EXHIBIT NO. ___(JAD-6)
DOCKET NO. UE-060266/UG-060267
2006 PSE GENERAL RATE CASE
WITNESS: JEFFREY A. DUBIN

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY, INC.,** **Respondent.**	**Docket No. UE-060266** **Docket No. UG-060267**

FIRST EXHIBIT (NONCONFIDENTIAL) TO THE PREFILED REBUTTAL TESTIMONY OF JEFFREY A. DUBIN ON BEHALF OF PUGET SOUND ENERGY, INC.

AUGUST 23, 2006

MASTER DATA BASE CONTENTS INDEX

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
WUTC	PSE	007	DR Resp	Re: PSE's Electric Weather Normalization Methodology (Witness: Jeffrey Dubin) Please provide all data, formulae, equations, models and detailed results of analysis used to support the weather normalization testimony of Dr. Dubin. Please provide the data in excel format with all formulae and equations intact and in executable format.	Electric Weather Normalization: System Load Normalization: Puget Sound Energy, Inc. ("PSE") provided the formula, equation/model and detailed results of the analysis used to support the electric weather normalization of Dr. Jeffrey A. Dubin in the prefiled workpapers of Dr. Dubin. Attached as Attachment A to PSE's Response to WUTC Staff Data Request No. 007, please find a CD-ROM that contains the data inputs and the Eviews program used to generate the equations for electric system loads. In particular, please see the files entitled "dlyelecloadgrc06.prg" and "data6.xls". Variable definitions are included in the Eviews code. To run the program, Eviews must be installed on the personal computer, and the folder names in the codes should be replaced appropriately. Rate Schedule Normalization: Regarding the weather normalization of electric energy by rate schedule, please see the following files provided on Attachment A to PSE's Response to WUTC Staff Data Request No. 007: (LIST OF DATA FILES) Attachment A to PSE's Response to WUTC Staff Data Request No. 007 is designated "CONFIDENTIAL" per Protective Order in WUTC Docket Nos. UE-060266 and UG-060267 and WAC 480-07-160.
WUTC	PSE	007	DR Resp Attach A (C)		Attach A - CD-ROM that contains the data inputs and the Eviews program used to generate the equations for electric system loads. In particular, please see the files entitled "dlyelecloadgrc06.prg" and "data6.xls". Data (1.) Hourly Seatac temperature dataset (a.) Hourly.csv (2.) Monthly actual usage by rate schedule (a.) Usage.csv (3.) Daily kWh usage for schedules 5, 7, 17, 24, 25, 26, 27, 29, 31, and 4 Note: The following files (items a – j) are confidential: (a.) (C) Sched05.csv (b.) (C) Sched07.csv (c.) (C) Sched17.csv (d.) (C) Sched24.csv (e.) (C) Sched25.csv (f.) (C) Sched26.csv (g.) (C) Sched27.csv (h.) (C) Sched29.csv (i.) (C) Sched31.csv (j.) (C) Sched43.csv Model (1.) 21 Accumulate Usage data.sas (2.) 22 Fit monthly usage models for schedule avg profiles.sas (3.) 23 Simulate monthly temp-adjusted usage.sas (4.) 24 Average temp-adjusted usage.sas (5.) 25 Create average usage file.sas (6.) PSE load analysis SAS macros.sas (7.) FileNms.sas (8.) Coefficients.xls Results (1.) GRC 2006 Temp Adj.xls
WUTC	PSE	007	DR Resp Supp 01	Re: PSE's Electric Weather Normalization Methodology (Witness: Jeffrey Dubin) Please provide all data, formulae, equations, models and detailed results of analysis used to support the weather normalization testimony of Dr. Dubin. Please provide the data in excel format with all formulae and equations intact and in executable format.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") First Supplemental Response to WUTC Staff Data Request No. 007, please find the following MS Excel files DRAFT Exhibit No. ___(JAD-WP06) (SummaryTablesCharts012406).xls, DRAFT Exhibit No. ___(JAD-WP07) (WeathAdjustmentSummary012406).xls, ElecTstYrAdjstmentSummary012406.xls, GasTstYrAdjustmentSummary012506.xls These files contain calculations of PSE's weather adjustment amounts using the estimated equations from Eviews. The equation coefficients in the workpaper of Jeffrey A. Dubin entitled JAD-WP07 are now linked to the appropriate equation in the "Equation" worksheets in the electric and gas adjustment files. The weather adjustment amounts in Mr. Dubin's workpaper entitled JAD-WP06 also are now linked to the appropriate source files. Mr. Dubin's workpapers were filed in this proceeding on February 15, 2006. Mr. Dubin's workpaper JAD-WP04 (ProFormaAdjustments.xls), also filed in this proceeding on February 15, 2006, is a direct copy from other MS Excel files previously submitted in other data requests. This workpaper is now replaced by Attachments B and C to PSE's First Supplemental Response to WUTC Staff Data Request No. 007. Attached as Attachment B to PSE's First Supplemental Response to WUTC Staff Data Request No. 007, please find CD-ROM containing a MS Excel file

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
					entitled, "GRC 2006 Temp Adj.xls", which is the first worksheet in Mr. Dubins workpaper entitled JAD-WP04 pertaining to electric adjustment. This file is now linked to the monthly weather adjusted GPI derived from ElecTstYrAdjstmentSummary012406.xls for electric. For PSE's gas weather adjustment, the rate class level coefficients and system level weather adjustment were not linked from the files in which they were developed to the pro forma revenue model where the final weather adjustment was calculated at the rate class level. Instead, the coefficients and system level weather adjustment were pasted into the pro forma revenue model. PSE's calculation of the gas weather normalization is presented in the file entitled, "PSE Response to NWIGU DR10 (C) Attach B Pro Forma Revenue V2.xls", found in worksheet Volume 30, which was previously submitted in PSE's Response to NWIGU Data Request No. 010, and which is also provided as Attachment C to PSE's First Supplemental Response to WUTC Staff Data Request No. 007. PSE's weather normalization coefficients at the rate class level presented in cells B19-K30 of the worksheet entitled, "GasRateSchedAdjstmnt" in Mr. Dubin's workpaper JAD-WP07 are located in cells D86-O95 of Volume 30. PSE's weather adjustment at the rate class level is calculated in the succeeding rows of Volume 30 based on these coefficients. Cells D137-P140 of the Volume 30 worksheet contain the system level weather adjustment that is developed in the worksheet entitled, "GasSystemAdjstmnt" in Mr. Dubins workpaper JAD-WP07. The adjustment was calculated as the difference between the normalized volume in cells Q13-S24 and the actual volume in cells F13-H24 of GasSystemAdjstmnt. The calculations used to reconcile this system level adjustment with the rate class level analysis are located in the succeeding rows of Volume 30. Attached as Attachment D to PSE's First Supplemental Response to WUTC Staff Data Request No. 007, please find a CD-ROM containing PSE's electric rate schedule weather normalization model. Please find the following electronic files in the following directory structure on the CD-ROM: ..\SASYoh\Code\21 Accumulate Usage data.sas ..\SASYoh\Code\22 Fit monthly usage models for schedule avg profiles.sas ..\SASYoh\Code\23 Simulate monthly temp-adjusted usage.sas ..\SASYoh\Code\24 Average temp-adjusted usage.sas ..\SASYoh\Code\25 Create average usage file.sas ..\SASYoh\Code\FileNms.sas ..\SASYoh\Code\PSE load analysis SAS macros.sas ..\SASYoh\Data\hourly.sas7bdat ..\SASYoh\Input Data\CONFIDENTIAL Input Data.zip ..\SASYoh\Parameter Inputs\daily_kwh_dgt_qnty.sas7bdat ..\SASYoh\Parameter Inputs\usage.csv Each of the SAS programs above has been modified to run using the directory structure 'C:\SASYoh\...'. In order for the programs to run without error, an additional empty directory 'C:\SASYoh\Output' must be created. The file entiled, 'CONFIDENTIAL Input Data.zip' must be unzipped prior to running the SAS programs. The 'Monthly Norm Usage.csv' file created by program '25 Create average usage.sas' file is then copied to the 'GRC 2006 Temp Adj.xls' excel file (Energy Norm tab) provided in the original Response to WUTC Staff DR No. 007. Attachment C to PSE's First Supplemental Response to WUTC DR 007 is designated CONFIDENTIAL per Protective Order in WUTC Docket Nos. UE-060266 and UG-060267.
WUTC	PSE	008	DR Resp	Re: PSE's Electric Weather Normalization Methodology (Witness: Jeffrey Dubin) Please provide daily system-wide load data and use per customer, after reducing load consumed by Schedule 48 customers, for the period 1994-2005.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 008, please find a CD-ROM that contains Schedule 48 customer loads by customer. PSE prepared this dataset for January 1995 through October 2001 (when all of the Schedule 48 customers had switched to transportation schedules and were no longer included in the system load). PSE does not consider the

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
					Schedule 48 load as a valid adjustment to system load for weather normalization purposes. There are many missing partial or full days of individual customer data that are used to calculate the total Schedule 48 load. Only 17% of the days contain complete data for all Schedule 48 customers, and 44% of the days have missing data for two or more customers. Of the days that are missing partial days or full days of data for one or more customers, most days (98%) are missing entire days of data for those individual customers. Status codes indicating the quality of daily individual customer data are included (0 = good; 99999=missing data for the entire day; and = the number of 15-minute intervals missing within the day). PSE has not archived, validated or edited daily customer data for the entire time period of interest. With this level of missing data, PSE cannot provide an accurate daily estimate of Schedule 48 volume. Attachment A to PSE's Response to WUTC Staff Data Request No. 008 is designated "CONFIDENTIAL" per Protective Order in WUTC Docket Nos. UE-060266 and UG-060267 and WAC 480-07-160.
WUTC	PSE	008	DR Resp Attach A (C)		Attach A - Schedule 48 customer loads by customer.
WUTC	PSE	009	DR Resp	Re: PSE's Natural Gas Weather Normalization Methodology (Witness: Jeffrey Dubin) Please provide all data, formulae, equations, models and detailed results of analysis used to support the weather normalization testimony of Dr. Dubin. Please provide the data in excel format with all formulae and equations intact and in executable format.	Natural Gas Weather Normalization: Gas Sendout Normalization: Puget Sound Energy, Inc. ("PSE") provided the formula, equation/model and detailed results of the analysis used to support the gas weather normalization of Dr. Jeffrey A. Dubin in the prefiled workpapers of Dr. Dubin. Attached as Attachment A to PSE's Response to WUTC Staff Data Request No. 009, please find a CD-ROM that contains the data inputs and the Eviews program used to generate the equations for gas firm, interruptible and transportation sendout. In particular, please see the files entitled "dlygasloadgrc06.prg" and "sndoutdly.xls". Variable definitions are included in the Eviews code. To run the program, Eviews must be installed on the personal computer, and the folder names in the codes should be replaced appropriately. Rate Schedule Normalization: Please see Attachment A to PSE's Response to WUTC Staff Data Request No. 009 for the Eviews program generating the rate schedule weather normalization equations and the data inputs. In particular, please see the files entitled "gasrateschedgrc06.prg" and "historicalcdarscustomerdata.xls". The definitions of variables are shown in the Eviews code. Eviews must also be installed on the personal computer and the folder names in the codes should be replaced appropriately to run these programs.
WUTC	PSE	009	DR Resp Attach A		Attach A - Eviews program generating the rate schedule weather normalization equations and the data inputs
WUTC	PSE	010	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 16, lines 4-17 Please provide all data (in excel format) on energy efficiency gains, energy conserved and energy curtailed for the past five years by rate schedule, and as a percentage of system loads.	Data on savings from various types of conservation by rate schedule is not available. Rough estimates of total savings were provided in PSE's Response to WUTC Staff Data Request No. 007. PSE tracks energy savings by energy efficiency measure and program. A detailed description of how PSE tracks and reports energy efficiency program energy savings may be found on pages one through five of the Program Measurement & Evaluation Plan, dated November 29, 2005, submitted with Cal Shirley's testimony as Exhibit No. (CES-07) and also as Attachment A to PSE's Response to WUTC Staff Data Request No. 010.
WUTC	PSE	010	DR Resp Attach A		Attach A - detailed description of how PSE tracks and reports energy efficiency program energy savings may be found on pages one through five of the Program Measurement & Evaluation Plan, dated November 29, 2005, submitted with Cal Shirley's testimony as Exhibit No. (CES-07) and also as Attachment A to PSE's Response to WUTC Staff Data

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
					Request No. 010.
WUTC	PSE	011	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 16, lines 4-17 Please provide a structural change test on use per customer data by rate schedule and system wide, after removing load consumed by Schedule 48 customers. Please provide all data (in excel format) and results.	This question can be answered more appropriately if the econometric model, time-period, and definition of structural change are properly defined. As previously explained in PSE's Response to WUTC Staff Data Request No. 007, Schedule 48 data cannot be used in the fashion suggested by the question as a reliable Schedule 48 data series for volume does not exist. Further, the Schedule 48 load is not included in the rate schedule level data since the data starts after 2001 when all the Schedule 48 loads had already left the system. This obviates the need to do a structural change test related to the effect of schedule 48 on system load.
WUTC	PSE	012	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 16, lines 4-17 Please explain your understanding of normalized rate setting related to weather normalization. In particular, explain whether you agree that the theory behind weather normalization is that, when load is normalized, on average we expect that load to be observed and the coefficients to reflect response of load under normal temperature.	There are two main reasons for temperature adjustment. The first is to set the revenue requirement based on normal weather so that the Company has the best opportunity to recover the appropriate amount of revenue if the weather is normal. Obviously, the Company can over or under collect if the weather is not normal but if the revenue requirement is not established on this basis, there is the potential for even greater distortions in revenue recovery depending on the weather variations in the rate year as compared to the test year. The second reason is to adjust the usage in the individual schedules where the usage is sensitive to temperature changes in order that the prices are neither set too high nor too low due to weather reflected in the actual test year consumption. As also stated in the Prefiled Direct Testimony of Dr. Jeffrey Dubin at page 4 lines 7-17, "Because electricity and natural gas usage are highly dependent on the weather, weather normalization is used to estimate what electric and gas loads during a rate case test year would have been if the weather had been "normal" during that test year. A corresponding adjustment is then made to the revenues a company collected during the test year in order to better estimate the amount of revenues that the company will require during the rate year. If rates are to be set based on normalized weather, this adjustment helps keep rates from being set too high if the test year was particularly warm (resulting in test year revenues being lower than normal), and helps keep rates from being set too low if the test year was particularly cold (resulting in test year revenues being higher than normal)." See also the Prefiled Direct Testimony of Dr. Jeffrey Dubin, page 6, lines 19-20 and page 7, lines 1-8: "As I stated above, electricity and natural gas usage are highly dependent on the weather. Temperature adjustment, or weather normalization, estimates electric and gas loads during a rate case test year as if the weather had been "normal" during that test year. By performing weather normalization, changes in loads over time, such as between test and rate years, can more accurately be attributed to factors other than weather, such as customer growth or changes in use per customer. Additionally, by setting rates based on normalized temperature, prices are more stable over time and more accurately reflect the costs to serve customers because they are not based merely on weather conditions that happened to prevail during a test year for a given rate case." According to regression theory, the weather adjustment coefficients represent the best linear unbiased estimates of the true relationship between load and weather. Hence, the coefficients give the expected response of loads to weather not only under normal temperatures but also under varying temperatures. If a random process has a given mean, then averages of observations of that process over a large number of observations will tend to that mean under the conditions of the law of large numbers.
WUTC	PSE	013	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 18, lines 11-21 Please provide theoretical and empirical support,	As explained in page 18, lines 12-15 of the Prefiled Direct Testimony of Dr. Jeffrey Dubin, "Given the prior significance of trend and conservation factors (using additional

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
				other than the presumption of structural change test, for truncating historical data to less than five years in developing PSE weather normalization procedure.	historical data) and based on these Chow test results, it is my opinion that it is sensible and desirable to limit the data period used for weather normalization to the most recent four years of electric data (January 2002 to present)." Changes in customer mix and conservation factors in the last ten years have changed usage patterns so that the relationship between load and weather observed during the last ten years is unlikely to be appropriate anymore in the test year. The theoretical construct is the Gauss-Markov theorem which states that the best linear unbiased estimator in a regression setting uses all the data that is assumed to derive from a given model. If the model does not have structural stability, then all the data cannot be used. Additionally, time-series analysis of the weather sensitivity of the Puget system from a decade ago is not relevant for determining the weather sensitivity on the system today if the thermal properties of residential and commercial buildings have changed. To the extent that conservation and energy efficiency have changed on the system, weather sensitivity has changed as well. Indeed, the point of conservation programs, which encourage added insulation and energy efficient appliances, is to alter the energy temperature load relationship so that less energy is required to maintain a given interior-exterior temperature differential. A rough estimate of the amount of conservation savings achieved through PSE's programs is indicated in PSE's Response to WUTC Staff Data Request No. 010. Below are some statistics on appliance and equipment saturation between 1992 and 2004 based on PSE's Residential Characteristics Surveys. The comparison is further empirical support for the claim that electric usage patterns are different now compared to more than ten years ago. (SEE TABLE IN RESPONSE)
WUTC	PSE	014	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 21, lines 2-11 Please provide theoretical and empirical support for the choice of base or balance point temperature such as 65 F.	The use of heating and cooling degree days to approximate thermal load and energy utilized for heating and cooling is discussed in the ASHRAE Handbook, 1985 Fundamentals, American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. 1985. According to ASHRAE, "The traditional use of 65 F-based degree days is founded on correlations between energy and degree days made in the 1930's. Since then, incidental gains from internal heat sources have increased substantially and conductances have decreased with the increased use of insulation. Both these trends decrease the balance point temperature… Therefore, calculations made with 65 F-based degree days overpredict energy loads on most modern buildings. Recognizing this disparity, the National Climatic Center has published degree days to a wide range of base temperatures…" The point of this discussion is that the base of a heating degree day calculation is distinct from a balance point temperature (the outdoor temperature at which the building does not require heating due to sensible heat gains from occupants and appliances). See also the derivation of balance point temperatures in Dubin (1985) previously cited. There is a long history of published literature establishing the empirical connection between heating and cooling degrees 65 F-based and energy utilization. Additionally, the Prefiled Direct Testimony of Jeffrey Dubin, page 23, lines 2-8, cites several articles establishing the non-linearity of energy utilization and temperature: "Engle et. al. and others have observed that the temperature-load relationship is non-linear. They attribute this to basic laws of thermodynamics and limitations on existing heating and cooling equipment. The non-linearity of the load response to temperature has been noted by researchers for years. For instance, the theoretical relationship between load and temperature was discussed in Dubin (1985, Chapter 2) . The empirical evidence has also recently been discussed and summarized by Moral-Carcedo and Vicens-Otero (2005)."

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
WUTC	PSE	015	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at pages 23-26 Please provide detailed load research data (in excel format) and results to show that 45 degrees could be used as a base temperature and offer an acceptable “thermal comfort” to weather sensitive rate payers (residential customers).	The Company has not used load research data for this purpose. The daily system load and heating or cooling degree days at various base temperatures have already been provided by PSE in PSE’s Response to WUTC Staff Data Request No. 007. However the following information may nonetheless be useful. Clearly, 45 degrees can be used as a base temperature because NOAA calculates heating-degree days to various bases including 45 degrees. With respect to the question regarding whether 45 degrees can offer acceptable thermal comfort, the non-linearity evidenced on the PSE system and determined empirically by my testimony (see Figures 5-6 in page 24), and by researchers cited in my testimony (see page 23, lines 2-8) concerning the non-linearity of load and temperature does not relate to the issue of whether a weather sensitive customer finds 45 degrees an acceptable temperature. A base temperature of 45 degrees is another measure of the temperature distribution indicating colder days as compared to the base 65 degree measure. Heating degrees day base 65 degrees F provides only one measure of the temperature dispersion in a given day -- that is the number of hours in which the temperature is lower than 65 degrees. Utilizing a second measure to another base (such as 45 degrees) provides more information about the dispersion of weather in a given day -- in this case indicating the number of hours where temperatures fall below 45 degrees. Dubin (1985) shows how multiple measurements of heating degree days at alternative base temperatures may be combined to reveal a reasonably accurate approximation to the true temperature distribution. As the regression analysis is performed using observations of daily load, two empirical measurements of heating degree days used in conjunction with one another provide a superior measurement of weather effects for a given day than a single variable (HDD65) can provide. See also PSE’s Response to WUTC Staff Data Request No. 014.
WUTC	PSE	016	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at pages 23-26 Please explain, and provide supporting documentation, to show why statistical analysis alone can be used to establish base or balance point temperature. Please explain, and provide supporting documentation, if non-statistical analysis was used to justify the use of different base or balance point temperature.	Base and balance point temperatures are numbers from which heating and cooling degrees calculations are made. Statistical analysis is not required to establish a base temperature. NOAA defines a heating degree measure around a base temperature. If it picks 65 degrees, one calculation follows and if it picks 60 degrees another calculation follows and so forth. See also PSE’s Response to WUTC Staff Data Request No. 014. Different base or balance point temperatures, in addition to 65 degrees F, were used to capture the non-linearity in the load-weather relationship. As described in the Prefiled Direct Testimony of Dr. Jeffrey Dubin, this non-linearity has been noted by many researchers for years, and is clearly evident for the PSE system loads as shown in Figures 5-6 in page 24 of the Prefiled Direct Testimony of Dr. Jeffrey Dubin.
WUTC	PSE	016	DR Resp Supp 01	Re: Regarding Exhibit No.___(JAD-1T), at pages 23-26 Please explain, and provide supporting documentation, to show why statistical analysis alone can be used to establish base or balance point temperature. Please explain, and provide supporting documentation, if non-statistical analysis was used to justify the use of different base or balance point temperature.	First Supplemental Response: Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") First Supplemental Response to WUTC Staff Data Request No. 016, please find the results of a study based on PSE survey data indicating that balance point temperatures lower than 65 degrees Fahrenheit are likely for customers within PSE's service territory. This study provides non-statistical support for the use of base temperatures lower than 65 degrees Fahrenheit in PSE's weather adjustment equations. This study also supports and expands the justifications discussed in the prefiled direct testimony of Mr. Jeffrey A. Dubin, Exhibit No. ___(JAD-1T), and in PSE's Response to WUTC Data Request Nos. 014, 015 and 016.
WUTC	PSE	017	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 26, line 14 to page 27, line 13 Please provide all data (in excel format), original and transformation (if any), model and results of the analysis supporting alternative weather	All data and analyses have been provided in the Prefiled Direct Testimony of Dr. Jeffrey Dubin ("Dubin Testimony"), exhibits and work papers to the Dubin Testimony and in PSE’s Response to WUTC Staff Data Request No. 007.

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
				normalization models.	
WUTC	PSE	018	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 29, lines 3-5 Please provide all support, including all documents, for the claim that "Many of Commission Staff's concerns implicitly arose because the Company used a long estimation period during which many factors on the PSE system changed."	In pages 12-13 of the Prefiled Direct Testimony of Dr. Jeffrey Dubin ("Dubin Testimony"), I listed a summary of the recommendations that the Commission Staff have proposed to PSE as part of past rate cases or through the collaborative process. For example, one Staff concern is whether the exclusion of average rates, income and other variables in the estimation would lead to biased weather sensitivity coefficients. I stated in footnote 5, page 29 of the Dubin Testimony, "The technical condition under which this could occur requires correlation between the omitted and included variables that may or may not be plausible in this case. For instance, excluding income from the regression model may not lead to bias in weather sensitivity measurement if income is not correlated with ambient temperature – which is presumably correct. In any case, the issues are generally mooted using the shorter estimation period." As indicated also in PSE's Response to WUTC Staff Data Request No. 013, surveys have shown that end uses have changed over time, which in turn, altered usage patterns.
WUTC	PSE	019	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 31, lines 2-18 Please provide temperature data (by weather station) along with billed sales data by county (in excel format).	This county data is available in the form of average daily temperature for weather and in the form of monthly billing data for kwh sales and customer counts from 2002 to 2004. The weather data for each county were taken from NOAA. Please note that many county weather stations have gaps or missing values. Also, the county level sales data is billed, hence, the data pertains to consumption in the current and previous months. Attached as Attachment A to Puget Sound Energy, Inc.'s (PSE) Response to WUTC Staff Data Request No. 019 are PSEStationAvgTmps1.xls (weather data provided electronically only due to volume), and ElecUsebyCo1.xls (county billed sales and customer counts). However, the Company does not advocate the use of this data for system-wide weather normalization analysis. Its limited uses are cited in the Prefiled Direct Testimony of Dr. Jeffrey Dubin (see page 31, lines 15-18).
WUTC	PSE	019	DR Resp Attach A		Attach A - county billed sales and customer counts
WUTC	PSE	019	DR Resp Attach A		Attach A - PSEStationAvgTmps1.xls (weather data provided electronically only due to volume)
WUTC	PSE	019	DR Resp Attach A		Attach A - weather data provided electronically only due to volume
WUTC	PSE	020	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 31, lines 2-18 Please provide all evidence to support the statement that NOAA did not make any adjustment or modification to the actual data collected due to inhomegeneity (e.g., change of location, instruments, observation practices, etc.) for the SEATAC weather station. Also, please show, using actual data and for the same time period, why PSE's derivation of normal temperature is different from that of NOAA.	The first part of the question pertains to a statement on page 31, lines 14-18 of the Prefiled Direct Testimony of Dr. Jeffrey Dubin ("Dubin Testimony"), about the relative accuracy of Sea-Tac data in comparison to other regional weather stations. "In addition, using the data from the weather station at Sea-Tac is appropriate because it is a "first-order" station with the most complete and accurate data. In contrast, other regional weather stations have missing data or experience technical issues from time to time that make their data less reliable for use in comparing temperatures on a daily basis over time." Specific adjustments made to Sea-Tac weather data are not known by PSE. Sea-Tac is a first-order weather station and is less prone to data anomalies in comparison to data from other regional weather stations. See the caveats, and actual data series showing daily temperature data from regional weather stations and compared with the same data from Sea-Tac weather station in PSE's Response to WUTC Staff Data Request No. 019. Attached as Attachment A to PSE's WUTC Staff Data Request No. 020 is the monthly normal HDD base 65 as calculated by PSE for the period 1971-2000 and 1975-2004, and the most recent NOAA normal (derived from the period 1971-

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
					2000). The electronic version PSE Resp WUTC DR 020 Attach A Monthly Normals.xls is provided. The definition of normals is available from NOAA for NOAA calculated normals (http://lwf.ncdc.noaa.gov/oa/climate/normals/usnormalshist.html) and is discussed in the Dubin Testimony for PSE normals, pages 34-37, describing their similarities and differences.
WUTC	PSE	020	DR Resp Attach A		Attach A - monthly normal HDD base 65 as calculated by PSE for the period 1971-2000 and 1975-2004, and the most recent NOAA normal (derived from the period 1971-2000). The electronic version PSE Resp WUTC DR 020 Attach A Monthly Normals.xls is provided.
WUTC	PSE	021	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 32, lines 2-11 Please provide the data (in excel format), model and statistical results that show representativeness of the sample.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 021, please find a CD-ROM that contains the following customer data files, which have been designated "Confidential" per WAC 480-07-160: (1.) summary_pop_sched05.csv (2.) summary_pop_sched07.csv (3.) summary_pop_sched17.csv (4.) summary_pop_sched24.csv (5.) summary_pop_sched25.csv (6.) summary_pop_sched26csv (7.) summary_pop_sched27.csv (8.) summary_pop_sched29.csv (9.) summary_pop_sched31.csv (10.) summary_pop_sched37.csv (11.) summary_pop_sched43.csv (12.) summary_pop_sched47.csv (13.) summary_sample_sched05.csv (14.) summary_sample_sched07.csv (15.) summary_sample_sched17.csv (16.) summary_sample_sched24.csv (17.) summary_sample_sched25.csv (18.) summary_sample_sched26csv (19.) summary_sample_sched27.csv (20.) summary_sample_sched29.csv (21.) summary_sample_sched31.csv (22.) summary_sample_sched37.csv (23.) summary_sample_sched43.csv (24.) summary_sample_sched47.csv Files 1-12 listed above contain data for the population, and files 13-24 contain data for the samples. The files are comma-delimited and the file layout for each is customer ID, schedule, number of days in 2005 the customer record was active, and total kWh consumed in 2005. Due to the large volume of data, these files are provided electronically only. Attached as Attachment B to PSE's Response to WUTC Staff Data Request No. 021 is the April 22, 2005 letter from PSE to WUTC Staff summarizing the sample analysis conducted by PSE as part of the weather normalization collaborative process as well as the detailed results of the analysis. These are provided electronically in files Attachment B PSE Resp WUTC DR 021 PSE Letter April 2005.doc and Attachment B PSE Resp WUTC DR 021 ANALYSIS of Item 3.doc Attached as Attachment C to PSE's Response to WUTC Staff Data Request No. 021 is the SAS program used to conduct the analysis provided in Attachment B to PSE's Response to WUTC Staff Data Request No. 021. This file is provided electronically as Attachment C PSE Resp WUTC DR 021 Anova.sas and can be read by any text editor software such as Notepad.
WUTC	PSE	021	DR Resp Attach A (C)		Attach A - CD-ROM that contains customer data files
WUTC	PSE	021	DR Resp Attach B		Attach B - letter from PSE to WUTC Staff summarizing the sample analysis conducted by PSE as part of the weather normalization collaborative process as well as the detailed results of the analysis.
WUTC	PSE	021	DR Resp Attach C (C)		Attach C - SAS program used to conduct the analysis provided in Attachment B
WUTC	PSE	022	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 34, lines	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
				2-18 Please provide daily normals developed by NOAA and compare them with monthly normals derived by NOAA and PSE (in excel format).	Staff Data Request No. 022 are the daily normals developed by NOAA. This information is provided electronically in the Excel file PSE Resp WUTC DR 022 Attach A - NOAA HDD65 Daily Normals.xls. Please see Attachment A to PSE's Response to WUTC Staff Data Request No. 020 for monthly PSE and NOAA normals.
WUTC	PSE	022	DR Resp Attach A		Attach A - daily normals developed by NOAA
WUTC	PSE	023	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 34, lines 2-18 Please demonstrate that NOAA's procedure for developing normals in 1971-2000 normal periods is nearly identical to the procedure used by PSE.	The procedure is nearly identical based on the clear meaning of the words used in the NOAA documentation as paraphrased in the Prefiled Direct Testimony of Dr. Jeffrey Dubin in page 35, lines 1-2. "For first-order stations, where daily data sets are largely devoid of missing values, monthly degree day totals were derived directly from daily values. Thus, for actual heating and cooling degree days on a daily basis (used in the weather normalization models), there should be little difference between PSE's measures and NOAA's in terms of the estimated effects of HDDs on loads." NOAA further states (http://lwf.ncdc.noaa.gov/oa/climate/normals/normdegdmeth.pdf) : "The computation of first-order monthly degree day totals begins with the computation of average daily temperatures for the 1971-2000 period (with a precision of 0.5 degree Fahrenheit). Daily HDD/CDD (base 65) values were then computed with a precision of 0.5. The summation of these daily values yielded 360 monthly totals for the 1971-2000 period. From the respective 30 monthly totals for a given month the preliminary monthly degree total was computed using a simple average." "Monthly average temperature normals were computed based on a sequential record adjusted for in-homogeneities (due to changes in station locations, instrumentation, time of observation, surrounding environment, observing practice, sensor drift, etc). Such adjustments yielded a time series and normals representative of the observing practices as of the end of the normals period (i.e., December 2000), since these are the conditions under which future observations will likely be compared. This adjustment was not accounted for in the preliminary monthly degree day normals, so they were subsequently adjusted for compatibility with the monthly average temperatures." This is precisely the procedure that PSE has followed for non-decennial 30-year periods. However, PSE's method does not further adjust for in-homogeneities at SEATAC in the SEATAC historical record if such in-homogeneities are, in fact, present.
WUTC	PSE	024	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 35, lines 7-16 PSE's method for developing normals resembles a rolling or moving average starting from the most recent test period and including 30 preceding years. If PSE filed a rate case next year, the normals would drop one year used in this rate case. Please explain how this procedure is similar to normals developed over a period of 30 years, but repeated every decade? Also, please explain the reasons for WMO and NOAA's adoption of developing normal every ten years.	NOAA's procedure is decennial and occurs at the beginning of each decade. PSE's procedure is rolling and is updated each rate case. NOAA's reasoning is explained in the Prefiled Direct Testimony of Dr. Jeffrey Dubin ("Dubin Testimony") and in the references cited in the Dubin Testimony. As stated in page 35, lines 10-16 of the Dubin Testimony, "PSE's 30-year period is consistent with the definitions adopted by the World Meteorological Organization ("WMO") as they pertain to 30-year contiguous time-periods. The 30-year period PSE relies on is the most recent 30 year period available. NOAA calculates weather normals on a decennial basis; that is, it updates its information every ten years at the end of each decade. NOAA does not update its information more frequently. However, PSE's definition of normal weather is perfectly consistent with NOAA and the WMO in all other respects." See also page 36, lines 17-21 of the Dubin Testimony: "the NOAA normal dataset is only updated every ten years. Utilizing this data would result in a weather adjustment that is not well correlated to energy usage behavior the further the test year moves away from the period used by NOAA to define normal weather (for example, the effect of cyclical climate changes). It could also result in significant changes in rates when a new ten-year increment is added

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					to the NOAA data. In contrast, PSE's method uses readily available updated weather data. In addition, by updating the dataset to the most recent 30-year period each time it files a rate case, PSE's method will result in more gradual rate changes related to weather normalization if the climate is changing over time." Attached as Attachment A to PSE's WUTC Staff Data Request No. 024 is an illustration of the PSE rolling average (30-year) heating degree day calculation base 65. This chart and data are also provided electronically in the Excel file PSE Resp WUTC DR 024 Attach A PSE Monthly Normals - Rolling 30-year.xls.
WUTC	PSE	024	DR Resp Attach A		Attach A - illustration of the PSE rolling average (30-year) heating degree day calculation base 65.
WUTC	PSE	024	DR Resp Supp 01	Re: Regarding Exhibit No.___(JAD-1T), at page 35, lines 7-16 PSE's method for developing normals resembles a rolling or moving average starting from the most recent test period and including 30 preceding years. If PSE filed a rate case next year, the normals would drop one year used in this rate case. Please explain how this procedure is similar to normals developed over a period of 30 years, but repeated every decade? Also, please explain the reasons for WMO and NOAA's adoption of developing normal every ten years.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") First Supplemental Response to WUTC Staff Data Request No. 024, please find a CD-ROM consisting of the following electronic files: (*) "Hourlytemp97.mdb" is an MS Access file of the hourly temperature data from Seatac, and a query computing the daily HDD with 65 degrees as base temperature, then calculating the normals for the period 1975-2004 in the query named "qry_24_hour_average_temp(final)"; (*) "Daily_Normal_Temp.xls" is an MS Excel file that illustrates the daily normal HDDs/CDDs, which are the results of the query from the MS Access file entitled, "Hourlytemp97.mdb". (*) "DDActuals01_05.xls" is an MS Excel file that illustrates the calculation of actual degree-days for various base temperatures.
WUTC	PSE	024	DR Resp Supp 01 Attach A		Attach A - Hourlytemp97.mdb" is an MS Access file of the hourly temperature data from Seatac, and a query computing the daily HDD with 65 degrees as base temperature, then calculating the normals for the period 1975-2004 in the query named "qry_24_hour_average_temp(final)
WUTC	PSE	024	DR Resp Supp 01 Attach A		Attach A - DDActuals01_05.xls" is an MS Excel file that illustrates the calculation of actual degree-days for various base temperatures.
WUTC	PSE	024	DR Resp Supp 01 Attach A		Attach A - Daily_Normal_Temp.xls" is an MS Excel file that illustrates the daily normal HDDs/CDDs, which are the results of the query from the MS Access file entitled, "Hourlytemp97.mdb".
WUTC	PSE	025	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 37, lines 8-9 Please explain why PSE wanted to use its normal when the results of regression coefficients were found to be unaffected by temperature derived by NOAA.	The regression equation being referred to in this question is ElecEq6 in Table 1 of page 27 in the Prefiled Direct Testimony of Dr. Jeffrey Dubin. In this equation, the weather coefficients were estimated using NOAA's actual heating and cooling degree days and were found to be not significantly different from the coefficients estimated using PSE's definition of actual heating and cooling degree days (see page 27, lines 7-9 for the differences in the calculation of actual degree days: "a HDD measures based on the average of actual hourly heating degrees or based on the average of minimum and maximum daily temperatures were added (PSE measures HDD using daily 24-hour average temperature); "). This indicates that the two measures of actual degree days have almost identical effects on loads. However, this does not imply that it is more desirable to use NOAA normal degree days. The question confuses the use of data for calibrating the regression model and normal temperatures used in weather normalization. There are differences in normal degree days and reasons for using PSE's normals as shown in PSE's Response to WUTC Staff Data Request No. 024. In addition, given the differences in the calculation of actual and normal degree days, there would be a disconnect if we had used NOAA's normals in the equation which was

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
					estimated using PSE's actual degree days. Instead, the Company relies on a consistent methodology to measure actual and normal heating degree days.
WUTC	PSE	026	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 41, lines 8-11 and page 42, lines 4-11 Please provide the data (in excel format), statistical model and results of the analysis to substantiate the choice of the final gas model.	The data and models for the gas system load adjustments were provided in PSE's Response to WUTC Staff Data Request No. 009 (dlygasloadgrc06.prg and sndoutdly.xls), while the results were already provided in the work papers submitted with the Prefiled Direct Testimony of Dr. Jeffrey Dubin (see WeathAdjustmentSumarry012406.xls and SummaryTablesCharts012406.xls).
WUTC	PSE	027	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 41, lines 8-11 and page 42, lines 4-11 Please provide monthly retail sales data (calendar month) and the corresponding NOAA temperature (calendar months) for the ten years including the test year by rate schedules (in excel format).	The gas rate schedule level monthly retail sales data on a calendar basis are only available on a consistent basis since 2001. Prior to this year, the data is not reliable since it cannot be adjusted for late bills or other errors in billing. However, the monthly rate schedule data and weather data have been provided in PSE's Response to WUTC Staff Data Request No. 009 (historicalcdarscustomerdata.xls).
WUTC	PSE	028	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 43, lines 3-5 and page 44, lines 1 Please provide the data (in excel format), model and results of the experiments conducted in determining weather normalized therms.	The data, alternative model specifications and results for gas weather normalization at the system and rate schedule levels have already been provided in the work paper attached to the Prefiled Direct Testimony of Dr. Jeffrey Dubin (WeathAdjustmentSummary012406.xls) and in PSE's Response to WUTC Staff Data Request No. 009.
WUTC	PSE	029	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 44, lines 2-7 Please provide monthly retail sales data (in excel format) and corresponding NOAA temperature for the past ten years and replicate the model that was chosen for a short time period (GASEQ10).	On March 15, 2006, Puget Sound Energy, Inc. ("PSE") received clarification from WUTC Staff that the reference to "a short time period (GASEQ10)" in WUTC Staff Data Request No. 29 means the period 2001-2005 that PSE used in developing its gas weather normalization procedure. With this clarification, PSE responds as follows: PSE is unable to provide the requested data or perform the requested modeling. As indicated in PSE's Response to WUTC Staff Data Request No. 027, reliable and consistent monthly retail sales data is only available starting in 2001. This data and the models/equations have been provided in PSE's Response to WUTC Staff Data Request No. 009 (see gasrateschedulegrc06.prg, historicalcdarscustomerdata.xls). To the extent possible, the gas rate schedule equations that PSE used in its weather normalization for this proceeding already follow closely the model utilized at the gas system level including the estimation period, as shown in a workpaper that was provided with the Prefiled Direct Testimony of Dr. Jeffrey A. Dubin, Exhibit No. ___(JAD-1T) (see the Equations tab in WeathAjustmentSummary012406.xls). Further, PSE has also already provided alternative gas system equations utilizing NOAA's weather variables in another workpaper that was provided with the Dubin prefiled direct testimony (see GASEQ6 in SummaryTablesCharts012406.xls, Tabs "GasSummary" and "GasEquations").
WUTC	PSE	029	DR Resp Supp 01	Re: Regarding Exhibit No.___(JAD-1T), at page 44, lines 2-7 Please provide monthly retail sales data (in excel format) and corresponding NOAA temperature for the past ten years and replicate the model that was chosen for a short time period (GASEQ10).	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 029, please find an excel file GasSalesCust94_05.xls with the updated actual historical monthly billed sales and customer count by rate schedule. Please note that this is raw data from the billing system and is potentially unsuitable for statistical examination in its present form. With respect to the "short time period," PSE has adopted the period from 2001-2005 for the gas analysis in GASEQ10 but does not admit that this period is short or long.
WUTC	PSE	029	DR Resp Supp 01 Attach A		Attach A - updated actual historical monthly billed sales and customer count by rate schedule

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
WUTC	PSE	030	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 46, lines 4-20 Please provide data (in excel format), model and results, as well as the theoretical basis used to "weight the sample to the population and normalize the class loads to the net-of-losses weather-normalized GPI load."	Please see Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 007 for the data, model and results of the electric rate schedule weather normalization adjustment that is used to allocate the total system weather adjustment to the various rate schedules. Daily consumption for samples of each rate schedule was selected from the population and is used to calculate average daily use per customer by rate schedule. Weather normalized average use per customer is multiplied by the ratio of total actual customer loads divided by actual use per customer as calculated using the sample to obtain the total weather adjusted loads for the schedule. As stated in the Prefiled Direct Testimony of Dr. Jeffrey Dubin on page 46, lines 15-20, "The amount of weather adjustment at the GPI level was allocated to each of the applicable schedules by taking the percentage share of each schedule's weather adjustment amount to total weather adjustment for all schedules as calculated by the rate schedule normalization equations, and then multiplying the system load temperature adjustment by these percentage shares."
WUTC	PSE	031	DR Resp	Re: Regarding Exhibit No.___(JAD-1T), at page 46, lines 4-20 Please provide data (in excel format), model, and results in which the company uses temperature normalized GPI electric load to calculate the load adjustment by rate schedules	Please see Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 007 for the data, model and results of the electric rate schedule weather normalization adjustment that is used to allocate the total system weather adjustment to the various rate schedules. Daily consumption for samples of each rate schedule was selected from the population and is used to calculate average daily use per customer by rate schedule. Weather normalized average use per customer is multiplied by the ratio of total actual customer loads divided by actual use per customer as calculated using the sample to obtain the total weather adjusted loads for the schedule. As stated in the Prefiled Direct Testimony of Dr. Jeffrey Dubin on page 46, lines 15-20, "The amount of weather adjustment at the GPI level was allocated to each of the applicable schedules by taking the percentage share of each schedule's weather adjustment amount to total weather adjustment for all schedules as calculated by the rate schedule normalization equations, and then multiplying the system load temperature adjustment by these percentage shares."
WUTC	PSE	133	DR Resp	Reference: Amen Direct at 29 If the weather normalization methods are improved, per the suggestions of Puget's witness Dubin, would that mitigate the need for a decoupling mechanism? Please explain why or why not.	Although Puget Sound Energy, Inc. ("PSE") believes that approval of its proposed weather normalization methods would result in a better forecast of loads under "normal" or average weather conditions, such approval would not imply that the need for a decoupling mechanism is mitigated. A correct and unbiased weather normalization methodology should produce an adjustment to PSE's actual loads for normal weather that is accurate on an expected or average basis, especially over a longer period of time. In any given year, weather may be colder or warmer than "normal", and this is to be expected. Please see PSE's Response to WUTC Staff Data Request No. 012 for a further discussion of the purpose of normalization. The purpose of weather normalization is different from the purpose of decoupling. Weather normalization does not sever the link between PSE's sales volumes and margin revenue. Weather normalization does not change the fact that normal temperatures seldom, if ever, occur, as discussed on page 30 of the prefiled direct testimony of Ronald J. Amen, Exhibit No. ___(RJA-1T). Even with refinements to PSE's weather normalization methods, actual consumption is still expected to differ from projected consumption. Weather normalization also does not change the fact that a large portion of PSE's fixed costs, which do not vary based on weather or consumption, are recovered through volumetric rates. PSE's decoupling mechanism would act to ensure that PSE actually recovers the revenues resulting from the weather normalization process and assumed in the design

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
					of PSE's rates.
WUTC	PSE	163	DR Resp	(Re: Weather Normalization (Witness Dubin)) For all first order weather stations within PSE's service territory, please provide the following data electronically in excel format: (1) dew point temperature, (2) relative humidity, (3) sunshine duration or % sunshine, (4) dry bulb temperature, (5) wind direction and velocity (speed), (6) wet bulb temperature, (7) amount of precipitation, (8) average cloudiness, and (9) sea level pressure All data should be average daily values for the years 1995-2005.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 163, please find electronic files containing various weather data, as requested, for Seattle-Tacoma International Airport from January 2002 through December 2005. Such files are provided in both Adobe Acrobat and text file format. Due to their large size, these files are provided only in electronic format. Attached as Attachment B to PSE's Response to WUTC Staff Data Request No. 163, please find a MS Excel file containing daily average temperature data for thirteen weather stations throughout PSE's service territory for the period December 1, 2001 to December 31, 2004. This data was provided to WUTC Staff as part of WUTC Staff and PSE's weather normalization collaborative on November 1, 2005. Due to its large size, Attachment B is provided only in electronic format. PSE does not have the remainder of the data requested in WUTC Staff Data Request No. 163.
WUTC	PSE	256	DR Resp	Re: Electric Weather Normalization Methodology (Witness: Jeffrey Dubin) PSE used data for the period 1/1/2002-12//31/2004 for its weather normalization procedure. Please provide electric weather normalization data (in excel format) for the period 1/1/2001-1/31/2005. Also, for the period 1/1/2001-12/31/2005, please perform the statistical analyses used in the company's weather normalization procedure using 65 degrees Fahrenheit as the base temperature.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 256, please find a CD-ROM consisting of the following MS Excel files: (1.) ElecTstYrAdjstmentSummary042806.xls. This file provides PSE's calculated MWHs weather adjustment amounts as a result of using a longer estimation period (from January 1, 2001 through December 31, 2005) for PSE's preferred equation, ElecEQ10, and an alternative equation including only HDD/CDD with 65 degrees Fahrenheit as base temperature. Please note that both equations rely on HDD/CDD with 65 degrees Fahrenheit as base temperature. The alternative equation is also provided in the prefiled direct testimony of Mr. Jeffrey A. Dubin, Exhibit No. ___(JAD-1T), in Table 1, page 27. As stated on pages 21 through 26 of Mr. Dubin's prefiled direct testimony, Exhibit No. ___(JAD-1T), HDD/CDD with only 65 degrees as base temperature does not accurately reflect the non-linear load weather relationship that is present in the PSE system, especially for temperatures below 45 degrees, which is predominant in the winter season. (2.) Data6.xls. This file contains PSE's updated daily system load and customer data. (3.) Schedule48loads(C).xls. This file indicates PSE's estimated daily loads from schedule 48; (4.) dlyelecloadgrc06y.prg. This file contains PSE's Eviews program, demonstrating PSE's estimation process. PSE has noted in its Response to WUTC Staff Data Request No. 008 that the estimated schedule 48 loads contain many missing or partial schedule data and is not an accurate estimate of the schedule 48 volume. Since the longer estimation period described above required adjustment of PSE's daily system load for schedule 48 loads from January 1, 2001 to October 31, 2001, the results of this analysis could also be inaccurate. Attachment A in PSE's Response to WUTC Staff Data Request No. 256 is "CONFIDENTIAL" per Protective Order in WUTC Docket Nos. UE-060266 and UG 060267.
WUTC	PSE	257	DR Resp	Re: Electric Weather Normalization Methodology (Witness: Jeffrey Dubin) Please demonstrate that temperature from SEATAC International Airport used in the company's weather normalization procedure has shown statistically significant change during the period 2001-2005 compared with the period 1971-2000.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 257, please find a spreadsheet that illustrates a structural change test for differences in weather, measured in HDD using 65 degrees Fahrenheit as base temperature. The results show that there is a negative trend that is statistically significant over the period, implying declining HDDs. This implies that actual HDDs in the test year are over-estimated by 1971-2000 normals the farther the test year is from the 1971-2000 period. See also Attachment A to PSE's WUTC Staff Data Request No. 024 showing the decline in PSE's rolling average (30-year) heating degree day calculation base 65.

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
WUTC	PSE	257	DR Resp Supp 01	Re: Electric Weather Normalization Methodology (Witness: Jeffrey Dubin) Please demonstrate that temperature from SEATAC International Airport used in the company's weather normalization procedure has shown statistically significant change during the period 2001-2005 compared with the period 1971-2000.	First Supplemental Response: Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") First Supplemental Response to WUTC Staff Data Request No. 257, please find a CD-ROM consisting of the following files: (i) MeansTest. xls – the results of the means test performed on the average daily temperatures for the period 1971 to 2000 versus 2001 to 2005; (ii) 71_05DlyTemps.xls – average daily temperature file; and (iii) MeansTest.prg – the Eviews program generating the means test. The tests provided in Attachment A to PSE's First Supplemental Response to WUTC Staff Data Request No. 257 are standard equality of means tests, which assumes constant variance and a common distribution. Under these maintained assumptions, the results indicate that the average daily temperatures are statistically different for January, February, September and December between the 1971-2000 and 2001-2005 periods. Furthermore, the results reveal that average daily temperatures are higher in 2001-2005 than in 1971-2000 for the months of January and December.
WUTC	PSE	266	DR Resp	Re: Natural Gas Weather Normalization Methodology PSE used data for the period 1/1/2001-8/31/2005 for its rate schedule natural gas weather normalization procedure. Please provide rate schedule natural gas weather normalization data (in excel format) for the period 10/1/2000-09/30/2005. Also, for the period 10/1/2000-09/30/2005, please perform the statistical analyses used in the Company's weather normalization procedure using 65 degrees Fahrenheit as the base temperature.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 266, please find a CD-ROM consisting of the following files: (1.) (DR266)(WeathAdjustmentSummary050306).xls. This file contains a MS Excel spreadsheet that provides estimated equations for the various rate schedules, starting in column Z in the Equations tab. It also provides estimated weather adjustment amounts in the tab entitled, "GasRateSchedAdjstmnt" (2.) HistoricalCDARSCustomerData01_05.xls. This is an updated input data file; and (3.) GasRateSchedgrc06y.prg. This file contains PSE's Eviews program with the expanded sample size. PSE's rate schedule gas normalization modeling is based on monthly data. Reliable monthly data prior to 2001 is not available, since PSE converted its gas billing system near the end of 2000. Validation of the data prior to 2001 might take as long as one person month, and after such an effort the resulting data series would be only a "best estimate". Additionally, structural change econometric analyses demonstrate that it is not appropriate to include data before 2001 in any weather normalization model. PSE has updated its weather normalization models based on the period from January 1, 2001 to December 31, 2005 to obtain five years of data for the estimation period, the same length of period requested in WUTC Staff Data Request No. 266. Please note that PSE's rate schedule level equations already rely only on HDD with 65 degrees Fahrenheit as base temperature.
WUTC	PSE	267	DR Resp	Re: Natural Gas Weather Normalization Methodology PSE used data for the period 1/1/2001-8/31/2005 for its system-wide natural gas weather normalization procedure. Please provide system-wide natural gas monthly weather normalization data (in excel format) for the period 10/1/1995-09/30/2005. Also, for the period 10/1/1995-09/30/2005, please perform the statistical analyses used in the Company's weather normalization procedure using 65 degrees Fahrenheit as the base temperature.	Attached as Attachment A to Puget Sound Energy, Inc.'s ("PSE") Response to WUTC Staff Data Request No. 267, please find a CD-ROM consisting of the following electronic files: (1.) GasTstYrAdjustmentSummary050106.xls. This file indicates PSE's calculated therms weather adjustment amount as a result of using a longer estimation period (January 1, 2001 to December 31, 2005) for PSE's preferred specification, equation GasEQ10, as well as for an alternative equation including only HDD with 65 degrees Fahrenheit as base temperature. The two models are identified as GasEQ13 and GasEQ14 in this spreadsheet. Please note that only the firm equation is revised in the equation GasEQ14 since the interruptible and transportation equations do not include HDD with 45 degrees as base temperature. Equation GasEQ14 is similar to GasEQ2, found on Table 4, page 42 of the prefiled direct testimony of Jeffrey A. Dubins, Exhibit No. ---(JAD-1T), except for the estimation period; (2.) SndOutDlya.xls. This file contains PSE's updated daily system load and customer counts for firm, interruptible, and transportation classes; (3.) dlygasloadgrc06y.prg. This file consists of PSE's Eviews program, indicating PSE's estimation process. PSE's system-wide natural gas weather

FROM	TO	NO	TYPE OF DOC	DESCRIPTION / DATA REQUEST	RESPONSE
					normalization model is based on daily data. Data does not exist for the period requested in WUTC Staff Data Request No. 267 (October 1, 1995 through September 30, 2005), as such daily data does not exist for periods prior to September 1, 1998. The statistical analysis indicates that structural shifts have occurred on the PSE system; please see the worksheet entitled “ChowTest” in the file entitled, "asTstYrAdjustmentSummary050106.xls", as found in Attachment A to PSE's Response to WUTC Staff Data Request No. 267. Therefore the “statistical analysis used in the Company’s weather normalization procedure” is not consistent with estimation based on data periods prior to 2001 even if such data exists. PSE has re-estimated its equations based on the period January 1, 2001 to December 31, 2005, utilizing five years of daily data consistent with electric. As noted in PSE’s Response to WUTC Staff Data Request No. 256, excluding HDD with 45 degrees as base temperature leads to an equation specification that does not accurately reflect the non-linear relationship between load and weather.
WUTC	PSE	336	DR Resp	Re: Testimony of Dr. Dubin (a.) Please provide the overall mean and standard deviation of data collected within the past five years (including the test year): (i) income; (ii) age and square foot of housing unit; (iii) number and age of people per household; (iv) number of attached units; (v) square foot of heated units by source of heat; and (vi) number and percentage of customers using air conditioning. These data should pertain to customers within PSE’s service territory. (b.) Please provide the overall mean and standard deviation of energy consumption and corresponding bill over the period 2001-2005. For both parts a and b above, please provide all data in excel format, separately reported for the Company’s total electric and total natural gas system.	