

Exhibit No. \_\_\_\_ (YKGM-2)  
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**

*Temperature Normalization Adjustment*

**August 15, 2006**

**Table 1: Statistical Results of Weather Sensitivity Coefficients (Staff's Analytical Result)**

Variable	Bellingham-503		Bremerton-503		Walla Walla 503		Yakima 503	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	16.08991	0.0079	16.26462	0.0086	12.70251	0	13.20395	0
JANHDD	0.1734	0	0.20611	0	0.133526	0	0.132095	0
FEBHDD	0.138138	0	0.168108	0	0.117154	0	0.106898	0
MARHDD	0.147411	0	0.168555	0	0.125212	0	0.109354	0
APRHDD	0.153345	0	0.161892	0	0.116293	0	0.083647	0
MAYHDD	0.137647	0.0001	0.144825	0	0.135148	0.0002	0.065671	0.001
JUNEHDD	0.04426	0.1993	0.036115	0.2179	0.03165	0.4279	0.01085	0.8451
JULYHDD	0.038395	0.5684	0.017894	0.6696	0.056757	0.8208	0.323081	0.7586
AUGHDD	0.039686	0.6216	0.017738	0.7033	0.052205	0.7995	-0.342037	0.785
SEPHDD	0.03868	0.1463	0.038342	0.2012	0.033055	0.2111	0.088693	0.138
OCTHDD	0.154853	0	0.189601	0	0.102153	0	0.064106	0
NOVHDD	0.179689	0	0.208584	0	0.11925	0	0.125794	0
DECHDD	0.154115	0	0.185041	0	0.112627	0	0.115453	0
R-squared	0.973897		0.977373		0.983735		0.985031	
Durbin-Watson stat	2.059591		2.050633		2.089957		2.016734	

Variable	Bellingham-504		Bremerton-504		Walla Walla 504		Yakima 504	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
C	99.09677	0	145.0745	0	122.9373	0	112.726	0
JANHDD	0.644002	0	0.867991	0	0.68982	0	0.63344	0
FEBHDD	0.528481	0	0.699141	0	0.622524	0	0.516843	0
MARHDD	0.546971	0	0.668515	0	0.61392	0	0.499742	0
APRHDD	0.560954	0	0.635076	0	0.568163	0	0.331126	0
MAYHDD	0.540144	0	0.595101	0.0001	0.675732	0.0004	0.243981	0.002
JUNEHDD	0.118909	0.3421	0.092909	0.5239	0.128511	0.5496	0.112873	0.6119
JULYHDD	0.096387	0.6944	-0.005135	0.9805	0.175019	0.8974	2.998184	0.4739
AUGHDD	0.182302	0.5343	0.068173	0.7699	0.468022	0.671	0.871973	0.8611
SEPHDD	0.131213	0.1756	0.15055	0.3143	0.247997	0.0866	0.784164	0.0017
OCTHDD	0.5796	0	0.815502	0	0.585072	0	0.356632	0
NOVHDD	0.623419	0	0.834996	0	0.581739	0	0.542008	0
DECHDD	0.570704	0	0.774558	0	0.577191	0	0.552972	0
R-squared	0.97009		0.964448		0.980203		0.988665	
Durbin-Watson stat	2.063898		2.012144		2.069105		2.053634	

**Table 2: Average Difference Between Estimated & Actual use per Customer (2000-2005)**

	Rate Schedule	Actual Base Load	Estimated Base Load	Actual Use Per Customer	Estimated Use Per Customer	Average Difference (estimated less actual use per customer) for base load	
		2000-2005	2000-2005	Test Year	Test Year	Base Load	Test Year
Bellingham	503	22.18	21.70	59.60	61.70	2.18%	-4%
	504	118.44	116.23	239.71	246.43	1.87%	-3%
Bremerton	503	21.65	21.18	58.07	60.39	2.18%	-4%
	504	160.70	158.50	298.78	303.85	1.37%	-2%
Walla Walla	503	14.91	14.47	49.61	51.73	2.92%	-4%
	504	136.33	133.89	304.74	311.60	1.79%	-2%
Yakima	503	13.22	13.15	49.80	52.22	0.48%	-5%
	504	121.25	119.96	289.78	296.12	1.06%	-2%
Average	503	49.31	48.39	112.09	115.28	2.24%	-3.51%
	504	138.49	136.21	281.08	287.29	1.67%	-2.25%

**Table 3: Test Year and Normal Heating Degree Days for Bellingham, Bremerton, Walla Walla, and Yakima**

Calendar	Bellingham				Bremerton			
	Test Year (a)	NOAA Normal (1971-2000) (b)	Normal - Actual (a-b) (c)	Cascade's Normal (1951-2005) (d)	Test Year (a)	NOAA Normal (b)	Normal - Actual (a-b) (c)	Cascade's Normal (d)
Jan-05	813	820	7	756.3	666	775	109	656.5
Feb-05	709	656	-53	660.8	595	641	46	580.3
Mar-05	562	630	68	600.8	521	605	84	544.4
Apr-05	459	478	19	458.8	477	456	-21	447.8
May-05	250	329	79	332.3	267	298	31	358.9
Jun-05	196	195	-1	187	196	160	-36	239.6
Jul-05	85	98	13	93.9	124	67	-57	144.5
Aug-05	69	89	20	83.6	124	61	-63	127.7
Sep-05	287	209	-78	210.8	256	149	-107	171.7
Oct-04	447	448	1	465.2	397	393	-4	375.5
Nov-04	648	637	-11	619.8	588	612	24	546
Dec-04	735	811	76	826.5	652	777	125	695.9
Total	5,260	5,400	140	5,296	4,863	4,994	131	
Calendar	Walla Walla				Yakima			
	Test Year (a)	NOAA Normal (b)	Normal - Actual (a-b) (c)	Cascade's Normal (d)	Test Year (a)	NOAA Normal (b)	Normal - Actual (a-b) (c)	Cascade's Normal (d)
Jan-05	957	939	-18	908.3	1,073	1097	24	1008
Feb-05	704	709	5	740.3	801	821	20	801
Mar-05	475	574	99	527.9	600	682	82	655
Apr-05	349	373	24	345.1	438	474	36	465.7
May-05	134	191	57	190.5	180	275	95	274.2
Jun-05	58	69	11	53.7	106	112	6	102.4
Jul-05	0	9	9	8.8	2	28	26	29.2
Aug-05	0	9	9	6.5	7	30	23	26.8
Sep-05	72	99	27	83.6	186	162	-24	151.7
Oct-04	306	323	17	330.8	420	493	73	508.9
Nov-04	674	659	-15	679.7	819	824	5	825.5
Dec-04	830	928	98	1000.2	940	1106	166	1112.5
Total	4,559	4,882	323	4,875	5,572	6,104	532	5,961

**Table 4: Monthly Weather Sensitive Natural Gas Adjustment by Rate Schedule for Bellingham**

Variables	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Unbilled HDD	140	7	-53	68	19	79	-1	13	20	-78	1	-11	76
<b>Rate Group</b>	<b>Parameter Values</b>												
<b>Schedule 503</b>													
Number of Customers		66,473	66,681	66,898	66,872	66,803	66,850	66,832	66,904	67,119	65,010	65,594	66,137
Unbilled Sales	1720396	80685	-488193	670582	194835	726423	-2959	33358	53103	-202501	10067	-129652	774645
Usage/HDD		0.1734	0.138138	0.147411	0.153345	0.137647	0.0443	0.0384	0.0397	0.03868	0.154853	0.17969	0.15412
<b>Schedule 504</b>													
Number of Customers		8,377	8,401	8,412	8,379	8,350	8,327	8,317	8,318	8,332	8,135	8,216	8,307
Unbilled Sales	824103	37764	-235308	312876	89304	356306	-990	10421	30328	-85275	4715	-56342	360304
Usage/HDD		0.644002	0.528481	0.546971	0.560954	0.540144	0.1189	0.0964	0.1823	0.13121	0.5796	0.62342	0.5707
Total Therms Adjustment	2544499	118449	-723500	983458	284140	1082729	-3949	43780	83431	-287776	14782	-185994	1134949

**Table 5: Monthly Weather Sensitive Natural Gas Adjustment by Rate Schedule for Bremerton**

Variables	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Unbilled HDD	131	109	46	84	-21	31	-36	-57	-63	-107	-4	24	125
Rate Group	Parameter Values												
<b>Schedule 503</b>													
Number of Customers		33,174	33,252	33,309	33,251	33,191	32,149	33,041	32,996	33,105	32,435	32,766	32,990
Unbilled Sales	2164305	745287	257137	471609	-113044	149013	-41798	-33700	-36873	-135816	-24599	164027	763063
Usage/HDD		0.20611	0.168108	0.168555	0.161892	0.144825	0.036115	0.0179	0.0177	0.0383	0.189601	0.208584	0.185041
<b>Schedule 504</b>													
Number of Customers		4,425	4,455	4,455	4,437	4,427	4,209	4,435	4,431	4,421	4,332	4,383	4,411
Unbilled Sales	1232344	418654	143275	250172	-59174	81670	-14078	1298	-19031	-71217	-14131	87835	427072
Usage/HDD		0.867991	0.699141	0.668515	0.635076	0.595101	0.092909	-0.0051	0.0682	0.1506	0.815502	0.834996	0.774558
Total Therms Adjustment	3396649	1163941	400412	721781	-172219	230683	-55876	-32402	-55904	-207034	-38730	251862	1190135

**Table 6: Monthly Weather Sensitive Natural Gas Adjustment by Rate Schedule for Walla Walla**

Variables	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Unbilled HDD	323	-18	5	99	24	57	11	9	9	27	17	-15	98
<b>Rate Group</b>	<b>Parameter Values</b>												
<b>Schedule 503</b>													
Number of Customers		22,139	22,309	22,409	22,435	22,473	22,537	22,590	22,691	22,901	21,138	21,554	21,903
Unbilled Sales	763768	-53210	13068	277782	62617	173119	7846	11539	10661	20439	36708	-38555	241753
Usage/HDD		0.133526	0.117154	0.125212	0.116293	0.135148	0.0317	0.0568	0.0522	0.0331	0.102153	0.11925	0.112627
<b>Schedule 504</b>													
Number of Customers		3,646	3,661	3,667	3,653	3,615	3,592	3,591	3,600	3,611	3,471	3,525	3,596
Unbilled Sales	635295	-45272	11395	222873	49812	139238	5078	5656	15164	24179	34523	-30759	203407
Usage/HDD		0.68982	0.622524	0.61392	0.568163	0.675732	0.1285	0.175	0.468	0.248	0.585072	0.581739	0.577191
Total Therms Adjustment	1399062	-98482	24463	500655	112429	312357	12924	17196	25825	44618	71232	-69314	445160

**Table 7: Monthly Weather Sensitive Natural Gas Adjustment by Rate Schedule for Yakima**

Variables	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Unbilled HDD	532	24	20	82	36	95	6	26	23	-24	73	5	166
Rate Group	Parameter Values												
<b>Schedule 503</b>													
Number of Customers		26,480	26,473	26,389	26,199	25,734	25,367	25,049	25,012	25,015	24,810	25,554	26,266
Unbilled Sales	1214241	83949	56598	236631	78893	160548	1651	210414	-196766	-53248	116104	16073	503393
Usage/HDD		0.132095	0.106898	0.109354	0.083647	0.065671	0.0109	0.32308	-0.342	0.088693	0.0641	0.125794	0.115453
<b>Schedule 504</b>													
Number of Customers		5,864	5,872	5,863	5,828	5,785	5,732	5,717	5,703	5,691	5,630	5,749	5,833
Unbilled Sales	1748056	89148	60698	240259	69473	134086	3882	445656	114376	-107104	146572	15580	535431
Usage/HDD		0.63344	0.516843	0.499742	0.331126	0.243981	0.1129	2.99818	0.87197	0.784164	0.3566	0.542008	0.552972
Total Therms Adjustment	2962297	173097	117296	476890	148366	294634	5533	656070	-82390	-160352	262676	31653	1038824



Table 8. Comparison of Staff and Cascade's Method of Weather Normalization on Proforma Revenue and Energy

Date	Staff's Volume and Revenue Adjustments						Cascade's Volume and Revenue Adjustment						Total Adjustment	
	Schedule 503		Schedule 504		Total		Schedule 503		Schedule 504		Total			
	Energy Impact	Revenue Impact	Energy Impact	Revenue Impact	Energy Impact	Revenue Impact	Energy Impact	Revenue Impact	Energy Impact	Revenue Impact	Total	Total	Energy Impact	Revenue Impact
Month	Therms	(\$000)	Therms	(\$000)	Therms	(\$000)	Therms	(\$000)	Therms	(\$000)	Therms	(\$000)	Therms	(\$000)
Jan-05	856,710	194	500,294	97	1,357,004	292	-945,369	-214	-599,602	-117	-1,544,971	-331	2,901,975	622
Feb-05	-161,390	-37	-19,939	-4	-181,329	-40	-339,411	-77	-125,938	-25	-465,350	-101	284,020	61
Mar-05	1,656,604	375	1,026,180	200	2,682,784	575	673,815	153	418,837	82	1,092,652	234	1,590,132	341
Apr-05	223,300	51	149,415	29	372,715	80	-63,378	-14	-4,243	-1	-67,621	-15	440,336	95
May-05	1,209,104	274	711,300	138	1,920,404	412	914,980	207	461,120	90	1,376,099	297	544,304	115
Jun-05	-35,259	-8	-6,108	-1	-41,368	-9	49,761	11	24,091	5	73,851	16	-115,219	-25
Jul-05	221,611	50	463,032	90	684,643	140	276,225	63	294,051	57	570,276	120	114,367	21
Aug-05	-169,874	-38	140,837	27	-29,037	-11	238,716	54	278,698	54	517,414	108	-546,451	-119
Sep-05	-371,126	-84	-239,417	-47	-610,543	-131	-583,389	-132	-363,060	-71	-946,449	-203	335,906	72
Oct-04	138,281	31	171,680	33	309,960	65	216,574	49	208,552	41	425,126	90	-115,166	-25
Nov-04	11,893	3	16,313	3	28,207	6	-478,642	-108	-201,423	-39	-680,065	-148	708,272	154
Dec-04	2,282,855	517	1,526,213	297	3,809,068	814	1,844,471	418	1,262,569	246	3,107,039	664	702,028	151
Total	5,862,710	1,328	4,439,798	864	#####	2,193	1,804,351	409	1,653,651	322	3,458,002	731	6,844,506	1,462

\$ 0.22658

\$ 0.19469