Description of South Dakota Test Year

Weather Normalized Sales and Revenue Process

Exhibit__(SDT-2) Schedule 1

1) Introduction

This document provides an overview of additional information supporting OTP's Calendar Year 2017 weather normalized test year sales and associated revenues. The document references detail provided in Exhibit__(SDT-2) Schedule 2. The determination of the portion of the sales and revenue attributable to weather takes into consideration actual sales and billings for 2017; the quantification of unbilled sales and revenues for 2017, billing adjustments applicable to 2017 and normal weather compared to actual weather.

The following table summarizes the Sections in Exhibit__(SDT-2) Schedule 2 and associated information found in those Sections. Further details and explanation are provided after the table.

Section Name	Section Content Summary
1) Summary-All Revenues - Original	Summary of all revenue components included in initial filing and as summarized in Attachment 1 to DR 5.05
2) Summary-All Revenues – Revised	Revised summary of all revenue components included in format consistent with Attachment 1 to DR 5.05 inclusive of errata updates.
3) Summary-Base Revenues – Original	Summary of components making up weather normalized base kWh sales and associated revenues for 2017 included in initial filing.
4) Summary-Base Revenues – Revised	Revised summary of components making up weather normalized base kWh sales and associated revenues for 2017 reflecting minor errata updates
5) Reconcile	Reconciliation of change in total revenue and fuel expense due to errata items
6) CIS339 Actual Billed kWhs	Includes monthly actual billed kWhs for 2017 as extracted from OTP's CIS339 database. Total Billed kWhs (excludes company use) was 426,769,586
7) Bill Adjustments	This tab summarizes the kWh and revenue from bill adjustments that were either removed or added to the 2017 Test Year
8) Unbilled	Summarizes the annual unbilled kWh and revenue adjustments as accounted for in 2017 Financial Statements. Reflects incremental change in unbilled from Dec 2016 and Dec 2017.

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9) WN kWh	This section shows the spread of the 5,953,568 kWhs attributable to weather normalization to the respective customer classes and associated rate group levels.
10) Monthly kWh	This section aggregates at the rate group level kWhs of billed kWh, unbilled kWh, weather normalized kWh and Bill Adjustment kWh. This aggregation is done on a monthly basis.
11) Fuel Adj	This section computes the impact to fuel revenue and costs attributable to the weather normalized kWhs and the bill adjustment kWhs.
12) Revenue Overview	This section provides a visual illustration of the SAS program logic which takes the TY kWh sales and applies the current rates to determine total TY base rate revenues.
13) Revenue Detail	This section reflects a summary of the revenue calculations as determined by the SAS Revenue Program following the logic illustrated in the Revenue Overview Tab.

Additional details are provided for certain sections identified above later in this document.

2) General Overview of the Process to Determine Calendar Year Weather Normalized Base Sales and Associated Revenues.

   a) **Monthly Weather Normalized Sales Analysis**
   Each month, an analysis is completed to determine an estimate of what the weather impact was on monthly sales. From a business operations perspective, weather normalization helps in the analysis of actual results and provides an estimate on the impact weather had on those sales. Separate revenue regression models are utilized to price those sales and quantify the estimated revenue impact. Monthly, the analysis involves a two-step process:

   i) **Step 1 - Determine Calendar Month Sales:** Step one in the process is utilizing actual billing data from a database referred to internally as CIS339 data, a regression analysis is run to develop an estimate of the calendar month sales. The regression takes into consideration actual billing information, the number of days in the various billing cycles, and the actual number of days in the month.

   ii) **Step 2 - Weather Normalize the Calendar Month Sales:** Step two is to run another regression analysis which utilizes HDD/CDD data and average temperatures to

compute the weather normalized sales for the month. HDD / CDD cutoffs are based on the 55/65-degree thresholds.

The results of this monthly analysis is saved in a file named regs2kWh*.xlsx.

b) **Annual Weather Normalized Sales**

To determine the annual calendar year weather normalized sales, a report is run which takes the output from each of the twelve monthly weather normalization analyses above and consolidates (adds together) those monthly amounts into the calendar year estimate. Total Calendar Year Sales developed through this process inherently includes modeled levels of billed sales, unbilled sales, billing adjustments, and impacts of weather. Because other sources of data can validate or quantify certain portions of the modeled total sales, such as billed sales, unbilled revenue analysis, and bill adjustments, the remaining incremental amount of kWh sales is attributed to weather.

The total calendar year weather normalized kWhs for 2017 were 434,650,631 as illustrated below in the summary table, and also reflected in *Sections 4) Summary-Base Revenues –Revised*

St	Year Month	Class	Calendar Month kWh	NORMC Weather Normalized kWh	Difference (Calendar -NORMC)
SD	2017	Residential	95,821,657	97,462,775	1,641,118
		Farm	7,624,926	7,665,390	40,464
		General Service	73,060,212	73,715,338	655,126
		Large General Service	214,053,771	214,394,579	340,808
		Pipelines	0	0	0
		Irrigation	248,368	259,470	11,102
		Lighting	4,295,566	4,295,566	0
		OPA	3,850,344	3,874,870	24,526
		Controlled Water Heating	4,952,600	4,958,965	6,365
		Controlled Service Interruptib	20,441,358	20,880,917	439,559
		Controlled Service Deferred	6,892,331	7,142,761	250,430
		Total	431,241,133	434,650,631	3,409,498
		Company Use	515,941	532,710	16,769
			431,757,074	435,183,341	3,426,267

While the process above also models an estimated Calendar Month kWh amount for the year, as earlier described as Step 1, (Which estimates calendar month kWh sales of 431,241,133), OTP compares known billing and modeled unbilled amounts used for financial reporting purposes, and reconciles that information along with known bill adjustments to determine the portion of modeled calendar year weather normalized sales that are attributable to weather.

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The logic is:

Actual Billed Sales

+ Unbilled Sales

+ Bill Adjustments

+ Weather Impact

= Total Calendar Year Weather Normalized Sales

Re-stating the equation:

Total Calendar Year Weather Normalized Sales

- Actual Billed Sales

- Unbilled Sales

- Bill Adjustments

= Weather Impact

C. Actual Billed Sales and Revenue – Monthly and annual reports from our Customer Information System databased (CIS339) provide actual billed kWhs sales and associated revenues for the year. *Section 6) CIS339 Actual Billed kWhs* includes the detailed actual billed sales for 2017 totaling 426,769,586 kWhs. Total actual base revenue billed in 2017 was $18,241,318 as summarized in the Summaries provided in Sections 1 – 4.

D. Modeled Unbilled Sales and Revenue – Monthly, a regression analysis is run to determine the unbilled sales and revenue for the month. This regression analysis is run using the same CIS339 data set as the weather normalization regression analysis is run on as described in **a.** above. The unbilled analysis and quantification supports accounting's monthly revenue accrual.

To determine the incremental amount of unbilled sales and revenue for 2017 (to adjust actual billed revenue to calendar year 2017 revenue) the difference between the unbilled kWh sales and revenues from December 2016 and the unbilled kWh sales and revenues from December 2017 is determined. Total incremental unbilled kWhs for 2017 was 1,835,830, and associated revenue of $108,870. *Section 8) Unbilled* provides a summary of the unbilled incremental kWhs and incremental revenue by customer class for 2017.

E. Billing Adjustments Sales and Revenue: During 2017, there were bill adjustments included on bills that were actually applicable to 2016 usage. There were also bill adjustments made in January of 2018 that were applicable to usage in 2017. OTP runs reports out of its billing system to identify these adjustments. *Section 7) Bill Adjustments* summarizes the kWhs and revenues applicable with these adjustments. Total kWhs of adjustments were 91,649 kWhs and associated revenue of $4,325.

F. Determination of Weather Normalized kWhs

Section 9) WN kWh summarizes the determination of the total kWhs attributable to Weather for 2017 following the re-stated equation provided in **b**. above as follows:

Line	Sales Components	kWhs
1	Total Weather Normalized Sales Estimate	434,650,633
2	- Actual Sales (CIS339)	-426,769,586
3	- Unbilled Sales (Incremental)	- 1,835,830
4	- Bill Adjustments	- 91,649
5	Subtotal	-428,697,065
6	= Weather Normalized Sales Line 1 – Line 5	5,953,568

Section 9) WN kWh also includes detailed output from both Step 1 and Step 2 regression analysis results discussed in 2 a. above. This data compares modeled delivered sales (Column F) with modeled weather normalized sales (Column G) at a group level. In order to spread the 5,953,568 kWhs of WN sales by month to the group level, that amount is spread to each month and each group based on the ratios reflected in Column I.

G. Total kWhs by Component - *Section 10) Monthly kWh* reflects the breakdown of monthly kWh sales at a rate group level for each of the components identified in F. above. The total kWhs sales identified here serve as the basis for determining total revenue attributable to those sales.

H. Pricing Sales to determine Revenue – OTP has developed a SAS program which follows the logic illustrated in *Section 12) Revenue Overview* to take the group level kWhs and further break down that information to the rate code level. At the rate code level, current rates can be applied to the particular billing determinants to determine total base weather normalized revenue. The output of the pricing model is provided in *Section 13) Revenue Detail,* and as summarized in *Section 4) Summary Base Revenues-Revised, rows 1-11.*

I. Impact on Fuel Costs for Weather Normalized and Billing Adjustment kWhs – *Section 11) Fuel Adj* – computes the cost of fuel and associated fuel clause revenues for the weather normalized kWhs and the kWhs associated with billing adjustments. Monthly kWhs are multiplied by the corresponding month's fuel clause rate to determine the total impact on fuel. Total fuel expense and associated revenues for the bill adjustments and weather normalized sales were $137,587.