Carcinoma | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Ovary | | Cyst | Minimal |
| | [Cyst TGLs = 1-9] | | |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	732	TMT:	8	SEX:	Female	DAY ON TEST:	730
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54568

ORGAN AND ACCOUNTABLE SITE STATUS

* Thyroid Gland	C Cell	Hyperplasia	Minimal
Tooth		Inflammation	Chronic Active, Mild

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	733	TMT:	8	SEX:	Female	DAY ON TEST:	634
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54569

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone Marrow | * Clitoral Gland | * Esophagus | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Ovary | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Spleen | * Stomach, Forestomach | * Stomach, Glandular |
| * Thymus | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Bone | Femur | Hyperostosis | Mild |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| * Lung | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Mammary Gland | | Hyperplasia | Mild |
| * Nose | Turbinate | Hyperostosis | Mild |
| | Respirat Epith | Hyperplasia | Mild |
| | Olfactory Epi | Inflammation | Chronic Active, Minimal |
| * Pituitary Gland | Pars Distalis | Metaplasia | Respiratory, Mild |
| | [Adenoma TGLs = 2-10] | Adenoma | |
| * Thyroid Gland | C Cell | Hyperplasia | Mild |
| * Uterus | Endometrium | Hyperplasia | Cystic, Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	733	TMT:	8	SEX:	Female	DAY ON TEST:	634
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54569

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 734	TMT: 8	SEX: Female	DAY ON TEST: 618
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54570

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Mammary Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|---------------------|
| * Lymph Node, Bronchial | * Parathyroid Gland |
|-------------------------|---------------------|

OBSERVATIONS

- | | | | |
|-------------------|---|---|--|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear
Pheochromocytoma Benign | |
| * Brain | | Hemorrhage
Leukemia Mononuclear | Mild |
| | [Hemorrhage TGLs = 10-1; 13-1, 15; 14-1] | | |
| * Heart | | Cardiomyopathy
Leukemia Mononuclear | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Eosinophilic Focus
Leukemia Mononuclear
Regeneration | Mild |
| | [Eosinophilic Focus TGLs = 15-17] | | |
| | [Leukemia Mononuclear TGLs = 9-6, 17, 18] | | |
| | [Regeneration TGLs = 16-18] | | |
| * Lung | Alveolar Epith
Bronchiole | Hyperplasia
Hyperplasia
Inflammation
Leukemia Mononuclear
Proteinosis | Moderate
Moderate
Chronic Active, Moderate |
| | Alveolus | | Moderate |
| | [Inflammation TGLs = 3-14; 4-4, 5; 5-5] | | |
| Lymph Node | Pancreatic | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 11-23] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 734	TMT: 8	SEX: Female	DAY ON TEST: 618
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54570

ORGAN AND ACCOUNTABLE SITE STATUS

* Lymph Node, Mandibular [Leukemia Mononuclear TGLs = 1-9]	Leukemia Mononuclear	
* Lymph Node, Mediastinal	Leukemia Mononuclear	
* Lymph Node, Mesenteric [Leukemia Mononuclear TGLs = 12-20]	Leukemia Mononuclear	
Mesentery Fat [Necrosis TGLs = 7-22]	Necrosis	Minimal
* Nose Turbinate Respirat Epith Olfactory Epi	Atrophy Hyperplasia Inflammation Metaplasia	Minimal Mild Chronic Active, Moderate Respiratory, Minimal
* Ovary	Leukemia Mononuclear	
* Pancreas	Atrophy	Minimal
* Pituitary Gland	Leukemia Mononuclear	
* Spleen [Leukemia Mononuclear TGLs = 8-19]	Leukemia Mononuclear	
* Thymus	Leukemia Mononuclear	
* Thyroid Gland Follicular Cel [Adenoma TGLs = 2-3]	Adenoma	
* Uterus [Leukemia Mononuclear TGLs = 6-21]	Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 735	TMT: 8	SEX: Female	DAY ON TEST: 641
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54571

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mesenteric |
| * Mammary Gland | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Clear Cell Focus | |
| | | Fatty Change | Mild |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| * Ovary | | Leukemia Mononuclear | |
| * Pituitary Gland | Pars Distalis | Adenoma | |
| | [Adenoma TGLs = 4-10] | | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	735	TMT:	8	SEX:	Female	DAY ON TEST:	641
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54571

ORGAN AND ACCOUNTABLE SITE STATUS

* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 2-7]		
* Stomach, Forestomach	Edema	Mild

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 736	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54572

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|--|--------------------------|
| * Adrenal Medulla | | Pheochromocytoma Benign
Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 4-7] | | |
| * Brain | | Compression | Minimal |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14] | | |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus
Clear Cell Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 6-15] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith
Bronchiole | Hyperplasia | Marked |
| | Alveolus | Hyperplasia | Marked |
| | [Inflammation TGLs = 2-4, 5] | Inflammation | Chronic Active, Moderate |
| | | Proteinosis | Moderate |
| * Mammary Gland | | Adenoma | |
| | [Adenoma TGLs = 7-16] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	736	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54572

ORGAN AND ACCOUNTABLE SITE STATUS

* Ovary	Olfactory Epi	Inflammation Metaplasia Cyst	Chronic Active, Moderate Respiratory, Mild Mild
[Cyst TGLs = 5-9]			
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma TGLs = 3-10]			
* Uterus	Endometrium	Hyperplasia	Cystic, Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 737	TMT: 8	SEX: Female	DAY ON TEST: 579
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54573

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Lymph Node, Mediastinal | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|--------------------------|--------------------------------------|----------------------|
| * Adrenal Cortex | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| | Pheochromocytoma Benign | |
| * Heart | Leukemia Mononuclear | |
| * Islets, Pancreatic | Carcinoma | |
| | [Carcinoma TGLs = 6-15] | |
| * Kidney | Nephropathy | Minimal |
| * Larynx | Inflammation | Minimal |
| * Liver | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | |
| * Lung | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Mild |
| | Hyperplasia | Chronic Active, Mild |
| | Inflammation | |
| | Leukemia Mononuclear | |
| | Alveolus | Mild |
| | Proteinosis | |
| | [Inflammation TGLs = 2-4, 5] | |
| Lymph Node | Pancreatic | |
| | [Leukemia Mononuclear TGLs = 6-15] | |
| * Lymph Node, Mandibular | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 1-9] | |
| * Lymph Node, Mesenteric | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-14] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	737	TMT:	8	SEX:	Female	DAY ON TEST:	579
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54573

ORGAN AND ACCOUNTABLE SITE STATUS

* Nose	Turbinate Respirat Epith	Atrophy Hyperplasia Inflammation	Minimal Mild Chronic Active, Moderate
	Olfactory Epi Respirat Epith	Metaplasia Necrosis	Respiratory, Minimal Mild
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 3-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 5-7]		

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 738	TMT: 8	SEX: Female	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54574

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Liver |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Spleen |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|--|--------------------------|
| * Adrenal Cortex | | Accessory Adrenal Cortical Nodule
Hyperplasia | Minimal
Moderate |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| | [Pheochromocytoma Benign TGLs = 2-7] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Mammary Gland | | Fibroadenoma | |
| | [Fibroadenoma TGLs = 1-14, 15, 16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Skin | | Fibroma | |
| | [Fibroma TGLs = 5-18] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 738 TMT: 8
DOSE: 5.0 mg/m3

SEX: Female
DISP: Terminal Sacrifice

DAY ON TEST: 730
HISTO: 54574

ORGAN AND ACCOUNTABLE SITE STATUS

* Stomach, Forestomach

Hyperplasia

Squamous, Mild

* Uterus

Polyp Stromal

[Polyp Stromal TGLs = 4-10]

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 739	TMT: 8	SEX: Female	DAY ON TEST: 670
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54575

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Medulla | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- | | |
|-------------------------|---------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mediastinal |
|-------------------------|---------------------------|

OBSERVATIONS

- | | | | |
|-------------------|--|--|--|
| * Adrenal Cortex | | Hyperplasia | Marked |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | [Nephropathy TGLs = 6-7] | Nephropathy | Moderate |
| * Liver | [Hepatodiaphragmatic Nodule TGLs = 3-14, 4-15, 5-16] | Basophilic Focus
Clear Cell Focus
Hepatodiaphragmatic Nodule | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith
Bronchiole | Hyperplasia | Marked |
| | Alveolus | Hyperplasia
Inflammation
Proteinosis | Marked
Chronic Active, Moderate
Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | Turbinate
Respirat Epith | Atrophy
Hyperplasia
Inflammation | Minimal
Mild
Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Adenoma | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	739	TMT:	8	SEX:	Female	DAY ON TEST:	670
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54575

ORGAN AND ACCOUNTABLE SITE STATUS

[Adenoma TGLs = 2-10]

* Uterus

Polyp Stromal

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 740	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54576

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|--------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Salivary Glands | * Skin | * Stomach, Forestomach |
| * Stomach, Glandular | * Thyroid Gland | * Trachea | * Urinary Bladder |

MISSING

- | | | | |
|------------------|-------------------------|---------------------|----------|
| * Clitoral Gland | * Lymph Node, Bronchial | * Parathyroid Gland | * Thymus |
|------------------|-------------------------|---------------------|----------|

OBSERVATIONS

- | | | | |
|---------------------------|-------------------------------------|------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Mild |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Eye | | Metaplasia | Osseous, Minimal |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 4-6] | | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Lymph Node, Mediastinal | | Infiltration Cellular | Histiocyte, Mild |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Corpora Amylacea | Mild |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Marked |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Moderate |
| * Spleen | | Leukemia Mononuclear | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	740	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54576

ORGAN AND ACCOUNTABLE SITE STATUS

* Uterus [Leukemia Mononuclear TGLs = 2-6]
[Polyp Stromal TGLs = 3-10] Polyp Stromal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 741	TMT: 8	SEX: Female	DAY ON TEST: 726
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54577

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Eye |
| * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Spleen |
| * Stomach, Glandular | * Thymus | * Trachea | * Urinary Bladder |
| * Uterus | | | |

MISSING

- | | |
|-------------|-------------------------|
| * Esophagus | * Lymph Node, Bronchial |
|-------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|---------------------------------|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Benign | |
| * Clitoral Gland | | Carcinoma | |
| | [Carcinoma TGLs = 1-14] | | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Moderate |
| * Larynx | | Foreign Body Inflammation | Minimal Mild |
| * Liver | | Basophilic Focus | |
| | [Basophilic Focus TGLs = 6-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 5-4, 5] | | |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 7-16] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	741	TMT:	8	SEX:	Female	DAY ON TEST:	726
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54577

ORGAN AND ACCOUNTABLE SITE STATUS

	Respirat Epith	Necrosis	Moderate
* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Cyst	Minimal
		Hyperplasia	Minimal
	[Cyst TGLs = 3-10]		
	[Hyperplasia TGLs = 4-10]		
* Skin		Hyperplasia	Squamous, Moderate
* Stomach, Forestomach		Ulcer	Marked
	[Ulcer TGLs = 8-10]		
* Thyroid Gland		Hemorrhage	Minimal
	[Hemorrhage TGLs = 9-3]		

PRIMARY CAUSE OF DEATH - Clitoral Gland Carcinoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 742	TMT: 8	SEX: Female	DAY ON TEST: 579
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54578

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Kidney | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | * Uterus |

MISSING

- | | |
|-------------|-------------------------|
| * Esophagus | * Lymph Node, Bronchial |
|-------------|-------------------------|

OBSERVATIONS

- | | | | |
|-------------------|-------------------------------------|-------------------------|----------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| | | Leukemia Mononuclear | |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Mild |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Mild |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Mammary Gland | | Hyperplasia | Minimal |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Ovary | | Leukemia Mononuclear | |
| * Pancreas | | Atrophy | Mild |
| * Pituitary Gland | Pars Distalis | Hyperplasia | Minimal |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	742	TMT:	8	SEX:	Female	DAY ON TEST:	579
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54578

ORGAN AND ACCOUNTABLE SITE STATUS

[Leukemia Mononuclear TGLs = 2-7]

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

ANIMAL NUM: 743	TMT: 8	SEX: Female	DAY ON TEST: 717
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54579

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|--------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Mammary Gland | * Ovary | * Parathyroid Gland |
| * Salivary Glands | * Skin | * Spleen | * Stomach, Forestomach |
| * Stomach, Glandular | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | | Pheochromocytoma Benign | |
| * Brain | | Compression | Moderate |
| * Heart | | Cardiomyopathy | Mild |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Basophilic Focus | |
| | | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | | Metaplasia | Respiratory, Mild |
| * Pancreas | | Atrophy | Minimal |
| * Pituitary Gland | | Adenoma | |
| | Pars Distalis | | |
| | [Adenoma TGLs = 2-10] | | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	743	TMT:	8	SEX:	Female	DAY ON TEST:	717
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54579

ORGAN AND ACCOUNTABLE SITE STATUS

Tooth	Inflammation	Chronic Active, Moderate
* Uterus	Polyp Stromal	
[Polyp Stromal TGLs = 3-10]		

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

ANIMAL NUM: 744	TMT: 8	SEX: Female	DAY ON TEST: 670
	DOSE: 5.0 mg/m3	DISP: Natural Death	HISTO: 54580

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Adrenal Cortex | * Bone | * Bone Marrow | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Pancreas | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--------------------------------|--|--------------------------|
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Minimal |
| * Brain | | Compression | Mild |
| * Heart | | Cardiomyopathy | Moderate |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus
Fatty Change
Leukemia Mononuclear | Minimal |
| | [Fatty Change TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Bronchiole | Hyperplasia | Moderate |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 1-4, 5] | Proteinosis | Moderate |
| * Nose | | Respirat Epith | Mild |
| | Olfactory Epi | Hyperplasia | Basal Cell, Minimal |
| | Olfactory Epi | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Pituitary Gland | | Adenoma | |
| | [Adenoma TGLs = 2-10] | | |
| * Spleen | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	744	TMT:	8	SEX:	Female	DAY ON TEST:	670
		DOSE:	5.0 mg/m3	DISP:	Natural Death	HISTO:	54580

ORGAN AND ACCOUNTABLE SITE STATUS

PRIMARY CAUSE OF DEATH - Pituitary Gland Pars Distalis Adenoma

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 745	TMT: 8	SEX: Female	DAY ON TEST: 732
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54581

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|-----------------------------|---------------------------|----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Colon | * Intestine Large, Rectum |
| * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum | * Islets, Pancreatic |
| * Lymph Node, Mandibular | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland |
| * Ovary | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|--------------------------|---|--------------------------------|--------------------------|
| * Adrenal Cortex | | Degeneration | Moderate |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 2-7] | | |
| * Clitoral Gland | | Adenoma | |
| Ear | | Inflammation | Chronic Active, Moderate |
| * Heart | | Cardiomyopathy | Moderate |
| * Intestine Large, Cecum | | Inflammation | Chronic Active, Marked |
| * Kidney | | Nephropathy | Mild |
| * Larynx | | Inflammation | Minimal |
| * Liver | | Basophilic Focus | |
| * Lung | | Alveolar/Bronchiolar Adenoma | |
| | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 3-4, 5] | | |
| * Nose | Turbinate | Atrophy | Minimal |
| | | Corpora Amylacea | Mild |
| | Respirat Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	745	TMT:	8	SEX:	Female	DAY ON TEST:	732
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54581

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas		Atrophy	Minimal
* Pituitary Gland	Pars Distalis	Adenoma	
	[Adenoma TGLs = 1-10]		
* Spleen		Leukemia Mononuclear	

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 746	TMT: 8	SEX: Female	DAY ON TEST: 731
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54582

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|---------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Lymph Node, Mandibular | * Lymph Node, Mediastinal |
| * Lymph Node, Mesenteric | * Ovary | * Parathyroid Gland | * Salivary Glands |
| * Stomach, Forestomach | * Thymus | * Thyroid Gland | * Trachea |
| * Urinary Bladder | * Uterus | | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | |
|-------------------|--|--------------------------|
| * Adrenal Cortex | Degeneration | Moderate |
| | Leukemia Mononuclear | |
| * Adrenal Medulla | Leukemia Mononuclear | |
| | Pheochromocytoma Benign | |
| | Pheochromocytoma Malignant | |
| * Heart | Cardiomyopathy | Minimal |
| * Kidney | Nephropathy | Moderate |
| | [Nephropathy TGLs = 8-7] | |
| * Larynx | Inflammation | Mild |
| * Liver | Inflammation | Chronic Active, Mild |
| | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 7-6] | |
| * Lung | Alveolar/Bronchiolar Carcinoma | Marked |
| | Alveolar Epith Hyperplasia | Moderate |
| | Bronchiole Hyperplasia | Chronic Active, Moderate |
| | Alveolus Inflammation | Moderate |
| | Proteinosis | |
| | Squamous Cell Carcinoma | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 3-15] | |
| | [Inflammation TGLs = 10-4, 5, 14, 15] | |
| | [Squamous Cell Carcinoma TGLs = 2-5, 14] | |
| * Mammary Gland | Fibroadenoma | |
| | [Fibroadenoma TGLs = 11-19] | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	746	TMT:	8	SEX:	Female	DAY ON TEST:	731
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54582

ORGAN AND ACCOUNTABLE SITE STATUS

Mesentery	Fat	Necrosis	Minimal
[Necrosis	TGLs = 9-16]		
* Nose	Turbinate	Atrophy	Minimal
	Respirat Epith	Hyperplasia	Moderate
	Olfactory Epi	Inflammation	Chronic Active, Moderate
	Respirat Epith	Metaplasia	Respiratory, Moderate
		Necrosis	Mild
* Pancreas		Atrophy	Mild
* Pituitary Gland	Pars Distalis	Adenoma	
[Adenoma	TGLs = 4-10]		
* Skin		Hyperplasia	Squamous, Mild
[Hyperplasia	TGLs = 1-18]		
* Spleen		Fibrosis	Moderate
		Leukemia Mononuclear	
[Fibrosis	TGLs = 6-17]		
[Leukemia Mononuclear	TGLs = 5-16]		
* Stomach, Glandular		Inflammation	Suppurative, Minimal

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 747	TMT: 8	SEX: Female	DAY ON TEST: 730
	DOSE: 5.0 mg/m3	DISP: Terminal Sacrifice	HISTO: 54583

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Pituitary Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Thyroid Gland | * Trachea | * Urinary Bladder | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|---|--|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| * Adrenal Medulla | | Hyperplasia
Pheochromocytoma Benign | Marked |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Mild |
| * Liver | | Basophilic Focus
Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | Alveolus | Inflammation | Chronic Active, Moderate |
| | [Inflammation TGLs = 2-4, 5] | Proteinosis | Moderate |
| Mesentery | Fat | Necrosis | Minimal |
| | [Necrosis TGLs = 1-14] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Mild |
| | Respirat Epith | Inflammation | Chronic Active, Moderate |
| | Olfactory Epi | Metaplasia | Respiratory, Moderate |
| | Respirat Epith | Necrosis | Minimal |
| * Pancreas | | Atrophy | Minimal |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	747	TMT:	8	SEX:	Female	DAY ON TEST:	730
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54583

ORGAN AND ACCOUNTABLE SITE STATUS

* Uterus	Endometrium	Hyperplasia	Cystic, Minimal
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TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM: 748	TMT: 8	SEX: Female	DAY ON TEST: 717
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54584

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Lymph Node, Mediastinal | * Lymph Node, Mesenteric | * Mammary Gland | * Ovary |
| * Parathyroid Gland | * Pituitary Gland | * Salivary Glands | * Skin |
| * Spleen | * Stomach, Forestomach | * Stomach, Glandular | * Thymus |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|-------------------|--|--------------------------------|------------------------------|
| * Adrenal Cortex | | Hyperplasia | Moderate |
| * Adrenal Medulla | Bilateral | Pheochromocytoma Malignant | |
| | [Pheochromocytoma Malignant TGLs = 5-7] | | |
| * Heart | | Cardiomyopathy | Minimal |
| | [Pheochromocytoma Malignant TGLs = 1-14] | Pheochromocytoma Malignant | Metastatic (Adrenal Medulla) |
| * Kidney | | Infarct | Minimal |
| | | Nephropathy | Mild |
| * Liver | | Basophilic Focus | |
| | [Basophilic Focus TGLs = 3-6] | Hepatodiaphragmatic Nodule | |
| | [Hepatodiaphragmatic Nodule TGLs = 4-16] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | |
| | Alveolar Epith | Hyperplasia | Marked |
| | Bronchiole | Hyperplasia | Marked |
| | | Inflammation | Chronic Active, Moderate |
| | | Pheochromocytoma Malignant | Metastatic (Adrenal Medulla) |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 2-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Moderate |
| | Respirat Epith | Inflammation | Chronic Active, Marked |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	748	TMT:	8	SEX:	Female	DAY ON TEST:	717
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54584

ORGAN AND ACCOUNTABLE SITE STATUS

	Olfactory Epi	Metaplasia	Respiratory, Mild
* Pancreas		Atrophy	Minimal
* Thyroid Gland	C Cell	Hyperplasia	Marked

PRIMARY CAUSE OF DEATH - Adrenal Medulla Bilateral Pheochromocytoma Malignant
 CONTRIBUTORY CAUSE OF DEATH - Heart Pheochromocytoma Malignant Adrenal Medulla
 - Lung Pheochromocytoma Malignant Adrenal Medulla

ANIMAL NUM: 749	TMT: 8	SEX: Female	DAY ON TEST: 621
	DOSE: 5.0 mg/m3	DISP: Moribund Sacrifice	HISTO: 54585

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|----------------------------|---------------------------|-----------------------------|--------------------------|
| * Bone | * Bone Marrow | * Brain | * Clitoral Gland |
| * Esophagus | * Eye | * Harderian Gland | * Intestine Large, Cecum |
| * Intestine Large, Colon | * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum |
| * Intestine Small, Jejunum | * Islets, Pancreatic | * Larynx | * Lymph Node, Mandibular |
| * Mammary Gland | * Pancreas | * Parathyroid Gland | * Salivary Glands |
| * Skin | * Stomach, Forestomach | * Stomach, Glandular | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- * Lymph Node, Bronchial

OBSERVATIONS

- | | | | |
|---------------------------|-------------------------------------|-------------------------|--------------------------|
| * Adrenal Cortex | | Hyperplasia | Minimal |
| | | Leukemia Mononuclear | |
| * Adrenal Medulla | Bilateral | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Heart | | Cardiomyopathy | Minimal |
| * Kidney | | Nephropathy | Minimal |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 5-6] | | |
| * Lung | Bronchiole | Hyperplasia | Marked |
| | Alveolar Epith | Hyperplasia | Moderate |
| | | Inflammation | Chronic Active, Moderate |
| | | Leukemia Mononuclear | |
| | Alveolus | Proteinosis | Moderate |
| | [Inflammation TGLs = 1-4, 5] | | |
| * Lymph Node, Mediastinal | | Leukemia Mononuclear | |
| * Lymph Node, Mesenteric | | Leukemia Mononuclear | |
| * Nose | Turbinate | Atrophy | Minimal |
| | Respirat Epith | Hyperplasia | Mild |
| | | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Minimal |
| * Ovary | | Cyst | Minimal |
| | | Thecoma Benign | |

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	749	TMT:	8	SEX:	Female	DAY ON TEST:	621
		DOSE:	5.0 mg/m3	DISP:	Moribund Sacrifice	HISTO:	54585

ORGAN AND ACCOUNTABLE SITE STATUS

	[Cyst TGLs = 3-9]		
	[Thecoma Benign TGLs = 4-9, 14]		
* Pituitary Gland	Pars Distalis	Hyperplasia	Marked
	[Hyperplasia TGLs = 6-10]		
* Spleen		Leukemia Mononuclear	
	[Leukemia Mononuclear TGLs = 2-6]		
* Thymus		Leukemia Mononuclear	

PRIMARY CAUSE OF DEATH - Spleen Leukemia Mononuclear

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	750	TMT:	8	SEX:	Female	DAY ON TEST:	732
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54586

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

- | | | | |
|---------------------------|-----------------------------|---------------------------|----------------------------|
| * Bone | * Bone Marrow | * Clitoral Gland | * Esophagus |
| * Eye | * Harderian Gland | * Intestine Large, Cecum | * Intestine Large, Colon |
| * Intestine Large, Rectum | * Intestine Small, Duodenum | * Intestine Small, Ileum | * Intestine Small, Jejunum |
| * Islets, Pancreatic | * Larynx | * Lymph Node, Mediastinal | * Lymph Node, Mesenteric |
| * Mammary Gland | * Parathyroid Gland | * Salivary Glands | * Skin |
| * Stomach, Forestomach | * Stomach, Glandular | * Thymus | * Thyroid Gland |
| * Trachea | * Urinary Bladder | * Uterus | |

MISSING

- | | |
|-------------------------|--------------------------|
| * Lymph Node, Bronchial | * Lymph Node, Mandibular |
|-------------------------|--------------------------|

OBSERVATIONS

- | | | | |
|-------------------|---|--------------------------------|----------------------|
| * Adrenal Cortex | | Leukemia Mononuclear | |
| * Adrenal Medulla | | Hyperplasia | Mild |
| | | Leukemia Mononuclear | |
| | | Pheochromocytoma Benign | |
| * Brain | | Compression | Mild |
| * Heart | | Leukemia Mononuclear | |
| * Kidney | | Nephropathy | Moderate |
| * Liver | | Leukemia Mononuclear | |
| | [Leukemia Mononuclear TGLs = 3-6] | | |
| * Lung | | Alveolar/Bronchiolar Carcinoma | Multiple |
| | Alveolar Epith | Hyperplasia | Moderate |
| | Bronchiole | Hyperplasia | Minimal |
| | | Inflammation | Chronic Active, Mild |
| | Alveolus | Leukemia Mononuclear | |
| | [Alveolar/Bronchiolar Carcinoma TGLs = 1-5, 14] | Proteinosis | Mild |
| | [Inflammation TGLs = 5-4, 5] | | |
| * Nose | | Atrophy | Minimal |
| | Turbinate | Hyperplasia | Moderate |
| | Respirat Epith | Inflammation | Chronic Active, Mild |
| | Olfactory Epi | Metaplasia | Respiratory, Mild |
| * Ovary | | Leukemia Mononuclear | |

* PROTOCOL REQUIRED TISSUE

TDMS No. 60311 - 05

Test Type: CHRONIC

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F344/N Tac

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 12/10/2008

Time Report Requested: 14:06:48

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

Lab: BNW

ANIMAL NUM:	750	TMT:	8	SEX:	Female	DAY ON TEST:	732
		DOSE:	5.0 mg/m3	DISP:	Terminal Sacrifice	HISTO:	54586

ORGAN AND ACCOUNTABLE SITE STATUS

* Pancreas	Atrophy	Minimal
* Pituitary Gland	Angiectasis	Moderate
[Angiectasis TGLs = 2-10]		
* Spleen	Leukemia Mononuclear	
[Leukemia Mononuclear TGLs = 4-15]		

*** END OF REPORT ***