Table L-3-3. (Continued)
Analysis of White Blood Cell (WBC) Count (Discrete)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED						
		Abnormal Low vs. Normal		Abnormal High vs. Normal		
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,059					AGE (p=0.047) RACE (p<0.001) CSMOK (p<0.001)
Background RH	371	1.11 (0.57,2.17)	0.754	1.03 (0.59,1.79)	0.925	
Low RH	259	1.32 (0.65,2.68)	0.445	1.56 (0.87,2.80)	0.133	
High RH	258	1.25 (0.59,2.65)	0.563	0.88 (0.46,1.68)	0.694	
Low plus High RH	517	1.28 (0.72,2.27)	0.393	1.18 (0.73,1.91)	0.489	

[a] Relative risk and confidence interval relative to Comparisons.

[b] Adjusted for percent body fat at the time of duty in SEA, change in body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-3-3. (Continued)
Analysis of White Blood Cell (WBC) Count (Discrete)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED						
		Analysis Results for Log_2 (Current Dioxin + 1)				
		Abnormal Low vs. Normal		Abnormal High vs. Normal		
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	887	0.94 (0.74,1.20)	0.622	0.86 (0.71,1.05)	0.136	PACKYR (p<0.001) AGE*RACE (p=0.009)
5	887	0.97 (0.78,1.20)**	0.766**	0.92 (0.78,1.07)**	0.272**	CURR*RACE (p=0.049) PACKYR (p<0.001) AGE*RACE (p=0.005)
6[c]	886	0.95 (0.76,1.19)**	0.675**	0.87 (0.74,1.03)**	0.105**	CURR*RACE (p=0.037) PACKYR (p<0.001) AGE*RACE (p=0.004)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log_2 (current dioxin + 1)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted relative risk, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-3 for further analysis of this interaction.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-4.
Analysis of Hemoglobin (gm/dl) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,059	15.65**			DXCAT*CSMOK (p=0.050) AGE (p=0.009) RACE (p<0.001) PACKYR (p=0.068)
Background RH	370	15.66**	0.01 (-0.11,0.13)**	0.862**	
Low RH	259	15.58**	-0.07 (-0.20,0.06)**	0.299**	
High RH	258	15.70**	0.04 (-0.09,0.18)**	0.533**	
Low plus High RH	517	15.64**	-0.01 (-0.12,0.09)**	0.789**	

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

** Categorized dioxin-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-4 for further analysis of this interaction.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-3-5.
Analysis of Hematocrit (percent) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[a]	Difference of Adj. Mean vs. Comparisons (95% C.I.)	p-Value	Covariate Remarks
Comparison	1,059	45.92**			DXCAT*CSMOK (p=0.027)
					RACE (p=0.010)
Background RH	370	45.93**	0.02 (-0.35,0.38)**	0.933**	PACKYR (p=0.091)
Low RH	259	45.62**	-0.30 (-0.71,0.11)**	0.155**	
High RH	258	46.08**	0.16 (-0.25,0.58)**	0.434**	
Low plus High RH	517	45.85**	-0.07 (-0.39,0.25)**	0.679**	

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

** Categorized dioxin-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-5 for further analysis of this interaction.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-3-6.
Analysis of Platelet Count (thousand/mm^3) (Continuous)
Occupation Removed from Final Model

a) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	248.4 (291)	247.2 (299)	255.1 (297)	0.044	0.0479 (0.0397)	0.228	AGE ($p<0.001$) PACKYR ($p<0.001$)
5	246.8 (296)	250.4 (297)	253.5 (294)	0.045	0.0524 (0.0338)	0.122	AGE ($p<0.001$) PACKYR ($p<0.001$)
6[d]	247.5 (295)	250.5 (297)	252.3 (294)	0.047	0.0428 (0.0367)	0.244	AGE ($p<0.001$) PACKYR ($p<0.001$)

[a] Transformed from square root scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on square root of platelet count versus log_2 (current dioxin +1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-7.
Analysis of Prothrombin Time (seconds) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	977	11.98**			DXCAT*AGE (p=0.004) RACE (p=0.006) CSMOK (p<0.001)
Background RH	341	12.01**	0.03 --**	0.298**	
Low RH	234	11.92**	-0.05 --**	0.121**	
High RH	240	11.97**	0.00 --**	0.931**	
Low plus High RH	474	11.95**	-0.03 --**	0.293**	

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on natural logarithm scale.

[d] P-value is based on difference of means on natural logarithm scale.

** Categorized dioxin-by-covariate interaction ($p \leq 0.05$); adjusted mean, difference of adjusted means, confidence interval, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-6 for further analysis of this interaction.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-3-8.
Analysis of Prothrombin Time (Discrete)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	977			AGE (p=0.004) PACKYR (p=0.521)
Background RH	341	2.67 (0.58,12.35)	0.208	
Low RH	234	1.92 (0.39,9.41)	0.419	
High RH	240	1.10 (0.12,10.24)	0.936	
Low plus High RH	474	1.60 (0.37,6.88)	0.525	

[a] Relative risk and confidence interval relative to Comparisons.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin >10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin >10 ppt, Initial Dioxin > 143 ppt.

Table L-3-9.
Analysis of RBC Morphology
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,061			AGE ($p<0.001$) RACE ($p=0.010$)
Background RH	371	0.78 (0.61,1.00)	0.048	
Low RH	259	0.90 (0.68,1.19)	0.462	
High RH	258	1.04 (0.78,1.37)	0.800	
Low plus High RH	517	0.97 (0.78,1.20)	0.749	

[a] Relative risk and confidence interval relative to Comparisons.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin >10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin >10 ppt, Initial Dioxin > 143 ppt.

Table L-3-9. (Continued)
Analysis of RBC Morphology
Occupation Removed from Final Model

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	888	1.06 (0.97,1.17)	0.207	AGE ($p<0.001$) RACE ($p=0.181$)
5	888	1.05 (0.97,1.14)	0.218	AGE ($p<0.001$) RACE ($p=0.178$)
6[c]	887	1.07 (0.98,1.17)	0.118	AGE ($p<0.001$) RACE ($p=0.193$)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-10.
Analysis of Absolute Neutrophils (segs) (thousand/mm^3)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[b]**			
Initial Dioxin	**n**	**Adj. Mean[ab]**	**R^2**	**Adj. Slope (Std. Error)[c]**	**p-Value**	**Covariate Remarks**
Low	174	3.606**	0.215	0.0093 (0.0116)**	0.426**	INIT*RACE (p=0.043) CSMOK (p<0.001) PACKYR (p=0.032)
Medium	172	3.616**				
High	171	3.681**				

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Slope and standard error based on natural logarithm of absolute neutrophils (segs) versus log_2 (initial dioxin).

** Log_2 (initial dioxin)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-7 for further analysis of this interaction.

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Table L-3-10. (Continued)
Analysis of Absolute Neutrophils (segs) (thousand/mm^3)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,059	3.614			CSMOK ($p<0.001$) PACKYR ($p=0.002$) AGE*RACE ($p=0.015$)
Background RH	370	3.563	-0.051 --	0.477	
Low RH	259	3.627	0.013 --	0.870	
High RH	258	3.724	0.110 --	0.186	
Low plus High RH	517	3.675	0.061 --	0.334	

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on natural logarithm scale.

[d] P-value is based on difference of means on natural logarithm scale.

Note: RH = Ranch Hand.
Comparison: Current Dioxin $\leq$ 10 ppt.
Background (Ranch Hand): Current Dioxin $\leq$ 10 ppt.
Low (Ranch Hand): Current Dioxin $>$ 10 ppt, 10 ppt $<$ Initial Dioxin $\leq$ 143 ppt.
High (Ranch Hand): Current Dioxin $>$ 10 ppt, Initial Dioxin $>$ 143 ppt.

Table L-3-10. (Continued)
Analysis of Absolute Neutrophils (segs) (thousand/mm^3)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	3.424 (291)	3.463 (299)	3.663 (297)	0.189	0.0174 (0.0080)	0.029	AGE (p=0.274) RACE (p<0.001) CSMOK (p<0.001) PACKYR (p=0.046)
5	3.421** (296)	3.476** (297)	3.662** (294)	0.194	0.0143 (0.0068)**	0.036**	CURR*RACE (p=0.021) AGE (p=0.351) CSMOK (p<0.001) PACKYR (p=0.045)
6[d]	3.430** (295)	3.480** (297)	3.653** (294)	0.194	0.0135 (0.0074)**	0.068**	CURR*RACE (p=0.022) AGE (p=0.386) CSMOK (p<0.001) PACKYR (p=0.051)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of absolute neutrophils (segs) versus log_2 (current dioxin + 1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

** Log_2 (current dioxin + 1)-by-covariate interaction ($0.01 < p \leq 0.05$); adjusted mean, adjusted slope, standard error, and p-value derived from a model fitted after deletion of this interaction; refer to Appendix Table L-4-7 for further analysis of this interaction.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-11.
Analysis of Absolute Neutrophils (bands) (thousand/mm^3)
(Continuous) (Nonzero Measurements)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[b]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	140	0.142	0.101	-0.0167 (0.0291)	0.566	CSMOK ($p<0.001$) RACE ($p=0.001$)
Medium	144	0.159				
High	144	0.146				

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Slope and standard error based on natural logarithm of absolute neutrophils (bands) versus log_2 (initial dioxin).

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Table L-3-11. (Continued)
Analysis of Absolute Neutrophils (bands) (thousand/mm^3)
(Continuous) (Nonzero Measurements)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	884	0.157			AGE (p=0.008) CSMOK*RACE (p=0.041)
Background RH	308	0.153	-0.004 --	0.642	
Low RH	213	0.159	0.002 --	0.792	
High RH	215	0.158	0.001 --	0.917	
Low plus High RH	428	0.158	0.001 --	0.812	

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on natural logarithm scale.

[d] P-value is based on difference of means on natural logarithm scale.

Note: RH = Ranch Hand.
Comparison: Current Dioxin $\leq$ 10 ppt.
Background (Ranch Hand): Current Dioxin $\leq$ 10 ppt.
Low (Ranch Hand): Current Dioxin $>$ 10 ppt, 10 ppt $<$ Initial Dioxin $\leq$ 143 ppt.
High (Ranch Hand): Current Dioxin $>$ 10 ppt, Initial Dioxin $>$ 143 ppt.

Table L-3-11. (Continued)
Analysis of Absolute Neutrophils (bands) (thousand/mm^3)
(Continuous)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED

Model[b]	Current Dioxin Category Adjusted Mean[a]/(n) Low	Medium	High	Analysis Results for Log_2 (Current Dioxin + 1) R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	0.155 (243)	0.154 (243)	0.158 (250)	0.071	0.0028 (0.0200)	0.890	AGE (p=0.102) CSMOK (p<0.001) RACE (p=0.004)
5	0.157 (244)	0.147 (243)	0.168 (249)	0.071	0.0030 (0.0168)	0.857	AGE (p=0.098) CSMOK (p<0.001) RACE (p=0.004)
6[d]	0.160 (243)	0.147 (243)	0.166 (249)	0.074	-0.0090 (0.0185)	0.627	AGE (p=0.145) CSMOK (p<0.001) RACE (p=0.005)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of absolute neutrophils (bands) versus log_2 (current dioxin + 1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-12.
Analysis of Absolute Lymphocytes (thousand/mm^3)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[b]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	174	1.917	0.076	0.0057 (0.0131)	0.663	CSMOK ($p<0.001$) AGE*RACE ($p=0.263$)
Medium	172	1.940				
High	171	1.978				

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Slope and standard error based on natural logarithm of absolute lymphocytes versus log_2 (initial dioxin).

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Table L-3-12. (Continued)
Analysis of Absolute Lymphocytes (thousand/mm^3)
Occupation Removed from Final Model

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,059	1.935			CSMOK ($p<0.001$) PACKYR ($p=0.110$)
Background RH	370	1.912	-0.023 --	0.558	
Low RH	259	1.914	-0.021 --	0.642	
High RH	258	1.941	0.006 --	0.907	
Low plus High RH	517	1.927	-0.008 --	0.822	

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on natural logarithm scale.

[d] P-value is based on difference of means on natural logarithm scale.

Note: RH = Ranch Hand.
Comparison: Current Dioxin $\leq$ 10 ppt.
Background (Ranch Hand): Current Dioxin $\leq$ 10 ppt.
Low (Ranch Hand): Current Dioxin $>$ 10 ppt, 10 ppt $<$ Initial Dioxin $\leq$ 143 ppt.
High (Ranch Hand): Current Dioxin $>$ 10 ppt, Initial Dioxin $>$ 143 ppt.

Table L-3-12. (Continued)
Analysis of Absolute Lymphocytes (thousand/mm^3)
Occupation Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED

	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	1.934 (291)	1.976 (299)	1.961 (297)	0.090	0.0039 (0.0084)	0.648	CSMOK (p<0.001) PACKYR (p=0.052) AGE*RACE (p=0.115)
5	1.927 (296)	1.979 (297)	1.963 (294)	0.090	0.0045 (0.0072)	0.536	CSMOK (p<0.001) PACKYR (p=0.052) AGE*RACE (p=0.116)
6[d]	1.947 (295)	1.988 (297)	1.951 (294)	0.092	0.0010 (0.0078)	0.899	CSMOK (p<0.001) PACKYR (p=0.067) AGE*RACE (p=0.102)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of absolute lymphocytes versus log_2 (current dioxin +1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table L-3-13.
Analysis of Absolute Eosinophils
(Zero versus Nonzero)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
517	1.04 (0.84,1.29)	0.722	AGE (p=0.973) RACE (p=0.079)

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[b] Relative risk for a twofold increase in initial dioxin.

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED

	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
6[c]	887	1.13 (0.98,1.29)	0.095	RACE*CSMOK (p=0.015)

[a] Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

APPENDIX L-4.

Interaction Tables for the Hematology Assessment Occupation Removed from Final Model

This appendix contains exposure analyses results of interactions between covariates and dioxin after occupation has been removed from those final dioxin models (Models 2 through 6) that contained occupation. These tables are supplements to tables in Appendix L-3, which are main effects results with occupation removed from the model. Results are presented for separate strata of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The analysis model, covariate involved in the interaction, and a reference to the analysis table in Chapter 16 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix L-4 Table	Chapter 16 Table	Appendix L-3 Table	Dependent Variable	Model	Covariate
L-4-1	16-3	L-3-1	Red Blood Cell (RBC) Count (Continuous)	3	Current Cigarette Smoking
L-4-2	16-5	L-3-2	White Blood Cell (WBC) Count (Continuous)	2 5 6	Race Race Race
L-4-3	16-6	L-3-3	White Blood Cell (WBC) Count (Discrete)	5 6	Race Race
L-4-4	16-7	L-3-4	Hemoglobin (Continuous)	3	Current Cigarette Smoking
L-4-5	16-9	L-3-5	Hematocrit (Continuous)	3	Current Cigarette Smoking
L-4-6	16-13	L-3-7	Prothrombin Time (Continuous)	3	Age
L-4-7	16-16	L-3-10	Absolute Neutrophils (segs)	2 5	Race Race

Table L-4-1.
Interaction Table for Red Blood Cell (RBC) Count (million/mm^3) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Current Cigarette Smoking: Tables 16-3 and L-3-1)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0-Never Smoked	Comparison	282	5.065		
	Background RH	108	5.019	-0.046 (-0.130,0.037)	0.280
	Low RH	72	5.051	-0.014 (-0.111,0.084)	0.785
	High RH	65	5.016	-0.049 (-0.151,0.053)	0.345
	Low plus High RH	137	5.034	-0.030 (-0.107,0.047)	0.438
0-Former Smoker	Comparison	528	5.051		
	Background RH	168	4.987	-0.063 (-0.129,0.002)	0.058
	Low RH	126	5.008	-0.043 (-0.116,0.030)	0.250
	High RH	113	5.023	-0.027 (-0.104,0.050)	0.486
	Low plus High RH	239	5.015	-0.036 (-0.093,0.022)	0.226
>0-20 Cigarettes/Day	Comparison	152	5.098		
	Background RH	59	5.172	0.073 (-0.040,0.187)	0.207
	Low RH	38	4.992	-0.106 (-0.240,0.028)	0.120
	High RH	49	5.079	-0.019 (-0.140,0.102)	0.761
	Low plus High RH	87	5.041	-0.057 (-0.156,0.042)	0.259
>20 Cigarettes/Day	Comparison	97	5.103		
	Background RH	35	5.270	0.167 (0.022,0.313)	0.024
	Low RH	23	5.192	0.089 (-0.082,0.261)	0.307
	High RH	31	5.113	0.010 (-0.142,0.162)	0.896
	Low plus High RH	54	5.146	0.044 (-0.081,0.169)	0.493

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-4-2.
Interaction Table for White Blood Cell (WBC) Count (thousand/mm^3) (Continuous)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Race: Tables 16-5 and L-3-2)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	17	5.18	0.1110 (0.0411)	0.007
	Medium	10	6.95		
	High	9	7.09		
Non-Black	Low	157	7.24	0.0040 (0.0087)	0.641
	Medium	162	7.32		
	High	162	7.31		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-5 and L-3-2)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	13	5.76	0.0659 (0.0271)	0.015
	Medium	23	5.66		
	High	15	7.25		
Non-Black	Low	283	7.05	0.0076 (0.0051)	0.140
	Medium	274	7.19		
	High	279	7.35		

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-5 and L-3-2)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	13	5.80	0.0635 (0.0272)	0.020
	Medium	23	5.68		
	High	15	7.25		
Non-Black	Low	282	7.08	0.0056 (0.0056)	0.312
	Medium	274	7.19		
	High	279	7.30		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm of WBC count versus log_2 dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-4-3.
Interaction Table for White Blood Cell (WBC) Count (Discrete)
Occupation Removed from Final Model

a) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-6 and L-3-3)

Analysis Results for Log_2 (Current Dioxin + 1)

Stratum	Current Dioxin	n	Percent			Abnormal Low vs. Normal		Abnormal High vs. Normal	
			Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	283	2.8	91.9	5.3	1.05 (0.84,1.32)	0.676	0.92 (0.79,1.08)	0.307
	Medium	274	3.3	89.1	7.7				
	High	279	3.6	90.7	5.7				
Black	Low	13	23.1	69.2	7.7	0.53 (0.27,1.02)	0.057	--	--
	Medium	23	21.7	78.3	0.0				
	High	15	0.0	100.0	0.0				

b) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-6 and L-3-3)

Analysis Results for Log_2 (Current Dioxin + 1)

Stratum	Current Dioxin	n	Percent			Abnormal Low vs. Normal		Abnormal High vs. Normal	
			Abnormal Low	Normal	Abnormal High	Adj. Relative Risk (95% C.I.)[a]	p-Value	Adj. Relative Risk (95% C.I.)[a]	p-Value
Non-Black	Low	282	2.8	91.8	5.3	1.03 (0.81,1.31)	0.792	0.88 (0.75,1.04)	0.133
	Medium	274	3.3	89.1	7.7				
	High	279	3.6	90.7	5.7				
Black	Low	13	23.1	69.2	7.7	0.53 (0.28,1.02)	0.059	--	--
	Medium	23	21.7	78.3	0.0				
	High	15	0.0	100.0	0.0				

[a] Relative risk for a twofold increase in current dioxin.

--: Relative risk, confidence interval, and p-value not presented due to the sparse number of abnormalities.

Note: Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table L-4-4.
Interaction Table for Hemoglobin (gm/dl) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Current Cigarette Smoking: Tables 16-7 and L-3-4)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0-Never Smoked	Comparison	282	15.50		
	Background RH	108	15.40	-0.10 (-0.31,0.12)	0.389
	Low RH	72	15.49	-0.01 (-0.26,0.24)	0.937
	High RH	65	15.54	0.05 (-0.22,0.31)	0.735
	Low plus High RH	137	15.51	0.02 (-0.18,0.22)	0.873
0-Former Smoker	Comparison	528	15.55		
	Background RH	168	15.47	-0.08 (-0.25,0.09)	0.376
	Low RH	126	15.40	-0.15 (-0.34,0.04)	0.124
	High RH	113	15.64	0.09 (-0.11,0.29)	0.386
	Low plus High RH	239	15.51	-0.04 (-0.19,0.11)	0.629
>0-20 Cigarettes/Day	Comparison	152	15.87		
	Background RH	59	16.15	0.28 (-0.02,0.57)	0.064
	Low RH	38	15.76	-0.10 (-0.45,0.24)	0.556
	High RH	49	15.85	-0.02 (-0.33,0.30)	0.905
	Low plus High RH	87	15.81	-0.06 (-0.31,0.20)	0.667
>20 Cigarettes/Day	Comparison	97	16.17		
	Background RH	35	16.57	0.40 (0.02,0.78)	0.038
	Low RH	23	16.32	0.15 (-0.29,0.60)	0.508
	High RH	31	16.08	-0.10 (-0.49,0.30)	0.624
	Low plus High RH	54	16.18	0.01 (-0.32,0.33)	0.965

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-4-5.
Interaction Table for Hematocrit (percent) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Current Cigarette Smoking: Tables 16-9 and L-3-5)

Stratum	Dioxin Category	n	Adjusted Mean	Difference of Adjusted Mean vs. Comparisons (95% C.I.)	p-Value
0-Never Smoked	Comparison	282	45.39		
	Background RH	108	45.07	-0.32 (-0.99,0.35)	0.355
	Low RH	72	45.33	-0.06 (-0.84,0.73)	0.889
	High RH	65	45.65	0.26 (-0.56,1.08)	0.534
	Low plus High RH	137	45.48	0.09 (-0.52,0.71)	0.766
0-Former Smoker	Comparison	528	45.52		
	Background RH	168	45.30	-0.22 (-0.75,0.30)	0.403
	Low RH	126	44.98	-0.54 (-1.13,0.04)	0.069
	High RH	113	45.88	0.36 (-0.25,0.98)	0.247
	Low plus High RH	239	45.41	-0.12 (-0.58,0.35)	0.624
>0-20 Cigarettes/Day	Comparison	152	46.78		
	Background RH	59	47.54	0.75 (-0.16,1.67)	0.104
	Low RH	38	46.23	-0.55 (-1.63,0.52)	0.315
	High RH	49	46.66	-0.12 (-1.09,0.86)	0.814
	Low plus High RH	87	46.47	-0.31 (-1.10,0.49)	0.449
>20 Cigarettes/Day	Comparison	97	47.58		
	Background RH	35	48.79	1.20 (0.03,2.37)	0.044
	Low RH	23	48.02	0.44 (-0.93,1.81)	0.530
	High RH	31	46.99	-0.60 (-1.82,0.62)	0.336
	Low plus High RH	54	47.43	-0.16 (-1.16,0.85)	0.761

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-4-6.
Interaction Table for Prothrombin Time (seconds) (Continuous)
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Age: Tables 16-13 and L-3-7)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]	p-Value[c]
Born ≥ 1942	Comparison	426	12.01		
	Background RH	121	12.07	0.06 --	0.203
	Low RH	75	11.85	-0.16 --	0.005
	High RH	146	11.96	-0.05 --	0.277
	Low plus High RH	221	11.92	-0.09 --	0.023
Born < 1942	Comparison	551	11.95		
	Background RH	220	11.97	0.02 --	0.548
	Low RH	159	11.96	0.01 --	0.822
	High RH	94	11.99	0.04 --	0.436
	Low plus High RH	253	11.97	0.02 --	0.554

[a] Transformed from natural logarithm scale.

[b] Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

[c] P-value is based on difference of means on natural logarithm scale.

[d] Slope and standard error based on natural logarithm of prothrombin time versus $\log_2$ dioxin.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table L-4-7.
Interaction Table for Absolute Neutrophils (segs) (thousand/mm^3)
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Race: Tables 16-16 and L-3-10)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	17	2.737	0.1202 (0.0560)	0.032
	Medium	10	3.636		
	High	9	3.697		
Non-Black	Low	157	4.161	0.0045 (0.0118)	0.701
	Medium	162	4.071		
	High	162	4.150		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-16 and L-3-10)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	13	2.764	0.0972 (0.0364)	0.008
	Medium	23	2.845		
	High	15	3.681		
Non-Black	Low	283	3.960	0.0113 (0.0069)	0.103
	Medium	274	4.030		
	High	279	4.189		

Table L-4-7. (Continued)
Interaction Table for Absolute Neutrophils (segs) (thousand/mm^3)
Occupation Removed from Final Model

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Race: Tables 16-16 and L-3-10)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[b]	p-Value
Black	Low	12	2.775	0.0956 (0.0365)	0.009
	Medium	23	2.851		
	High	15	3.679		
Non-Black	Low	282	3.967	0.0104 (0.0075)	0.166
	Medium	274	4.030		
	High	279	4.172		

[a] Transformed from natural logarithm scale.

[b] Slope and standard error based on natural logarithm versus log_2 dioxin.

Note: Model 2: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

APPENDIX M-1.

Dependent Variable-Covariate Associations for the Renal Assessment

This appendix contains results of tests of association between each dependent variable and candidate covariates for the adjusted analysis of each dependent variable. Pearson's chi-square test (continuity-adjusted for 2×2 tables) is used for the significance testing of the associations between each discrete dependent variable and the candidate covariate. When a candidate covariate is continuous in nature (for example, age), the covariate is discretized prior to the analysis of the discrete dependent variable. Pearson's correlation coefficient is used for significance testing of the associations between each continuous dependent variable and a continuous candidate covariate. When a candidate covariate is discrete in nature, means (transformed back to the original scale, if necessary) are presented and an analysis of variance is used to investigate the difference between the means.

Table M-1-1.
Dependent Variable-Covariate Associations for the Renal Assessment

Dependent Variable	Level	Age			Occupation			
		Born ≥1942	Born <1942	p-Value	Officer	Enlisted Flyer	Enlisted Groundcrew	p-Value
Kidney Disease	Yes	(n=947) 13.2%	(n=1,235) 18.8%	0.001	(n=843) 15.4%	(n=358) 15.6%	(n=981) 17.4%	0.472
Kidney Stones from KUB X Ray	Present	(n=956) 1.9%	(n=1,277) 3.6%	0.023	(n=869) 3.5%	(n=365) 3.3%	(n=999) 2.2%	0.236
Urinary Protein	Present	(n=953) 3.8%	(n=1,276) 5.2%	0.145	(n=869) 3.6%	(n=363) 4.7%	(n=997) 5.4%	0.162
Urinary Red Blood Cell Count	Abnormal	(n=953) 2.6%	(n=1,276) 2.8%	0.879	(n=869) 1.7%	(n=363) 2.2%	(n=997) 3.8%	0.018
Urinary White Blood Cell Count	Abnormal	(n=953) 2.2%	(n=1,276) 3.5%	0.109	(n=869) 2.0%	(n=363) 4.7%	(n=997) 3.1%	0.031
Serum Creatinine[a]		n=2,232 r=0.061		n=2,232 0.004	(n=869) $\bar{x}$=0.9794	(n=364) $\bar{x}$=0.9591	(n=999) $\bar{x}$=0.9745	0.125
Urine Specific Gravity		n=2,229 r=-0.037		n=2,229 0.081	(n=869) $\bar{x}$=1.0182	(n=363) $\bar{x}$=1.0182	(n=997) $\bar{x}$=1.0196	<0.001

[a] Analysis performed on natural logarithm scale; means transformed from natural logarithm scale.

Table M-1-1. (Continued)
Dependent Variable-Covariate Associations for the Renal Assessment

Dependent Variable	Level	Race			Diabetic Class			
		Black	Non-Black	p-Value	Normal	Impaired	Diabetic	p-Value
Kidney Disease	Yes	(n=130) 12.3%	(n=2,052) 16.6%	0.244	(n=1,621) 14.7%	(n=241) 17.4%	(n=317) 24.0%	<0.001
Kidney Stones from KUB X Ray	Present	(n=131) 2.3%	(n=2,102) 2.9%	0.891	(n=1,653) 2.9%	(n=251) 2.8%	(n=326) 2.8%	0.987
Urinary Protein	Present	(n=131) 7.6%	(n=2,098) 4.4%	0.131	(n=1,651) 2.7%	(n=251) 4.8%	(n=325) 13.9%	<0.001
Urinary Red Blood Cell Count	Abnormal	(n=131) 6.9%	(n=2,098) 2.5%	0.007	(n=1,651) 2.6%	(n=251) 3.6%	(n=325) 2.8%	0.674
Urinary White Blood Cell Count	Abnormal	(n=131) 5.3%	(n=2,098) 2.8%	0.151	(n=1,651) 2.4%	(n=251) 2.8%	(n=325) 5.9%	0.003
Serum Creatinine[a]		(n=131) $\bar{x}$=1.0513	(n=2,101) $\bar{x}$=0.9692	<0.001	(n=1,653) $\bar{x}$=0.9750	(n=251) $\bar{x}$=0.9877	(n=326) $\bar{x}$=0.9584	0.081
Urine Specific Gravity		(n=131) $\bar{x}$=1.0198	(n=2,098) $\bar{x}$=1.0188	0.069	(n=1,651) $\bar{x}$=1.0186	(n=251) $\bar{x}$=1.0194	(n=325) $\bar{x}$=1.0198	0.002

[a] Analysis performed on natural logarithm scale; means transformed from natural logarithm scale.

APPENDIX M-2.

Interaction Tables for the Renal Assessment

This appendix contains exposure analyses results of interactions between covariates and group or dioxin. Results are presented for each separate stratum of the covariate and include sample sizes, percent abnormal, relative risks, confidence intervals, and p-values for discrete dependent variables. Sample sizes, adjusted means, differences of adjusted means and confidence intervals or adjusted slopes and standard errors, and p-values are given for continuous dependent variables. Means are transformed back to the original scale, if necessary. Chapter 7, Statistical Methods, provides further details on the analytical approaches used in the interaction analyses. The covariate involved in the interaction and a reference to the analysis table in Chapter 17 are given in the heading of each subtable. A summary of the interactions described in this appendix follows.

Appendix M-2 Table	Chapter 17 Table	Dependent Variable	Model	Covariate
M-2-1	17-4	Kidney Stones	2	Diabetic Class
M-2-2	17-5	Urinary Protein	4 5 6	Diabetic Class Diabetic Class Diabetic Class
M-2-3	17-6	Urinary Red Blood Cell Count	3 4 5 6	Occupation Occupation Occupation Occupation
M-2-4	17-8	Serum Creatinine	1 2 3	Diabetic Class Diabetic Class Diabetic Class
M-2-5	17-9	Urine Specific Gravity	2	Age

Table M-2-1.
Interaction Table for Kidney Stones

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Diabetic Class: Table 17-4)					
Initial Dioxin Category Summary Statistics				**Analysis Results for Log_2 (Initial Dioxin)**	
Stratum	**Initial Dioxin**	**n**	**Percent Present**	**Adjusted Relative Risk (95% C.I.)[a]**	**p-Value**
Normal	Low	120	4.2	0.83 (0.50,1.39)	0.486
	Medium	117	4.3		
	High	111	2.7		
Impaired	Low	22	4.6	0.57 (0.08,4.07)	0.571
	Medium	24	0.0		
	High	28	0.0		
Diabetic	Low	32	9.4	0.01 (0.00,0.96)	0.048
	Medium	32	0.0		
	High	34	0.0		

[a] Relative risk for a twofold increase in initial dioxin.

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

Table M-2-2.
Interaction Table for Urinary Protein

a) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Diabetic Class: Table 17-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Normal	Low	239	3.8	0.69 (0.46,1.04)	0.076
	Medium	210	2.4		
	High	195	1.0		
Impaired	Low	27	0.0	2.17 (1.19,3.94)	0.011
	Medium	32	6.3		
	High	48	8.3		
Diabetic	Low	28	10.7	1.20 (0.86,1.68)	0.289
	Medium	57	14.0		
	High	55	10.9		

b) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Diabetic Class: Table 17-5)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Normal	Low	250	3.6	0.78 (0.58,1.06)	0.109
	Medium	206	2.4		
	High	188	1.1		
Impaired	Low	23	0.0	1.92 (1.09,3.37)	0.024
	Medium	35	2.9		
	High	49	10.2		
Diabetic	Low	26	11.5	1.18 (0.88,1.58)	0.279
	Medium	55	10.9		
	High	59	13.6		

Table M-2-2. (Continued)
Interaction Table for Urinary Protein

c) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Diabetic Class: Table 17-5)					
Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Present	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Normal	Low	249	3.6	0.78 (0.57,1.06)	0.115
	Medium	206	2.4		
	High	188	1.1		
Impaired	Low	23	0.0	1.93 (1.10,3.40)	0.022
	Medium	35	2.9		
	High	49	10.2		
Diabetic	Low	26	11.5	1.20 (0.88,1.65)	0.248
	Medium	55	10.9		
	High	59	13.6		

[a] Relative risk for a twofold increase in current dioxin.

Note: Model 4: Low = ≤8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table M-2-3.
Interaction Table for Urinary Red Blood Cell Count

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED (Dioxin Category-by-Occupation: Table 17-6)

Stratum	Dioxin Category	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)	p-Value
Officer	Comparison	409	1.0		
	Background RH	236	0.9	0.89 (0.16,4.89)	0.889
	Low RH	103	4.9	4.92 (1.28,18.83)	0.020
	High RH	9	22.2	28.11 (4.34,181.98)	<0.001
	Low plus High RH	112	6.3	6.43 (1.83,22.59)	0.004
Enlisted Flyer	Comparison	173	1.7		
	Background RH	40	5.0	3.18 (0.50,20.11)	0.219
	Low RH	55	0.0	--	--
	High RH	54	3.7	2.25 (0.36,13.99)	0.385
	Low plus High RH	109	1.8	1.03 (0.17,6.29)	0.971
Enlisted Groundcrew	Comparison	480	2.9		
	Background RH	98	4.1	1.30 (0.41,4.14)	0.658
	Low RH	101	1.0	0.29 (0.04,2.25)	0.236
	High RH	196	5.6	2.25 (0.99,5.13)	0.054
	Low plus High RH	297	4.0	1.44 (0.65,3.18)	0.364

b) MODEL 4: RANCH HANDS — CURRENT DIOXIN — ADJUSTED (Current Dioxin-by-Occupation: Table 17-6)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	193	0.5	4.31 (1.55,12.00)	0.005
	Medium	141	4.3		
	High	14	14.3		
Enlisted Flyer	Low	31	3.2	1.22 (0.53,2.83)	0.641
	Medium	57	1.8		
	High	61	3.3		
Enlisted Groundcrew	Low	71	4.2	0.96 (0.70,1.31)	0.781
	Medium	101	3.0		
	High	223	4.5		

Table M-2-3. (Continued)
Interaction Table for Urinary Red Blood Cell Count

c) MODEL 5: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 17-6)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	192	0.5	2.80 (1.34,5.83)	0.006
	Medium	136	4.4		
	High	20	10.0		
Enlisted Flyer	Low	33	3.0	1.12 (0.54,2.32)	0.754
	Medium	56	1.8		
	High	60	3.3		
Enlisted Groundcrew	Low	75	4.0	0.96 (0.73,1.26)	0.780
	Medium	104	2.9		
	High	216	4.6		

d) MODEL 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED
(Current Dioxin-by-Occupation: Table 17-6)

Current Dioxin Category Summary Statistics				Analysis Results for Log_2 (Current Dioxin + 1)	
Stratum	Current Dioxin	n	Percent Abnormal	Adjusted Relative Risk (95% C.I.)[a]	p-Value
Officer	Low	192	0.5	3.13 (1.37,7.12)	0.007
	Medium	136	4.4		
	High	20	10.0		
Enlisted Flyer	Low	32	3.1	1.15 (0.53,2.49)	0.716
	Medium	56	1.8		
	High	60	3.3		
Enlisted Groundcrew	Low	75	4.0	0.99 (0.74,1.31)	0.923
	Medium	104	2.9		
	High	216	4.6		

[a] Relative risk for a twofold increase in current dioxin.

Note: Model 3: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.
Model 4: Low = ≤ 8.1 ppt; Medium = > 8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = > 46-128 ppq; High = > 128 ppq.

Table M-2-4.
Interaction Table for Serum Creatinine (mg/dl)

Stratum	Occupational Category	Group	n	Adjusted Mean[a]	Difference of Adjusted Means (95% C.I.)[b]	p-Value[c]
a) MODEL 1: RANCH HANDS VS. COMPARISONS — ADJUSTED (Group-by-Diabetic Class: Table 17-8)						
Normal	*All*	*Ranch Hand*	*688*	*1.0068*	*-0.0131 --*	*0.111*
		Comparison	*965*	*1.0199*		
Impaired	*All*	*Ranch Hand*	*119*	*1.0390*	*0.0333 --*	*0.113*
		Comparison	*132*	*1.0057*		
Diabetic	*All*	*Ranch Hand*	*144*	*0.9982*	*0.0402 --*	*0.024*
		Comparison	*182*	*0.9579*		
Normal	Officer	Ranch Hand	271	1.0198	-0.0081 --	0.537
		Comparison	399	1.0279		
	Enlisted Flyer	Ranch Hand	116	1.0006	-0.0091 --	0.656
		Comparison	139	1.0097		
	Enlisted Groundcrew	Ranch Hand	301	1.0011	-0.0191 --	0.123
		Comparison	427	1.0201		
Impaired	Officer	Ranch Hand	39	1.0422	0.0120 --	0.746
		Comparison	45	1.0302		
	Enlisted Flyer	Ranch Hand	21	0.9849	0.0133 --	0.774
		Comparison	27	0.9716		
	Enlisted Groundcrew	Ranch Hand	59	1.0794	0.0575 --	0.066
		Comparison	60	1.0219		
Diabetic	Officer	Ranch Hand	57	0.9787	0.0413 --	0.155
		Comparison	58	0.9374		
	Enlisted Flyer	Ranch Hand	25	0.9860	0.0485 --	0.233
		Comparison	36	0.9376		
	Enlisted Groundcrew	Ranch Hand	62	1.0331	0.0363 --	0.184
		Comparison	88	0.9967		

Table M-2-4. (Continued)
Interaction Table for Serum Creatinine (mg/dl)

b) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED
(Initial Dioxin-by-Diabetic Class: Table 17-8)

Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean[a]	Adjusted Slope (Std. Error)[d]	p-Value
Normal	Low	120	1.0323	-0.0184 (0.0086)	0.032
	Medium	117	0.9822		
	High	111	0.9749		
Impaired	Low	22	0.9863	0.0373 (0.0176)	0.035
	Medium	24	0.9970		
	High	28	1.1184		
Diabetic	Low	32	1.0488	-0.0113 (0.0145)	0.439
	Medium	32	0.9784		
	High	34	0.9632		

c) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED
(Dioxin Category-by-Diabetic Class: Table 17-8)

Stratum	Dioxin Category	n	Adjusted Mean[a]	Difference of Adjusted Mean vs. Comparisons (95% C.I.)[b]	p-Value[c]
Normal	Comparison	802	1.0163		
	Background RH	298	0.9963	-0.0200 --	0.080
	Low RH	176	1.0301	0.0137 --	0.326
	High RH	172	0.9866	-0.0297 --	0.037
	Low plus High RH	348	1.0111	-0.0053 --	0.502
Impaired	Comparison	109	0.9946		
	Background RH	33	1.0216	0.0271 --	0.423
	Low RH	33	0.9602	-0.0344 --	0.281
	High RH	41	1.0737	0.0791 --	0.014
	Low plus High RH	74	1.0231	0.0285 --	0.329
Diabetic	Comparison	151	0.9472		
	Background RH	42	0.9872	0.0400 --	0.158
	Low RH	51	1.0051	0.0579 --	0.028
	High RH	47	0.9642	0.0169 --	0.526
	Low plus High RH	98	0.9862	0.0390 --	0.065

[a] Transformed from natural logarithm scale.

[b] Difference of means after transformation to original scale; confidence interval on difference of means not presented because analysis was performed on natural logarithm scale.

[c] P-value is based on difference of means on natural logarithm scale.

[d] Slope and standard error based on natural logarithm of serum creatinine versus log_2 (initial dioxin).

Note: RH = Ranch Hand.
Model 2: Low = 39-98 ppt; Medium = >98-232 ppt; High = > 232 ppt.
Model 3: Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table M-2-5.
Interaction Table for Urine Specific Gravity

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED (Initial Dioxin-by-Age: Table 17-9)					
Initial Dioxin Category Summary Statistics				Analysis Results for Log_2 (Initial Dioxin)	
Stratum	Initial Dioxin	n	Adjusted Mean	Adjusted Slope (Std. Error)	p-Value
Born ≥ 1942	Low	54	1.0191	-0.0002 (0.0003)	0.535
	Medium	72	1.0194		
	High	111	1.0183		
Born < 1942	Low	119	1.0178	0.0009 (0.0004)	0.012
	Medium	101	1.0188		
	High	61	1.0203		

Note: Low = 39-98 ppt; Medium = > 98-232 ppt; High = > 232 ppt.

APPENDIX M-3.

Renal Analysis Tables
Occupation and Diabetic Class Removed from Final Model

This appendix contains results of exposure analyses after occupation or diabetic class has been removed from those final dioxin models (Models 2 through 6) that contained occupation or diabetic class. These analyses are performed to investigate the relationship of the dependent variable to dioxin without adjusting any effects due to occupation or diabetic class. The format of these tables closely parallels the adjusted panels of Chapter 17 tables. A summary of the tables found in this appendix follows.

Appendix M-3 Table	Chapter 17 Table	Dependent Variable
M-3-1	17-3	Kidney Disease
M-3-2	17-4	Kidney Stones
M-3-3	17-5	Urinary Protein
M-3-4	17-6	Urinary Red Blood Cell Count
M-3-5	17-7	Urinary White Blood Cell Count
M-3-6	17-8	Serum Creatinine
M-3-7	17-9	Urine Specific Gravity

Table M-3-1.
Analysis of Kidney Disease
Occupation and Diabetic Class Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	**n**	**Adj. Relative Risk (95% C.I.)[ab]**	**p-Value**	**Covariate Remarks**
Comparison	1,041			AGE ($p<0.001$)
Background RH	364	1.02 (0.73,1.42)	0.905	
Low RH	253	1.00 (0.69,1.45)	0.985	
High RH	256	1.17 (0.81,1.70)	0.393	
Low plus High RH	509	1.08 (0.81,1.44)	0.580	

[a] Relative risk and confidence interval relative to Comparisons.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table M-3-2.
Analysis of Kidney Stones
Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
	Analysis Results for Log_2 (Initial Dioxin)[a]		
n	**Adj. Relative Risk (95% C.I.)[b]**	**p-Value**	**Covariate Remarks**
520	0.65 (0.39,1.06)	0.061	AGE ($p=0.057$)

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[b] Relative risk for a twofold increase in initial dioxin.

Table M-3-3.
Analysis of Urinary Protein
Occupation and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED			
Analysis Results for Log_2 (Initial Dioxin)[a]			
n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
518	1.18 (0.87,1.59)	0.287	

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin.

[b] Relative risk for a twofold increase in initial dioxin.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,062			AGE (p=0.012)
Background RH	374	1.28 (0.72,2.25)	0.401	
Low RH	259	0.64 (0.30,1.33)	0.230	
High RH	259	0.99 (0.50,1.92)	0.965	
Low plus High RH	518	0.80 (0.47,1.36)	0.407	

[a] Relative risk and confidence interval relative to Comparison.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table M-3-3. (Continued)
Analysis of Urinary Protein
Occupation and Diabetic Class Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	892	1.18 (0.94,1.49)	0.157	AGE*RACE (p=0.039)
5	892	1.16 (0.95,1.43)	0.145	AGE*RACE (p=0.035)
6[c]	891	1.15 (0.93,1.44)	0.203	AGE*RACE (p=0.036)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table M-3-4.
Analysis of Urinary Red Blood Cell Count
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED				
Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,062			AGE (p=0.054) RACE (p=0.004)
Background RH	374	1.07 (0.47,2.47)	0.869	
Low RH	259	1.08 (0.43,2.73)	0.873	
High RH	259	3.39 (1.69,6.79)	0.001	
Low plus High RH	518	2.10 (1.13,3.90)	0.020	

[a] Relative risk and confidence interval relative to Comparison.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED				
	Analysis Results for Log_2 (Current Dioxin + 1)			
Model[a]	n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	892	1.18 (0.92,1.50)	0.197	
5	892	1.16 (0.93,1.44)	0.194	
6[c]	891	1.16 (0.92,1.46)	0.224	

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids.

Table M-3-5.
Analysis of Urinary White Blood Cell Count
Occupation Removed from Final Model

a) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Relative Risk (95% C.I.)[ab]	p-Value	Covariate Remarks
Comparison	1,063			AGE (p=0.040) RACE (p=0.069)
Background RH	374	1.03 (0.47,2.24)	0.947	
Low RH	260	1.34 (0.61,2.92)	0.467	
High RH	260	1.81 (0.85,3.87)	0.124	
Low plus High RH	520	1.55 (0.84,2.86)	0.160	

[a] Relative risk and confidence interval relative to Comparison.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED

Model[a]	Analysis Results for Log_2 (Current Dioxin + 1) n	Adj. Relative Risk (95% C.I.)[b]	p-Value	Covariate Remarks
4	892	1.13 (0.87,1.47)	0.370	AGE (p=0.174)
5	892	1.10 (0.87,1.38)	0.430	AGE (p=0.186)
6[c]	891	1.15 (0.89,1.48)	0.278	AGE (p=0.153)

[a] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[b] Relative risk for a twofold increase in current dioxin.

[c] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Table M-3-6.
Analysis of Serum Creatinine (mg/dl)
Occupation and Diabetic Class Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED

Initial Dioxin Category Summary Statistics			Analysis Results for Log_2 (Initial Dioxin)[a]			
Initial Dioxin	n	Adj. Mean[ab]	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
Low	174	1.0286	0.012	-0.0069 (0.0069)	0.320	AGE (p=0.471) RACE (p=0.072)
Medium	173	0.9819				
High	173	0.9952				

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Slope and standard error based on natural logarithm of serum creatinine versus log_2 (initial dioxin).

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

b) MODEL 3: RANCH HANDS AND COMPARISONS BY DIOXIN CATEGORY — ADJUSTED

Dioxin Category	n	Adj. Mean[ab]	Difference of Adj. Mean vs. Comparisons (95% C.I.)[c]	p-Value[d]	Covariate Remarks
Comparison	1,063	1.0051			AGE*RACE (p=0.033)
Background RH	374	0.9992	-0.0058 --	0.561	
Low RH	260	1.0178	0.0127 --	0.274	
High RH	260	0.9977	-0.0073 --	0.526	
Low plus High RH	520	1.0082	0.0031 --	0.761	

[a] Transformed from natural logarithm scale.

[b] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

[c] Difference of adjusted means after transformation to original scale; confidence interval on difference of adjusted means not presented because analysis was performed on natural logarithm scale.

[d] P-value is based on difference of means on natural logarithm scale.

Note: RH = Ranch Hand.
Comparison: Current Dioxin ≤ 10 ppt.
Background (Ranch Hand): Current Dioxin ≤ 10 ppt.
Low (Ranch Hand): Current Dioxin > 10 ppt, 10 ppt < Initial Dioxin ≤ 143 ppt.
High (Ranch Hand): Current Dioxin > 10 ppt, Initial Dioxin > 143 ppt.

Table M-3-6. (Continued)
Analysis of Serum Creatinine (mg/dl)
Occupation and Diabetic Class Removed from Final Model

c) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean[a]/(n)			Analysis Results for Log_2 (Current Dioxin + 1)			
Model[b]	Low	Medium	High	R^2	Adj. Slope (Std. Error)[c]	p-Value	Covariate Remarks
4	1.0018 (295)	1.0158 (300)	1.0005 (299)	0.016	0.0033 (0.0043)	0.437	AGE (p=0.013) RACE (p=0.001)
5	0.9972 (300)	1.0144 (297)	1.0066 (297)	0.017	0.0039 (0.0037)	0.291	AGE (p=0.012) RACE (p=0.002)
6[d]	1.0001 (299)	1.0149 (297)	1.0054 (297)	0.016	0.0025 (0.0040)	0.525	AGE (p=0.014) RACE (p=0.002)

[a] Transformed from natural logarithm scale.

[b] Model 4: Log_2 (lipid-adjusted current dioxin + 1).
Model 5: Log_2 (whole-weight current dioxin + 1).
Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

[c] Slope and standard error based on natural logarithm of serum creatinine versus log_2 (current dioxin + 1).

[d] Adjusted for log_2 total lipids in addition to covariates specified under "Covariate Remarks" column.

Note: Model 4: Low = ≤ 8.1 ppt; Medium = >8.1-20.5 ppt; High = >20.5 ppt.
Models 5 and 6: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

Table M-3-7.
Analysis of Urine Specific Gravity
Occupation Removed from Final Model

a) MODEL 2: RANCH HANDS — INITIAL DIOXIN — ADJUSTED						
Initial Dioxin Category Summary Statistics			**Analysis Results for Log_2 (Initial Dioxin)[a]**			
Initial Dioxin	**n**	**Adj. Mean[a]**	**R^2**	**Adj. Slope (Std. Error)**	**p-Value**	**Covariate Remarks**
Low	173	1.0184	0.028	0.0003 (0.0002)	0.139	AGE (p=0.800)
Medium	173	1.0192				
High	172	1.0193				

[a] Adjusted for percent body fat at the time of duty in SEA, change in percent body fat from the time of duty in SEA to the date of the blood draw for dioxin, and covariates specified under "Covariate Remarks" column.

Note: Low = 39-98 ppt; Medium = >98-232 ppt; High = >232 ppt.

b) MODELS 4, 5, AND 6: RANCH HANDS — CURRENT DIOXIN — ADJUSTED							
	Current Dioxin Category Adjusted Mean/(n)			**Analysis Results for Log_2 (Current Dioxin + 1)**			
Model[a]	**Low**	**Medium**	**High**	**R^2**	**Adj. Slope (Std. Error)**	**p-Value**	**Covariate Remarks**
6	1.0180 (299)	1.0187 (296)	1.0194 (296)	0.008	0.0003 (0.0001)	0.027	

[a] Model 6: Log_2 (whole-weight current dioxin + 1), adjusted for log_2 total lipids.

Note: Low = ≤ 46 ppq; Medium = >46-128 ppq; High = >128 ppq.

APPENDIX N-1.

Dependent Variable-Covariate Associations for the Endocrine Assessment

This appendix contains results of tests of association between each dependent variable and candidate covariates for the adjusted analysis. Pearson's chi-square test (continuity-adjusted for 2×2 tables) is used for the significance testing of the associations between each discrete dependent variable and the candidate covariate. When a candidate covariate is continuous in nature (for example, age), the covariate is discretized prior to the analysis of the discrete dependent variable. Pearson's correlation coefficient is used for significance testing of the associations between each continuous dependent variable and a continuous candidate covariate. When a candidate covariate is discrete in nature, means (transformed back to the original scale, if necessary) are presented and an analysis of variance is used to investigate the difference between the means.