

**Exhibit No. \_\_\_ (YKGM-3)**  
**Docket No. UG-060265**  
**Witness: Yohannes K.G. Mariam**

**BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION,**

**Complainant,**

**v.**

**CASCADE NATURAL GAS  
CORPORATION,**

**Respondent.**

**DOCKET NO. UG-060265**

**EXHIBIT TO TESTIMONY OF  
YOHANNES K.G. MARIAM, PH.D.  
STAFF OF  
WASHINGTON UTILITIES AND  
TRANSPORTATION COMMISSION**

*Statistical Analysis of Temperature Data*

**August 15, 2006**

**Table 1. Results of Descriptive Statistics**

Date: 08/07/06 Time: 08:50

Sample: 1955:01 2005:12

	BELLINGHAM	BREMERTON	WALLA WALLA	YAKIMA
Mean	466.1958	421.4088	418.4079	500.3864
Median	486	427.25	367.5	479.25
Maximum	1146.5	1033	1415.5	1556.5
Minimum	11	11	0	0
Std. Dev.	266.2383	263.3752	353.8442	389.3939
Skewness	0.074378	0.054582	0.45863	0.340789
Kurtosis	1.926873	1.734839	2.146596	1.970375
Jarque-Bera	28.36516	39.23871	33.29	38.87925
Probability	0.000001	0.000000	0.000000	0.000000
Sum	270393.6	246102.7	212969.6	306236.5
Sum Sq. Dev.	41041170	40440669	63604498	92644481
Observations	580	584	509	612

**Table 2a: Results of Unit Root Test (Bellingham and Bremerton)**

ADF Test Statistic	-25.65753	1% Critical Value*	-3.9791		ADF Test Statistic	-21.59198	1% Critical Value*	-3.9863	
		5% Critical Value	-3.42				5% Critical Value	-3.4234	
		10% Critical Value	-3.1323				10% Critical Value	-3.1344	
Augmented Dickey-Fuller Test Equation					Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(BELLINGHAM,3)					Dependent Variable: D(BREMERTON,3)				
Method: Least Squares					Method: Least Squares				
Date: 08/07/06 Time: 08:48					Date: 08/07/06 Time: 08:49				
Sample(adjusted): 1955:01 2005:08					Sample: 1955:01 2005:12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Bellingham(-1),2)	-20.15016	0.785351	-25.65753	0	D(Bremerton(-1),2)	-20.3329	0.941688	-21.59198	0
D(Bellingham(-1),3)	17.71559	0.754768	23.47157	0	D(Bremerton(-1),3)	17.88345	0.904162	19.77905	0
D(Bellingham(-2),3)	16.09313	0.696438	23.10777	0	D(Bremerton(-2),3)	16.26133	0.832133	19.54175	0
D(Bellingham(-3),3)	14.4615	0.627716	23.0383	0	D(Bremerton(-3),3)	14.59892	0.750471	19.45301	0
D(Bellingham(-4),3)	12.77486	0.559099	22.84903	0	D(Bremerton(-4),3)	12.89914	0.668862	19.2852	0
D(Bellingham(-5),3)	11.07811	0.49307	22.46761	0	D(Bremerton(-5),3)	11.20445	0.590762	18.96607	0
D(Bellingham(-6),3)	9.398091	0.428832	21.91558	0	D(Bremerton(-6),3)	9.495726	0.514113	18.47012	0
D(Bellingham(-7),3)	7.725733	0.363663	21.2442	0	D(Bremerton(-7),3)	7.797167	0.435073	17.92154	0
D(Bellingham(-8),3)	5.991143	0.29901	20.03657	0	D(Bremerton(-8),3)	6.081321	0.357667	17.00274	0
D(Bellingham(-9),3)	4.244076	0.233634	18.16546	0	D(Bremerton(-9),3)	4.336105	0.279734	15.5008	0
D(Bellingham(-10),3)	2.601348	0.166778	15.59767	0	D(Bremerton(-10),3)	2.654205	0.199645	13.29461	0
D(Bellingham(-11),3)	1.19614	0.099431	12.02985	0	D(Bremerton(-11),3)	1.194286	0.119844	9.965352	0
D(Bellingham(-12),3)	0.350506	0.039956	8.772189	0	D(Bremerton(-12),3)	0.350681	0.048126	7.286711	0
C	0.025167	7.407899	0.003397	0.9973	C	1.92783	6.751533	0.28554	0.7754
Trend	0.001063	0.021951	0.04843	0.9614	Trend	-0.001746	0.022399	-0.07793	0.9379
R-squared	0.915798	Mean dependent var	0.01546		R-squared	0.92343	Mean dependent var	-1.771	
Adjusted R-squared	0.913595	S.D. dependent var	304.236		Adjusted R-squared	0.920468	S.D. dependent var	268.807	
S.E. of regression	89.4296	Akaike info criterion	11.8517		S.E. of regression	75.80715	Akaike info criterion	11.5332	
Sum squared resid	4278744	Schwarz criterion	11.9692		Sum squared resid	2080314	Schwarz criterion	11.6897	
Log likelihood	-3244.21	F-statistic	415.627		Log likelihood	-2159.015	F-statistic	311.835	
Durbin-Watson stat	2.15578	Prob(F-statistic)	0		Durbin-Watson stat	2.154565	Prob(F-statistic)	0	

**Table 2b: Results of Unit Root Test (Walla Walla and Yakima)**

ADF Test Statistic	-23.55323	1% Critical Value*	-3.9813		ADF Test Statistic	-25.82736	1% Critical Value*	-3.9776	
		5% Critical Value	-3.4211				5% Critical Value	-3.4192	
		10% Critical Value	-3.1329				10% Critical Value	-3.1319	
Augmented Dickey-Fuller Test Equation					Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(WALLA WALLA,3)					Dependent Variable: D(YAKIMA,3)				
Method: Least Squares					Method: Least Squares				
Date: 08/07/06 Time: 08:49					Date: 08/07/06 Time: 08:50				
Sample(adjusted): 1955:01 1995:02					Sample: 1955:01 2005:12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.	Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Walla Walla(-1),2)	-19.62792	0.833343	-23.55323	0	D(Yakima(-1),2)	-19.10531	0.739731	-25.82736	0
D(Walla Walla(-1),3)	17.25511	0.800344	21.55962	0	D(Yakima(-1),3)	16.75071	0.709986	23.59301	0
D(Walla Walla(-2),3)	15.69795	0.738491	21.25679	0	D(Yakima(-2),3)	15.21766	0.653999	23.26862	0
D(Walla Walla(-3),3)	14.06572	0.666706	21.09734	0	D(Yakima(-3),3)	13.64865	0.590112	23.12893	0
D(Walla Walla(-4),3)	12.39921	0.594683	20.85013	0	D(Yakima(-4),3)	12.03161	0.526642	22.8459	0
D(Walla Walla(-5),3)	10.76875	0.52416	20.54478	0	D(Yakima(-5),3)	10.43545	0.464305	22.47541	0
D(Walla Walla(-6),3)	9.127886	0.454739	20.07281	0	D(Yakima(-6),3)	8.841856	0.403171	21.9308	0
D(Walla Walla(-7),3)	7.481165	0.385673	19.39768	0	D(Yakima(-7),3)	7.25936	0.341598	21.25116	0
D(Walla Walla(-8),3)	5.834625	0.31669	18.42376	0	D(Yakima(-8),3)	5.642384	0.280655	20.10434	0
D(Walla Walla(-9),3)	4.140135	0.247095	16.75524	0	D(Yakima(-9),3)	3.996899	0.219161	18.2373	0
D(Walla Walla(-10),3)	2.508812	0.176608	14.20551	0	D(Yakima(-10),3)	2.40975	0.157159	15.3332	0
D(Walla Walla(-11),3)	1.141799	0.106347	10.73652	0	D(Yakima(-11),3)	1.050214	0.094784	11.08013	0
D(Walla Walla(-12),3)	0.339659	0.043668	7.778136	0	D(Yakima(-12),3)	0.303799	0.038873	7.815244	0
C	-0.444378	11.47543	-0.038724	0.9691	C	-1.694769	9.348554	-0.181287	0.8562
Trend	-0.001096	0.041302	-0.026528	0.9788	Trend	0.006381	0.026491	0.240881	0.8097
R-squared	0.905858	Mean dependent var	-1.6131		R-squared	0.908149	Mean dependent var	-0.6397	
Adjusted R-squared	0.903036	S.D. dependent var	405.122		Adjusted R-squared	0.905995	S.D. dependent var	377.575	
S.E. of regression	126.1513	Akaike info criterion	12.5435		S.E. of regression	115.7652	Akaike info criterion	12.3652	
Sum squared resid	7431906	Schwarz criterion	12.6735		Sum squared resid	8000744	Schwarz criterion	12.4735	
Log likelihood	-3007.975	F-statistic	320.971		Log likelihood	-3768.754	F-statistic	421.62	
Durbin-Watson stat	2.140873	Prob(F-statistic)	0		Durbin-Watson stat	2.111359	Prob(F-statistic)	0	