

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

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

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**NTP Study Number:** C60311  
**Lock Date:** 11/29/2005  
**Cage Range:** ALL  
**Date Range:** ALL  
**Reasons For Removal:** ALL  
**Removal Date Range:** ALL  
**Treatment Groups:** Include ALL  
**Study Gender:** Both  
**TDMSE Version:** 3.0.2.3\_002  
**PWG Approval Date:** NONE

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID: 1**

**TRT#: 1**

**SEX: Male**

**DAY ON TEST: 16**

**DOSE: CONTROL**

**DISP: Terminal Sacrifice**

**HISTO: 52454**

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

\* Kidney

\* Liver

\* Lung

\* Nose

\* Thyroid Gland

Urinary Bladder

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

ANIMAL ID: 2

TRT#: 1

SEX: Male

DAY ON TEST: 16

DOSE: CONTROL

DISP: Terminal Sacrifice

HISTO: 52455

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

\* Kidney

\* Liver

\* Lung

\* Nose

\* Thyroid Gland

Urinary Bladder

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 3

**TRT#:** 1

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52456

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain  
Lymph Node, Mediastinal

\* Kidney  
\* Nose

\* Liver  
\* Thyroid Gland

\* Lung  
Urinary Bladder

---

**OBSERVATIONS**

Lym Node Media

Note: No corresponding lesion for tgl 1 in mediastinal LN

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 4

**TRT#:** 1

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52457

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain  
Lymph Node, Mediastinal

\* Kidney  
\* Nose

\* Liver  
\* Thyroid Gland

\* Lung  
Urinary Bladder

---

**OBSERVATIONS**

Lym Node Media

Note: no corresponding lesion for tgl 1 in mediastinal LN.

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 5

**TRT#:** 1

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52458

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

\* Kidney

\* Liver

\* Lung

\* Nose

\* Thyroid Gland

Urinary Bladder

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 201

**TRT#:** 3

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 2.5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52504

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Minimal

Olfactory Epi

Necrosis

Minimal

---

**Experiment Number:** 60311 - 01

**Test Type:** 14-DAY

**Route:** RESPIRATORY EXPOSURE WHOLE BODY

**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

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

**Date Report Requested:** 09/13/2016

**Time Report Requested:** 11:25:33

**First Dose M/F:** 08/02/04 / 08/02/04

**Lab:** BNW

---

**ANIMAL ID:** 202

**TRT#:** 3

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 2.5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52505

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Minimal

---



Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 203

**TRT#:** 3

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 2.5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52506

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

Nose

Olfactory Epi

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

<b>ANIMAL ID:</b> 204	<b>TRT#:</b> 3	<b>SEX:</b> Male	<b>DAY ON TEST:</b> 16
	<b>DOSE:</b> 2.5 MG/M3	<b>DISP:</b> Terminal Sacrifice	<b>HISTO:</b> 52507
<b>OBSERVATIONS</b>			
Lung	Bronchiole, Epithelium	Vacuolization Cytoplasmic	Minimal
Nose	Olfactory Epi	Atrophy	Mild
		Inflammation	Acute, Minimal
	Olfactory Epi	Necrosis	Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 205

**TRT#:** 3

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 2.5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52508

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Mild

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 401

**TRT#:** 5

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52494

---

**OBSERVATIONS**

Lung

Alveolus  
Bronchiole, Epithelium

Infiltration Cellular  
Vacuolization Cytoplasmic

Histiocyte, Minimal  
Minimal

Note: NO CORRELATING LESION FOR TGL 1.

Nose

Olfactory Epi  
Olfactory Epi

Atrophy  
Necrosis

Mild  
Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 402

**TRT#:** 5

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52495

---

**OBSERVATIONS**

Lung

Alveolus  
Bronchiole, Epithelium

Infiltration Cellular  
Vacuolization Cytoplasmic

Histiocyte, Minimal  
Minimal

Nose

Olfactory Epi

Atrophy

Mild

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 403

**TRT#:** 5

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52496

---

**OBSERVATIONS**

Lung

Alveolus  
Bronchiole, Epithelium

Infiltration Cellular  
Vacuolization Cytoplasmic

Histiocyte, Minimal  
Mild

Nose

Olfactory Epi  
Olfactory Epi

Atrophy  
Necrosis

Mild  
Minimal

---

**Experiment Number:** 60311 - 01

**Test Type:** 14-DAY

**Route:** RESPIRATORY EXPOSURE WHOLE BODY

**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

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

**Date Report Requested:** 09/13/2016

**Time Report Requested:** 11:25:33

**First Dose M/F:** 08/02/04 / 08/02/04

**Lab:** BNW

---

**ANIMAL ID:** 404

**TRT#:** 5

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52497

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

Nose

Olfactory Epi

Atrophy

Minimal

Olfactory Epi

Necrosis

Mild

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

<b>ANIMAL ID:</b> 405	<b>TRT#:</b> 5	<b>SEX:</b> Male	<b>DAY ON TEST:</b> 16
	<b>DOSE:</b> 5 MG/M3	<b>DISP:</b> Terminal Sacrifice	<b>HISTO:</b> 52498
<b>OBSERVATIONS</b>			
Lung	Alveolus	Infiltration Cellular	Histiocyte, Minimal
	Bronchiole, Epithelium	Vacuolization Cytoplasmic	Mild
Nose	Olfactory Epi	Atrophy	Mild
	Olfactory Epi	Necrosis	Minimal

---



**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 601

**TRT#:** 7

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 10 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52484

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

Urinary Bladder

---

**OBSERVATIONS**

Lung

Interstitialium

Fibrosis

Minimal

Alveolus

Infiltration Cellular

Histiocyte, Mild

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

Nose

Olfactory Epi

Atrophy

Moderate

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 602

**TRT#:** 7

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 10 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52485

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain

Lymph Node, Mediastinal

Urinary Bladder

**OBSERVATIONS**

Lung

Interstitialium

Fibrosis

Minimal

Alveolus

Infiltration Cellular

Histiocyte, Minimal

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

[ Fibrosis TGLs = 2-1 ]

Lym Node Media

Note: NCL on TGL 1 in mediastinal LN,

Nose

Olfactory Epi

Atrophy

Moderate

Olfactory Epi

Necrosis

Minimal

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 603

TRT#: 7

SEX: Male

DAY ON TEST: 16

DOSE: 10 MG/M3

DISP: Terminal Sacrifice

HISTO: 52486

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain

Urinary Bladder

OBSERVATIONS

Lung

Interstitialium

Fibrosis

Mild

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

[ Fibrosis TGLs = 1-1 ]

Nose

Olfactory Epi

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 604

**TRT#:** 7

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 10 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52487

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain

Urinary Bladder

**OBSERVATIONS**

Lung

Interstitialium

Fibrosis

Minimal

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

[ Fibrosis TGLs = 1-1 ]

Nose

Olfactory Epi

Atrophy

Mild

Foreign Body

Olfactory Epi

Necrosis

Minimal

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 605

**TRT#:** 7

**SEX:** Male

**DAY ON TEST:** 16

**DOSE:** 10 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52488

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain

Lymph Node, Mediastinal

Urinary Bladder

**OBSERVATIONS**

Lung

Interstitialium

Fibrosis

Minimal

Hemorrhage

Minimal

Alveolus

Infiltration Cellular

Histiocyte, Minimal

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

[ Fibrosis TGLs = 1-1 ]

Lym Node Media

Note: NCL on TGL 2 in mediastinal LN.

Nose

Olfactory Epi

Atrophy

Mild

Inflammation

Acute, Minimal

Respirat Epith

Metaplasia

Squamous, Minimal

Olfactory Epi

Necrosis

Minimal

Respirat Epith

Necrosis

Minimal

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 801

**TRT#:** 9

**SEX:** Male

**DAY ON TEST:** 5

**DOSE:** 20 MG/M3

**DISP:** Natural Death

**HISTO:** 52474

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain	Kidney	Liver	Thyroid Gland
Urinary Bladder			

**OBSERVATIONS**

Brain			
Note: NCL for TGL 2 in brain.			
Lung		Hemorrhage	Minimal
	Alveolar Epith	Hyperplasia	Mild
	Alveolus	Infiltration Cellular	Histiocyte, Minimal
		Inflammation	Acute, Mild
	Bronchiole, Epithelium	Necrosis	Minimal
[ Hemorrhage TGLs = 1-1+6 ]			
Nose	Olfactory Epi	Atrophy	Minimal
	Respirat Epith	Necrosis	Minimal

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 802

TRT#: 9

SEX: Male

DAY ON TEST: 5

DOSE: 20 MG/M3

DISP: Natural Death

HISTO: 52475

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain  
Urinary Bladder

Kidney

Liver

Thyroid Gland

OBSERVATIONS

Brain

Note: NCL for TGL 2 in brain.

Lung

Alveolar Epith  
Alveolus

Hemorrhage  
Hyperplasia  
Infiltration Cellular  
Inflammation

Minimal  
Minimal  
Histiocyte, Minimal  
Acute, Minimal

Bronchiole, Epithelium

Necrosis

Minimal

[ Hemorrhage TGLs = 1-1 ]

Nose

Olfactory Epi

Necrosis

Moderate

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 803

TRT#: 9

SEX: Male

DAY ON TEST: 9

DOSE: 20 MG/M3

DISP: Natural Death

HISTO: 52476

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain  
Urinary Bladder

Kidney

Liver

Thyroid Gland

OBSERVATIONS

Brain

Note: NCL for TGL 1 in brain.

Lung

Interstitialium

Fibrosis

Mild

Hemorrhage

Mild

Alveolar Epith

Hyperplasia

Mild

Alveolus

Infiltration Cellular

Histiocyte, Moderate

Inflammation

Acute, Minimal

[ Hemorrhage TGLs = 2-1 ]

Nose

Olfactory Epi

Atrophy

Minimal

Respirat Epith

Metaplasia

Squamous, Minimal

Olfactory Epi

Necrosis

Moderate

Respirat Epith

Necrosis

Minimal



Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 804

TRT#: 9

SEX: Male

DAY ON TEST: 5

DOSE: 20 MG/M3

DISP: Natural Death

HISTO: 52477

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain  
Urinary Bladder

Kidney

Liver

Thyroid Gland

OBSERVATIONS

Brain  
Note: NCL for TGL 2 in brain.

Lung

Alveolus

Hemorrhage  
Infiltration Cellular  
Inflammation

Minimal  
Histiocyte, Moderate  
Acute, Minimal

[ Hemorrhage TGLs = 1-1+5 ]

Nose

Olfactory Epi  
Respirat Epith

Necrosis  
Necrosis

Moderate  
Mild

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 805

**TRT#:** 9

**SEX:** Male

**DAY ON TEST:** 13

**DOSE:** 20 MG/M3

**DISP:** Moribund Sacrifice

**HISTO:** 52478

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain

Kidney

Liver

Thyroid Gland

**OBSERVATIONS**

Lung

Interstitialium

Fibrosis

Marked

Hemorrhage

Minimal

Alveolus

Infiltration Cellular

Histiocyte, Mild

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

Note: Multifocal necrosis of epithelium in small bronchioles and alveolar ducts.

[ Fibrosis TGLs = 1-1+1R ]

[ Infiltration Cellular TGLs = 1-1 ]

Nose

Olfactory Epi

Atrophy

Moderate

Respirat Epith

Metaplasia

Squamous, Minimal

Olfactory Epi

Necrosis

Mild

Urinary Bladder

Muscularis, Serosa

Edema

Moderate

[ Edema TGLs = 2-5 ]

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1001

TRT#: 11

SEX: Male

DAY ON TEST: 5

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52464

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain	* Kidney	* Liver	Lymph Node, Bronchial
* Thyroid Gland	Urinary Bladder		

OBSERVATIONS

Brain

Note: No corresponding brain micro lesion for TGL 2.

\* Lung

Alveolar Epith  
Alveolus

Hemorrhage  
Hyperplasia  
Infiltration Cellular  
Inflammation

Moderate  
Minimal  
Histiocyte, Minimal  
Acute, Mild

[ Hemorrhage TGLs = 1-6+1 ]

\* Nose

Olfactory Epi  
Olfactory Epi  
Respirat Epith

Atrophy  
Necrosis  
Necrosis

Minimal  
Moderate  
Minimal

PRIMARY CAUSE OF DEATH

- Lung Hemorrhage

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1002

TRT#: 11

SEX: Male

DAY ON TEST: 7

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52465

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain  
Urinary Bladder

\* Kidney

\* Liver

\* Thyroid Gland

OBSERVATIONS

\* Lung

Alveolar Epith  
Alveolus

Hemorrhage  
Hyperplasia  
Infiltration Cellular  
Inflammation  
Necrosis

Marked  
Moderate  
Histiocyte, Minimal  
Acute, Mild  
Minimal

[ Hemorrhage TGLs = 2-1+5 ]

\* Nose

Olfactory Epi  
Olfactory Epi  
Respirat Epith

Atrophy  
Necrosis  
Necrosis

Mild  
Moderate  
Mild

Urin Bladder

Note: NCL for TGL 1 in bladder.

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 1003

**TRT#:** 11

**SEX:** Male

**DAY ON TEST:** 6

**DOSE:** 40 MG/M3

**DISP:** Natural Death

**HISTO:** 52466

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain  
Urinary Bladder

\* Kidney

\* Liver

\* Thyroid Gland

**OBSERVATIONS**

Brain

Note: NCL for TGL 1 in brain.

\* Lung

Alveolar Epith  
Alveolus

Hemorrhage  
Hyperplasia  
Infiltration Cellular  
Inflammation

Mild  
Minimal  
Histiocyte, Mild  
Acute, Mild

Bronchiole, Epithelium

Necrosis

Minimal

[ Hemorrhage TGLs = 2-5+1 ]

\* Nose

Olfactory Epi  
Respirat Epith

Necrosis  
Necrosis

Moderate  
Minimal

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1004

TRT#: 11

SEX: Male

DAY ON TEST: 6

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52467

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain	* Kidney	* Liver	Lymph Node
* Thyroid Gland	Urinary Bladder		

OBSERVATIONS

* Lung		Hemorrhage	Moderate
	Alveolar Epith	Hyperplasia	Minimal
	Alveolus	Infiltration Cellular	Histiocyte, Minimal
		Inflammation	Acute, Mild
[ Hemorrhage TGLs = 1-1+5 ]			
* Nose	Olfactory Epi	Necrosis	Moderate
	Respirat Epith	Necrosis	Minimal

Note: Hard to tell necrosis from autolysis.

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 1005

**TRT#:** 11

**SEX:** Male

**DAY ON TEST:** 7

**DOSE:** 40 MG/M3

**DISP:** Natural Death

**HISTO:** 52468

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

\* Kidney  
Urinary Bladder

\* Liver

Testes

\* Thyroid Gland

**OBSERVATIONS**

Brain		Hemorrhage	Minimal
* Lung		Hemorrhage	Moderate
	Alveolar Epith	Hyperplasia	Minimal
	Alveolus	Infiltration Cellular	Histiocyte, Minimal
		Inflammation	Acute, Mild
	Bronchiole, Epithelium	Necrosis	Minimal
[ Hemorrhage TGLs = 1-1+5 ]			
* Nose	Olfactory Epi	Atrophy	Mild
	Respirat Epith	Metaplasia	Squamous, Minimal
	Olfactory Epi	Necrosis	Moderate
	Respirat Epith	Necrosis	Mild
Testes			
Note: NCL for TGL 2 in testis			
Urin Bladder			
Note: NCL for TGL 3 in urinary bladder.			

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 101

**TRT#:** 2

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52459

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

\* Kidney

\* Liver

\* Lung

\* Nose

\* Thyroid Gland

---



**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 102

**TRT#:** 2

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52460

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

\* Kidney

\* Liver

\* Lung

\* Nose

\* Thyroid Gland

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 103

**TRT#:** 2

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52461

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

\* Kidney

\* Liver

\* Lung

\* Nose

\* Thyroid Gland

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 104

**TRT#:** 2

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52462

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

\* Kidney

\* Liver

\* Lung

\* Nose

\* Thyroid Gland

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 105

**TRT#:** 2

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** CONTROL

**DISP:** Terminal Sacrifice

**HISTO:** 52463

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain  
\* Nose

\* Kidney  
\* Thyroid Gland

\* Liver

\* Lung

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 301

**TRT#:** 4

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 2.5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52509

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 302

**TRT#:** 4

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 2.5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52510

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

<b>ANIMAL ID:</b> 303	<b>TRT#:</b> 4	<b>SEX:</b> Female	<b>DAY ON TEST:</b> 16
	<b>DOSE:</b> 2.5 MG/M3	<b>DISP:</b> Terminal Sacrifice	<b>HISTO:</b> 52511
<b>OBSERVATIONS</b>			
Lung	Bronchiole, Epithelium	Necrosis	Minimal
Nose	Olfactory Epi	Atrophy	Mild
	Olfactory Epi	Necrosis	Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

<b>ANIMAL ID:</b> 304	<b>TRT#:</b> 4	<b>SEX:</b> Female	<b>DAY ON TEST:</b> 16
	<b>DOSE:</b> 2.5 MG/M3	<b>DISP:</b> Terminal Sacrifice	<b>HISTO:</b> 52512

---

**OBSERVATIONS**

Lung	Bronchiole, Epithelium	Vacuolization Cytoplasmic	Minimal
Nose	Olfactory Epi	Atrophy	Mild
	Olfactory Epi	Necrosis	Minimal

---



Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 305

**TRT#:** 4

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 2.5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52513

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Minimal

Olfactory Epi

Necrosis

Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 501

**TRT#:** 6

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52499

---

**OBSERVATIONS**

Lung	Bronchiole, Epithelium	Vacuolization Cytoplasmic	Minimal
Nose	Olfactory Epi	Atrophy	Mild
	Olfactory Epi	Necrosis	Minimal

Note: olfact lesions most notable on medial edge of several ethmoturbinates in xs 3; no atrophy in xs2.

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 502

**TRT#:** 6

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52500

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Lymph Node

---

**OBSERVATIONS**

Int Sm Duoden

Note: this tissue was a histologically normal pancreatic lymph node.

Lung

Bronchiole, Epithelium

Necrosis

Minimal

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Lymph Node

Note: Slide 5 is normal pancreatic lymph node.

Nose

Olfactory Epi

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

---

**ANIMAL ID:** 503

**TRT#:** 6

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52501

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Mild

Respirat Epith

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

---

**Experiment Number:** 60311 - 01

**Test Type:** 14-DAY

**Route:** RESPIRATORY EXPOSURE WHOLE BODY

**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

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

**Date Report Requested:** 09/13/2016

**Time Report Requested:** 11:25:33

**First Dose M/F:** 08/02/04 / 08/02/04

**Lab:** BNW

---

**ANIMAL ID:** 504

**TRT#:** 6

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52502

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Mild

---

**Experiment Number:** 60311 - 01

**Test Type:** 14-DAY

**Route:** RESPIRATORY EXPOSURE WHOLE BODY

**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

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

**Date Report Requested:** 09/13/2016

**Time Report Requested:** 11:25:33

**First Dose M/F:** 08/02/04 / 08/02/04

**Lab:** BNW

---

**ANIMAL ID:** 505

**TRT#:** 6

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 5 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52503

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Minimal

Nose

Olfactory Epi

Atrophy

Mild

---

Experiment Number: 60311 - 01

Test Type: 14-DAY

Route: RESPIRATORY EXPOSURE WHOLE BODY

Species/Strain: RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**

Cobalt

CAS Number: 7440-48-4

Date Report Requested: 09/13/2016

Time Report Requested: 11:25:33

First Dose M/F: 08/02/04 / 08/02/04

Lab: BNW

ANIMAL ID: 701

TRT#: 8

SEX: Female

DAY ON TEST: 16

DOSE: 10 MG/M3

DISP: Terminal Sacrifice

HISTO: 52489

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain

**OBSERVATIONS**

Lung

Interstitialium

Fibrosis

Minimal

Bronchiole, Epithelium

Necrosis

Minimal

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

Nose

Olfactory Epi

Atrophy

Mild

Respirat Epith

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 702

TRT#: 8

SEX: Female

DAY ON TEST: 16

DOSE: 10 MG/M3

DISP: Terminal Sacrifice

HISTO: 52490

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain

OBSERVATIONS

Lung	Interstitialium	Fibrosis	Minimal
	Bronchiole, Epithelium	Necrosis	Minimal
	Bronchiole, Epithelium	Vacuolization Cytoplasmic	Minimal
Nose	Olfactory Epi	Atrophy	Mild
	Olfactory Epi	Necrosis	Minimal

Note: olfact lesions worst in xs3



**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 703

**TRT#:** 8

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 10 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52491

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

---

**OBSERVATIONS**

Lung	Interstitialium	Fibrosis	Minimal
	Bronchiole, Epithelium	Necrosis	Minimal
	Bronchiole, Epithelium	Vacuolization Cytoplasmic	Mild
Nose	Olfactory Epi	Atrophy	Mild
	Respirat Epith	Atrophy	Mild
	Olfactory Epi	Necrosis	Minimal

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 704

**TRT#:** 8

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 10 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52492

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

---

**OBSERVATIONS**

Lung	Interstitialium	Fibrosis	Minimal
	Bronchiole, Epithelium	Necrosis	Minimal
	Bronchiole, Epithelium	Vacuolization Cytoplasmic	Mild
Nose	Olfactory Epi	Atrophy	Mild
	Olfactory Epi	Necrosis	Minimal

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

---

**ANIMAL ID:** 705

**TRT#:** 8

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 10 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52493

---

**ORGAN AND ACCOUNTABLE SITE STATUS**

---

**NORMAL**

Brain

---

**OBSERVATIONS**

Lung

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

Nose

Olfactory Epi

Atrophy

Mild

Olfactory Epi

Necrosis

Minimal

---

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 901

**TRT#:** 10

**SEX:** Female

**DAY ON TEST:** 5

**DOSE:** 20 MG/M3

**DISP:** Natural Death

**HISTO:** 52479

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Kidney

Liver

Thyroid Gland

**OBSERVATIONS**

Brain

Hemorrhage

Moderate

[ Hemorrhage TGLs = 1-6 ]

Lung

Hemorrhage

Mild

Alveolar Epith

Hyperplasia

Minimal

Alveolus

Infiltration Cellular

Histiocyte, Mild

Inflammation

Acute, Minimal

Bronchiole, Epithelium

Necrosis

Minimal

[ Hemorrhage TGLs = 2-1+5 ]

Nose

Atrophy

Mild

Olfactory Epi

Necrosis

Moderate

Olfactory Epi

Necrosis

Mild

Respirat Epith

Necrosis

**PRIMARY CAUSE OF DEATH**

- Lung Hemorrhage

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 902

**TRT#:** 10

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 20 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52480

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain	Kidney	Liver	Thyroid Gland
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**OBSERVATIONS**

Lung	Interstitium Alveolus Bronchiole, Epithelium Bronchiole, Epithelium	Fibrosis Infiltration Cellular Necrosis Vacuolization Cytoplasmic	Moderate Histiocyte, Mild Minimal Mild
[ Fibrosis TGLs = 2-1 ] Nose	Olfactory Epi Respirat Epith Olfactory Epi Respirat Epith	Atrophy Foreign Body Metaplasia Necrosis Necrosis	Moderate Squamous, Minimal Minimal Minimal

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 903

**TRT#:** 10

**SEX:** Female

**DAY ON TEST:** 16

**DOSE:** 20 MG/M3

**DISP:** Terminal Sacrifice

**HISTO:** 52481

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain

Kidney

Liver

Thyroid Gland

**OBSERVATIONS**

Lung

Interstitialium

Fibrosis

Moderate

Alveolus

Infiltration Cellular

Histiocyte, Mild

Bronchiole, Epithelium

Vacuolization Cytoplasmic

Mild

[ Fibrosis TGLs = 1-1 ]

Nose

Olfactory Epi

Atrophy

Moderate

Respirat Epith

Atrophy

Moderate

Olfactory Epi

Metaplasia

Squamous, Minimal

Olfactory Epi

Necrosis

Mild

Respirat Epith

Necrosis

Minimal

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 904

**TRT#:** 10

**SEX:** Female

**DAY ON TEST:** 7

**DOSE:** 20 MG/M3

**DISP:** Natural Death

**HISTO:** 52482

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Brain

Kidney

Liver

Thyroid Gland

**OBSERVATIONS**

Lung

Alveolar Epith

Hemorrhage

Moderate

Alveolus

Hyperplasia

Minimal

Infiltration Cellular

Histiocyte, Mild

Inflammation

Acute, Minimal

Bronchiole, Epithelium

Necrosis

Minimal

[ Hemorrhage TGLs = 1-1+5 ]

Nose

Respirat Epith

Necrosis

Mild

Olfactory Epi

Necrosis

Moderate

**Experiment Number:** 60311 - 01  
**Test Type:** 14-DAY  
**Route:** RESPIRATORY EXPOSURE WHOLE BODY  
**Species/Strain:** RATS/F 344/N

**P14: INDIVIDUAL ANIMAL PATHOLOGY DATA**  
 Cobalt  
**CAS Number:** 7440-48-4

**Date Report Requested:** 09/13/2016  
**Time Report Requested:** 11:25:33  
**First Dose M/F:** 08/02/04 / 08/02/04  
**Lab:** BNW

**ANIMAL ID:** 905

**TRT#:** 10

**SEX:** Female

**DAY ON TEST:** 13

**DOSE:** 20 MG/M3

**DISP:** Natural Death

**HISTO:** 52483

**ORGAN AND ACCOUNTABLE SITE STATUS**

**NORMAL**

Kidney

Liver

Thyroid Gland

**OBSERVATIONS**

Brain

Hemorrhage

Minimal

Lung

Interstitialium

Fibrosis

Moderate

Alveolus

Hemorrhage

Minimal

Bronchiole, Epithelium

Infiltration Cellular

Histiocyte, Mild

Vacuolization Cytoplasmic

Minimal

[ Fibrosis TGLs = 1-1 ]

[ Hemorrhage TGLs = 1-1 ]

Nose

Olfactory Epi

Atrophy

Moderate

Respirat Epith

Necrosis

Minimal

Olfactory Epi

Necrosis

Minimal



Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1101

TRT#: 12

SEX: Female

DAY ON TEST: 6

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52469

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

\* Kidney

\* Liver

\* Thyroid Gland

OBSERVATIONS

Brain

[ Hemorrhage TGLs = 2-6 ]

Hemorrhage

Mild

\* Lung

Alveolar Epith

Alveolus

Bronchiole, Epithelium

Hemorrhage

Hyperplasia

Infiltration Cellular

Inflammation

Necrosis

Moderate

Minimal

Histiocyte, Mild

Acute, Mild

Minimal

\* Nose

[ Hemorrhage TGLs = 1-1+5 ]

Olfactory Epi

Respirat Epith

Necrosis

Necrosis

Moderate

Minimal

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1102

TRT#: 12

SEX: Female

DAY ON TEST: 5

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52470

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain

\* Kidney

\* Liver

\* Thyroid Gland

OBSERVATIONS

\* Lung

Alveolus

Hemorrhage

Mild

Infiltration Cellular

Histiocyte, Minimal

Inflammation

Acute, Minimal

Bronchiole, Epithelium

Necrosis

Minimal

[ Hemorrhage TGLs = 1-1+5 ]

\* Nose

Olfactory Epi

Necrosis

Moderate

Respirat Epith

Necrosis

Minimal

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1103

TRT#: 12

SEX: Female

DAY ON TEST: 6

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52471

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain	* Kidney	* Liver	* Thyroid Gland
Trachea	Urinary Bladder		

OBSERVATIONS

Brain

Note: NCL for TGL 3 in brain.

\* Lung

Alveolar Epith  
Alveolus

Hemorrhage  
Hyperplasia  
Infiltration Cellular  
Inflammation

Moderate  
Minimal  
Histiocyte, Minimal  
Acute, Minimal

[ Hemorrhage TGLs = 2-1+5 ]

\* Nose

Respirat Epith  
Olfactory Epi

Inflammation  
Necrosis  
Necrosis

Acute, Minimal  
Minimal  
Moderate

Trachea

Note: NCL for TGL 1 in trachea.

Urin Bladder

Note: NCL for TGL 4 in bladder.

PRIMARY CAUSE OF DEATH

- Lung Hemorrhage

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1104

TRT#: 12

SEX: Female

DAY ON TEST: 6

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52472

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

Brain

\* Kidney

\* Liver

Urinary Bladder

MISSING

\* Thyroid Gland

OBSERVATIONS

Brain

Note: NCL for TGL 2 in brain.

\* Lung

Alveolus

Hemorrhage

Moderate

Infiltration Cellular

Histiocyte, Mild

Inflammation

Acute, Mild

Bronchiole, Epithelium

Necrosis

Minimal

[ Hemorrhage TGLs = 3-5 ]

\* Nose

Respirat Epith

Necrosis

Mild

Olfactory Epi

Necrosis

Moderate

Urin Bladder

Note: NCL for TGL 1 in bladder.

PRIMARY CAUSE OF DEATH

- Lung Hemorrhage

Experiment Number: 60311 - 01  
Test Type: 14-DAY  
Route: RESPIRATORY EXPOSURE WHOLE BODY  
Species/Strain: RATS/F 344/N

P14: INDIVIDUAL ANIMAL PATHOLOGY DATA  
Cobalt  
CAS Number: 7440-48-4

Date Report Requested: 09/13/2016  
Time Report Requested: 11:25:33  
First Dose M/F: 08/02/04 / 08/02/04  
Lab: BNW

ANIMAL ID: 1105

TRT#: 12

SEX: Female

DAY ON TEST: 7

DOSE: 40 MG/M3

DISP: Natural Death

HISTO: 52473

ORGAN AND ACCOUNTABLE SITE STATUS

NORMAL

\* Kidney

\* Liver

\* Thyroid Gland

Trachea

OBSERVATIONS

Brain

Hemorrhage

Mild

\* Lung

Hemorrhage

Moderate

Alveolus

Infiltration Cellular

Histiocyte, Moderate

Inflammation

Acute, Minimal

[ Hemorrhage TGLs = 2-1+5 ]

\* Nose

Olfactory Epi

Atrophy

Mild

Olfactory Epi

Metaplasia

Squamous, Minimal

Olfactory Epi

Necrosis

Moderate

Respirat Epith

Necrosis

Mild

Trachea

Note: NCL for TGL 1 in trachea.

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