Mark Thompson
Rates & Regulatory Affairs
Tel: 503.721.2476
Fax: 503.721.2516
email: mark.thompson@nwnatural.com

NW Natural
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
www.nwnatural.com

February 21, 2018

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street SE, Suite 100
Post Office Box 1088
Salem, Oregon 97308-1088

Re: LC 64 – NW Natural's 2016 Integrated Resource Plan (IRP) Update (2)

In compliance with Oregon Administrative Rule (OAR) 860-027-0400(9), Northwest Natural Gas Company, dba NW Natural ("NW Natural" or "Company"), hereby files an update to its 2016 Integrated Resource Plan that was previously filed on August 26, 2016 in Docket LC 64. This update is an informational filing and no Commission action is requested at this time.

Please contact me at (503)721-2476 if you have any questions.

Sincerely,

NW NATURAL

/s/ Mark R. Thompson

Mark Thompson
Manager, Rates & Regulation

Enclosure

NW Natural's 2016 IRP Update
Docket No. LC 64
February 21, 2018

Introduction

NW Natural filed its 2016 Integrated Resource Plan (2016 IRP) on August 29, 2016 and the Public Utility Commission of Oregon (Commission) acknowledged the associated Action Items in Order No. 17-059, entered on February 21, 2017. NW Natural submits this annual update in compliance with Oregon Administrative Rule (OAR) 860-027-0400(8) and does not seek Commission acknowledgement of any action items with this update. This filing is for informational purposes only.

NW Natural previously filed an Update to its 2016 IRP concerning recall of Mist storage capacity to be effective May 2018 and the Company's potential acquisition of additional T-South pipeline capacity. NW Natural filed this limited update on August 9, 2017. A copy of that update is attached as Appendix One.

A recently updated forecast indicates a small supply deficit for gas year 2018–2019. NW Natural is currently identifying and evaluating alternative solutions for addressing this.

NW Natural provides updates regarding other action items in the 2016 IRP below, and includes certain Staff recommendations not related to a specific action item.

Large Dehydrator at Mist's Miller Station

NW Natural's 2016 IRP included discussion related to the Mist storage facility's dehydration systems.[1] Specifically, NW Natural's action item 2 stated:

> *Replace or repair, depending on relative cost-effectiveness, the large dehydrator at Mist's Miller Station. Replacement is currently estimated to cost between $6 million and $7 million based on estimates obtained from a third-party engineering consulting firm.*

The Company has recently received the final report from the consultant it engaged to evaluate the existing dehydration systems at Mist and develop alternative solutions to identified issues. NW Natural is currently assessing the recommendations and proposed solutions provided in this report.

Southeast Eugene Reinforcement

NW Natural's 2016 IRP action plan included the following as Resource Investment action item 3:

> *Proceed with the SE Eugene Reinforcement project to be in service for the 2018/2019 heating season and at a preliminary estimated cost of $4 million to $6 million.*

This project is currently in the planning phase. NW Natural anticipates the project will be in-service for the 2018/2019 heating season. The estimated cost of this project has not changed from the estimated $4 to $6 million in the 2016 IRP.

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[1] *See* pages 3.25 – 3.29.

Regional Pipeline Projects

Staff Recommendation No. 3b was that "…the Company update its IRP stakeholders regarding potential regional pipeline projects and associated cost analysis as information becomes available."

The Jordan Cove LNG export project refiled applications with the Federal Energy Regulatory Commission (FERC) in September 2017 for the export facility and for the associated natural gas pipeline—Jordan Cove Energy Project (JCEP) and Pacific Connector Gas Pipeline (PCGP), respectively. The developer's website indicates it anticipates a FERC decision in November 2018. As of early 2018, and associated with NW Natural's integrated resource planning, there is no new cost analysis or other information to update. It should be noted that the refiled PCGP application no longer includes an interconnection with Northwest Pipeline's Grants Pass Lateral. This means the possibility of a bundled pipeline transportation service from Malin to NW Natural's citygate (e.g., Eugene), as discussed in the 2016 IRP, may not be suitable for analysis in the 2018 IRP.

NW Natural filed an update to the Company's 2016 IRP on August 9, 2017 in Docket No. LC 64. The update included information regarding the Company's acquisition of future capacity on Enbridge's T-South pipeline in British Columbia, Canada. This capacity would come through an Enbridge expansion project that is not scheduled for completion until November 1, 2020, at the earliest. This new capacity does not increase NW Natural's overall resource portfolio at the citygate, but allows realignment of certain current upstream purchases from Sumas to the less expensive Station 2 trading hub in northern British Columbia.

Energy Trust Funding and Therm Savings

NW Natural's 2016 IRP action plan included the following, as modified by Staff Recommendation No. 6, as Demand-side Resource and Environmental action item 1:

> *Consistent with methodology in chapter 6, NWN will ensure Energy Trust has sufficient funding to acquire therm savings of 5.1 million therms in 2017 and 5 million therms in 2018 or the amount identified and approved by the Energy Trust Board.*

The Energy Trust Board modified the values above to a budgeted 6.2 million therms in 2017 and 5.7 million therms in 2018. NW Natural provided the 2017 funding necessary to acquire the budgeted 2017 savings less $1.1 million associated with changes to the Oregon Industrial program. NW Natural and Energy Trust agreed upon this reduction as a partial remedy to a rate inequity between the Company's Industrial rate schedules. To reduce customer migration from those industrial rate schedules eligible for programmatic energy efficiency to those schedules which are not—and are therefore not required to pay into this fund (Transportation rate schedules)—the incentive cap was reduced from 75 percent of project costs to 65 percent. The estimated impact of this change is a 365 thousand therm reduction in 2017 savings. The 5.7 million therm savings in 2018 includes the impact of the changes to the Oregon Industrial program.

Actual 2017 savings have not been released to the Company, but we expect the results by the end of February 2018.

Targeted DSM Pilot

NW Natural's 2016 IRP action plan included the following item as Demand-side Resource and Environmental action item 2:

> *Work with Energy Trust of Oregon to further scope a geographically targeted DSM pilot via accelerated and/or enhanced offerings ("Targeted DSM" pilot) to measure and quantify the potential of demand-side resources to cost-effectively avoid/delay gas distribution system reinforcement projects in a timely manner and make a Targeted DSM pilot filing with the Oregon Public Utility Commission in late 2017 or early 2018.*

Teams from NW Natural and Energy Trust have been working together to determine the scope of a pilot, select a test location, and develop budgets and evaluation plans. With support from Energy Trust, NW Natural expects to file for approval of the pilot plan with the Commission in mid-2018 after receiving additional input from Staff and other stakeholders.

Energy Trust / Peak Day Savings from DSM

NW Natural's 2016 IRP action plan included the following as Demand-side Resource and Environmental action item 3:

> *Work with Energy Trust of Oregon to track peak day savings from DSM programs in addition to the typical Energy Trust metric of total annual savings to better understand if the capacity costs projected to be avoided with peak day savings in the DSM savings projection are being saved.*

Energy Trust has provided expected peak day and hour savings from their expected activities going forward as part of the 20-year savings projection provided to NW Natural for the 2018 IRP. These activities will continue on an ongoing basis.

Northwest Innovation Works (NWIW)

Staff Recommendation No. 3b was for NW Natural to "…update its IRP stakeholders regarding potential regional pipeline projects and associated cost analysis as information becomes available."

NW Natural's 2016 IRP included a brief discussion of the methanol export project planned for Kalama, Washington.[2] The discussion mentioned a potential arrangement between the Company and the developer—Northwest Innovation Works Kalama, LLC (NWIW)—regarding NW Natural's release of its contracted capacity on Northwest Pipeline (NWP) to NWIW.

NW Natural submitted, on April 5, 2017 as a confidential supplemental response to OPUC Staff's Data Request No. 11 in the 2016 IRP proceeding Docket No. 64, the Precedent Agreement and Transaction Confirmation related to a capacity sharing arrangement with NWIW. As of early 2018, NW Natural has no additional information regarding the NWIW project's status other than information NWIW provides on its website; e.g., updates regarding the project's permitting process.

[2] *See* page 3.38 of the 2016 IRP.

Portland LNG Projects

NW Natural has initiated a project to eliminate rainwater contamination in the Portland LNG plant tank's secondary containment basin. The combination of seasonal rain events and associated rises in groundwater levels results in a large volume of contaminated water entering the containment area. Federal regulation[3] requires LNG tank secondary containment basins to be free of or to minimize standing water in the impoundment.

Currently, groundwater and stormwater entering the containment basin is pumped from the basin and treated in the existing onsite groundwater water treatment facility. However, the volume of water removed from the containment basin taxes the groundwater treatment system.

There are multiple reasons for NW Natural undertaking this project in the very near future:

1. Preventing or minimizing infiltration of water in the tank's secondary containment would reduce the risk of damage in the event of a release from the LNG tank or related appurtenances.
2. Preventing or minimizing infiltration of water in the basin will focus operation of the groundwater treatment system on keeping contaminated groundwater from discharging to the river, as the system was designed to do.
3. Preventing or minimizing infiltration of groundwater into the containment basin avoids the risk that people or animals may come into contact with contaminated water.

NW Natural examined a total of five potential solutions, three of which were assessed as not viable for regulatory compliance reasons. A preliminary cost estimate of the selected alternative—based on input from a consultant—is in the $4 to $6 million range.

Additional Staff Recommendations

Staff Recommendation No. 1 included "…that NWN use a weather scenario based upon the Company's actual highest heating requirement day in 30 years for its peak day analysis."

NW Natural will discuss the Company's peak day planning with stakeholders in one or more Technical Working Group meetings associated with development of its 2018 IRP.

Staff Recommendation No. 2 included "…that the Company continue to explore load center-specific data, such as the Oregon Office of Economic Analysis' long-term population forecast by county that NWN identified in its Reply Comments."

NW Natural will discuss the Company's customer forecasting with stakeholders in one or more Technical Working Group meetings associated with development of its 2018 IRP.

Staff Recommendation No. 9 included "…that the Company improve its risk analysis chapter in the next IRP as described in Staff comments."

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[3] *See* 49 CFR 193.

NW Natural will discuss risk analysis in the 2018 IRP with stakeholders in one or more Technical Working Group meetings associated with development of its 2018 IRP.

GAIL HAMMER
Tariffs and Regulatory Compliance
Tel: 503.226.4211 ext. 5865
Fax: 503.721.2516
email: gail.hammer@nwnatural.com

NW Natural
220 NW 2ND AVENUE
PORTLAND, OR 97209
TEL 503.226.4211
www.nwnatural.com

August 9, 2017

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street SE, Suite 100
Post Office Box 1088
Salem, Oregon 97308-1088

Re: LC 64 – NW Natural's 2016 Integrated Resource Plan (IRP) Update

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Please contact me at (503)226-4211, extension 5865, if you have any questions.

Sincerely,

NW NATURAL

/s/ Gail Hammer

Gail Hammer
Rates & Regulation

Enclosure

NW Natural's 2016 Integrated Resource Plan Update
August 9, 2017

NW Natural provides this IRP update regarding two issues relevant to its acknowledged 2016 IRP action plan: (1) the proposed recall of Mist storage capacity from the Company's interstate storage account and (2) the Company's acquisition of year-round expansion capacity on the T-South pipeline transmission system.

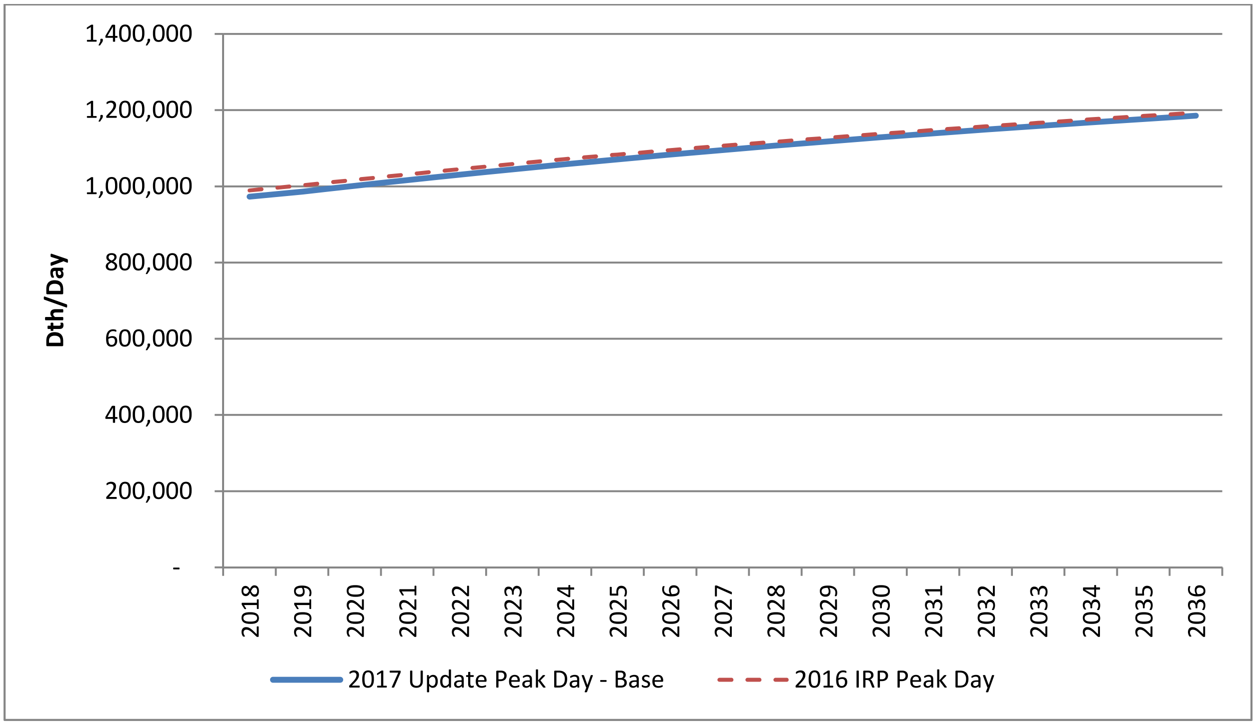
I. Mist Storage Capacity Recall

NW Natural's acknowledged 2016 IRP action plan included the following item:

> *Plan to recall 15,000 Dth/day of Mist storage capacity from the interstate storage account effective May 2018 to serve core customer needs, subject to a review based on an update of the annual load forecast in the summer of 2017. Plan to recall 15,000 Dth/day of Mist storage capacity from the interstate storage account effective May 2019 to serve core customer needs, subject to a review based on an update of the annual load forecast in the summer of 2018.*

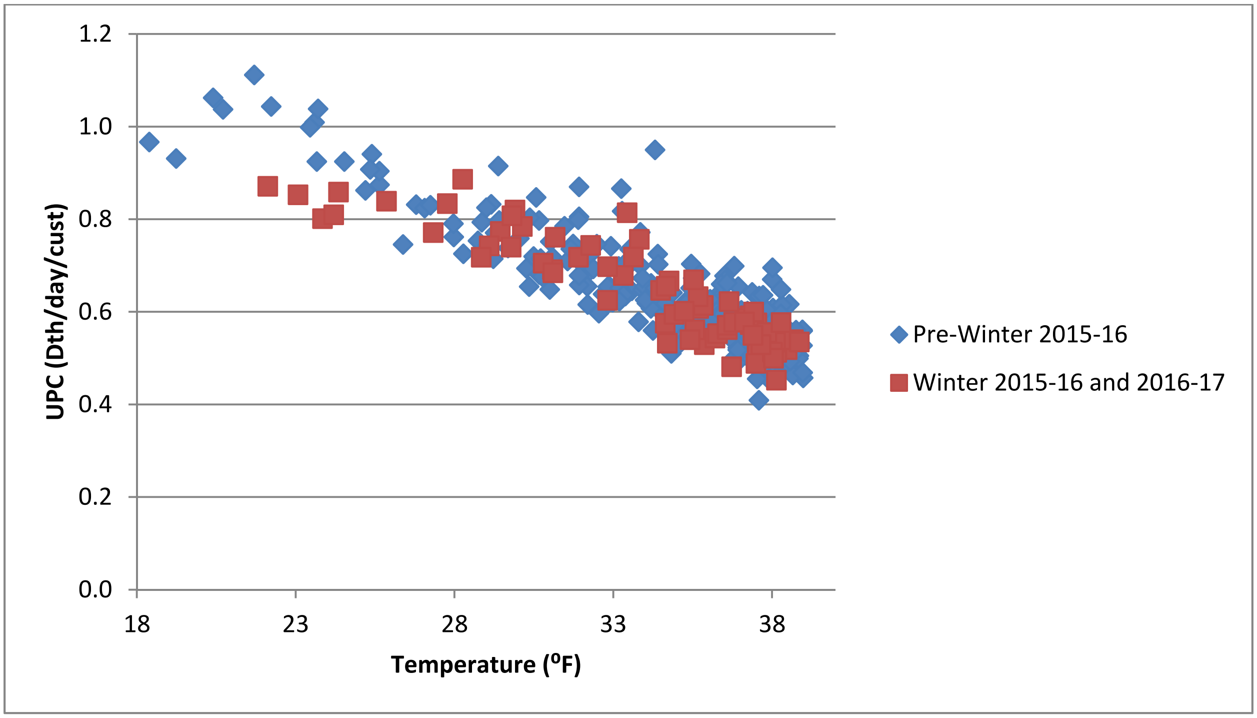
As set forth in the action item, using the same methodology detailed in the 2016 IRP, the Company updated both its peak day and customer forecast. NW Natural derives the peak day demand forecast by combining a forecast of peak day use per customer (UPC) and forecasts of firm sales customers. The Company revised both the UPC and customer count forecasts in May 2017 using updated demand, weather, customer, and economic data that has become available since the completion of the 2016 IRP analyses. As illustrated in Figure 1, the resulting updated peak day forecast indicates an expected peak day load approximately 14,491 Dth/day (or 1.7%) lower for the year 2018-19 relative to the corresponding base case forecast in the 2016 IRP.

Figure 1 – 2016 IRP Peak Day Load Forecast vs. 2017 Update



The change in peak day load forecast stems primarily from marginal changes to the estimated coefficients in the peak day UPC model. The winter of 2016-17 provided forty additional data points in which the daily average temperature experienced by the Company's system fell within the "cold" range (less than 38 degrees F) that is most relevant to peak load modeling. Combined with the cold days of the 2015-16 heating season, the new data represents a 25 percent increase in sample size for the peak day UPC model, and includes several days with average temperatures among the coldest of the last ten years. Figure 2 summarizes this new daily data alongside the data available for the 2016 IRP analysis, plotted against usage per customer.

Figure 2 – Use-per-customer by System Temperature, 2016 IRP Data vs. 2017 Update



As noted above, incorporating this new data into the peak day UPC model produced marginally lower UPC predictions which, when multiplied by the Company's updated forecast of customers, led to a lower peak day load prediction over the entirety of the base case forecast. The second column of Table 1 summarizes the updated results of the forecasted UPC,[1] customer count, and peak day firm sales load relative to the 2016 IRP for the 2018-2019 period, which would contain the first winter that a Mist recall decision this summer could serve. Updates to the Company's customer count forecasts produced very minor changes from the 2016 IRP, differing by less than 0.5 percent in every year. Customer counts for the next several years are somewhat lower in the Update than were forecast in the 2016 IRP, primarily due to 2015-16 and 2016-17 actuals being less than forecast. This situation reverses beyond 2023-24, after which the customer counts in the Update are somewhat greater than were forecast in the 2016 IRP.

Table 1 – Peak Day Load Forecast Model Results, 2016 IRP vs. 2017 Update

Forecast year 2018-19	2016 IRP Results	2017 Update Results
Predicted Peak Day UPC[1] (DTh/day)	1.336	1.319
Customers	740,809	739,274
Peak Day Load (Dth)	989,608	975,117

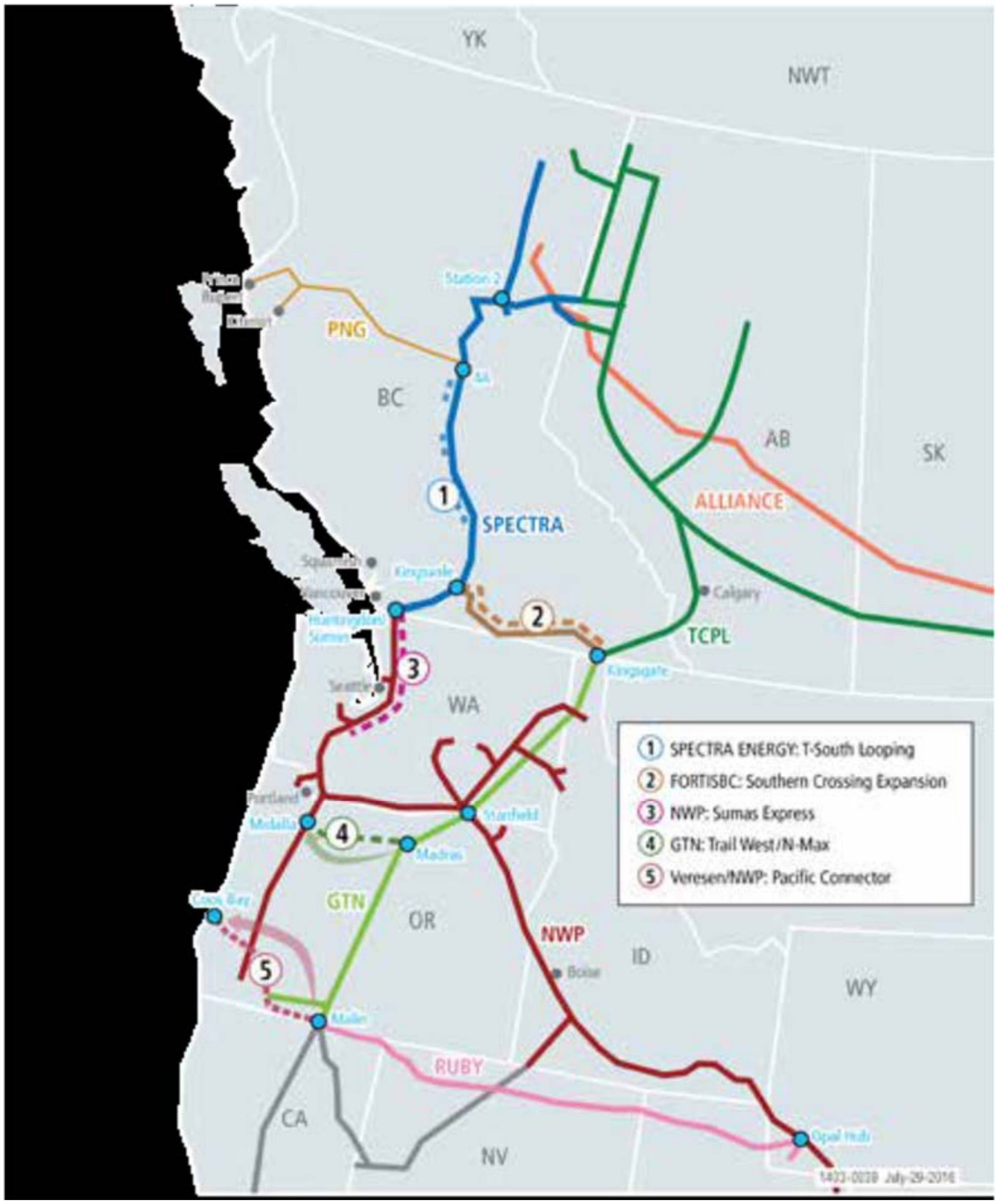
[1] Per aggregate (residential, commercial, and firm industrial) customer, before adjustments for incremental DSM. See 2016 IRP Appendix 2 for technical details regarding the Company's peak day forecasting model.

Mist recall is currently a least-cost resource option for the Company, and as such was identified in the 2016 IRP as capable of meeting near-term capacity needs. The updated peak planning forecasts completed by the Company in May 2017 serve to defer this need through the 2018-2019 period identified in the 2016 IRP. That is, with this load forecast re-evaluation, the 2016 IRP action plan item to recall 15,000 Dth/day of Mist deliverability effective May 2018 to serve the 2018/19 winter is not needed. And as stated in the 2016 IRP, the subsequent action plan item to recall an additional 15,000 Dth/day effective May 2019 to serve the 2019/2020 winter will be subject to a similar load forecast re-evaluation next summer.

II. T-South Pipeline Capacity

T-South refers to the pipeline transmission system in British Columbia between Compressor Station 2 (“Station 2”) in northern B.C. and Huntingdon/Sumas (“Sumas”) at the international border. T-South is part of the Westcoast Energy system, which is owned by Enbridge (after its recent acquisition of Spectra). The T-South system is fully subscribed, but NW Natural has been able to acquire some T-South service over time from existing capacity holders at market prices. As mentioned in Chapter 3, Section 4.4 of the 2016 IRP, there are both economic considerations to holding T-South capacity (i.e., the price spread between Station 2 and Sumas), as well as reliability considerations given the relative liquidity of supply at Station 2 versus Sumas.

A T-South expansion project is now in progress, designated with the symbol ① in the following map (Enbridge acquired Spectra after this map was produced by the Northwest Gas Association):



Source: NWGA 2016 Gas Outlook, Figure C5

Station 2 provides an alternative to Sumas for purchases of gas in B.C., but as mentioned above, T-South capacity currently is fully subscribed on an annual basis. Winter-only (November-March) T-South service had been available until an open season last December/January claimed the remaining 160 million cubic feet per day (MMcfd) of such service. NW Natural participated in the Winter-Only open season but the submitted bids of 11- and 7-year terms were not awarded. The winners in that open season bid contract terms exceeding 40 years.

Due to this interest in T-South service, Enbridge decided to hold an open season in the spring of 2017 for an expansion of year-round T-South service of up to 190 MMcfd. NW Natural participated in this expansion open season. In June 2017, Enbridge awarded to NW Natural a contract quantity of 672.90 10^3m^3/day (roughly 25,000 Dth/day) of year-round T-South capacity for a 40 year term that commences with the in-service date of the T-South expansion project, which currently is anticipated to occur on

November 1, 2020. An expansion contract is now fully executed between NW Natural and Enbridge (included as Appendix One).

NW Natural submitted three separate bids to Enbridge in the T-South expansion open season. The two shorter-term bids (of 15 and 25 years) were not awarded. The 40-year bid was pro-rated by Enbridge due to oversubscription of the expansion—i.e., bids at 40 years and longer fully subscribed the 190 MMcfd of expansion capacity.

ENBRIDGE

WESTCOAST ENERGY INC.

FIRM SERVICE AGREEMENT

THIS AGREEMENT made as of the 8th day of June, 2017
BETWEEN:

WESTCOAST ENERGY INC., carrying on business as Spectra Energy Transmission, a corporation having an office in Calgary, Alberta

("Westcoast")

- and -

NORTHWEST NATURAL GAS COMPANY, a corporation having an office in Portland, Oregon

("Shipper")

WHEREAS Shipper has requested Westcoast to provide it with the Firm Transportation Service described in this Agreement and Westcoast has agreed to provide Shipper with such service in accordance with and subject to the terms and conditions hereinafter set forth;

NOW THEREFORE in consideration of the mutual agreements hereinafter contained the parties hereto agree as follows:

ARTICLE 1
TOLL SCHEDULES AND GENERAL TERMS AND CONDITIONS

1.01 Westcoast's Toll Schedules for Service and General Terms and Conditions - Service, both as filed with the National Energy Board and in effect from time to time in accordance with Part IV of the *National Energy Board Act*, are incorporated herein by reference and constitute part of this Agreement. Unless otherwise defined herein, the terms and expressions used in this Agreement have the same meaning as the corresponding terms and expressions used in Westcoast's Toll Schedules for Service and the General Terms and Conditions.

1.02 In and for the purpose of this Agreement:

(a) "Expansion Facilities" means those pipeline, compression and related facilities which Westcoast determines to be required to enable it to provide the Expansion Service and which will be more particularly described in Westcoast's application to the National Energy Board for approval to construct and operate such facilities;

(b) "Expansion Service" means the Firm Transportation Service described in Schedule A;

(c) "Schedule A" means Schedule A attached to this Agreement as the same may be amended and in effect from time to time; and

(d) "this Agreement" means this Agreement as the same may be amended and in effect from time to time, and includes Westcoast's Toll Schedules for Service, the General Terms and Conditions and Schedule A.

ENBRIDGE

ARTICLE 2
SERVICES

2.01 Subject to the provisions of this Agreement, Westcoast shall provide to Shipper the Expansion Service on each day during the period commencing and expiring on the days specified in Schedule A.

ARTICLE 3
TOLLS

3.01 Shipper shall pay Westcoast each month in respect of the Expansion Service the applicable tolls for such service approved by the National Energy Board and specified in Westcoast's Toll Schedules for Service in effect from time to time.

ARTICLE 4
RECEIPT AND DELIVERY POINTS

4.01 Shipper shall in respect of the Expansion Service deliver gas to Westcoast at the Receipt Point and in volumes not exceeding those specified in Schedule A.

4.02 Westcoast shall in respect of the Expansion Service deliver gas to Shipper at the Delivery Points specified in Schedule A.

ARTICLE 5
CONDITIONS

5.01 The obligations of Westcoast to proceed with the Expansion Facilities and to provide Expansion Service to Shipper hereunder are subject to the following conditions precedent which are for the sole benefit of Westcoast and may be waived by Westcoast in whole or in part:

(a) the execution by other prospective shippers of Firm Service Agreements providing for Firm Transportation Service in respect of Contract Demand volumes sufficient to support the construction and operation of the Expansion Facilities on an economic basis acceptable to Westcoast in its sole discretion;

(b) the determination by Westcoast's Board of Directors and by its senior management to commit to the construction of the Expansion Facilities;

(c) Westcoast obtaining all governmental and regulatory orders, certificates, approvals, authorizations, licenses and permits, in form and substance satisfactory to Westcoast, required to construct and operate the Expansion Facilities including, without limitation, orders and certificates of the National Energy Board pursuant to Parts III and IV of the *National Energy Board Act;*

(d) the satisfaction of all conditions contained in the orders, certificates, approvals, authorizations, licenses and permits referred to in subsection 5.01(c);

(e) the completion of construction and placing into service of the Expansion Facilities; and

(f) the determination by Westcoast, in its sole discretion, that none of the Pipeline System, the Expansion Facilities or Westcoast have been or could be adversely

ENBRIDGE

affected by any prevailing or future economic, regulatory, financial or other circumstances (including, without limitation, Westcoast's tolls, toll design and cost recovery methodologies).

5.02 The design and capacity of the Expansion Facilities and the form, substance and timing of Westcoast's applications for the orders, certificates, approvals, authorizations, licenses and permits referred to in subsection 5.01(c) shall be determined by Westcoast, in its sole discretion.

ARTICLE 6
GENERAL

6.01 Shipper shall at all times after the execution of this Agreement:

(a) demonstrate to Westcoast that it has a credit quality acceptable to Westcoast, in its sole discretion, through the provision of financial statements and such other information as Westcoast may require;

(b) if Shipper is unable to meet the requirements in subsection 6.01 (a), provide to Westcoast a guarantee of payment in form and substance satisfactory to Westcoast by another entity who meets such requirements; or

(c) if Shipper is unable to meet the requirements of subsection 6.01(a) or 6.01(b), provide to Westcoast, and at all times maintain an irrevocable letter of credit in favour of Westcoast issued by a financial institution and in form acceptable to Westcoast in an amount equal to the maximum amount payable by Shipper under this Agreement for 30 months of service or such other alternative financial security acceptable to Westcoast.

If at any time after the execution of this Agreement, Shipper fails to comply with the creditworthiness requirements set forth in this Section 6.01, Westcoast may at its option suspend the provision of service to Shipper under this Agreement or terminate this Agreement, provided however that any such suspension of service or termination shall not relieve Shipper from its obligation to pay all tolls, charges, or other amounts payable to Westcoast in respect of the Expansion Service for what would otherwise have been the balance of the term of this Agreement.

ARTICLE 7
ADDRESS FOR DELIVERY

7.01 The address of each of the parties hereto for the purpose of giving any notice hereunder or in accordance with the General Terms and Conditions is as follows:

WESTCOAST: Westcoast Energy Inc.
Suite 200, 425 1st Street S.W.
Calgary, Alberta
T2P 3L8

SHIPPER: Northwest Natural Gas Company
220 NW 2nd Avenue
Portland, OR
97209

ENBRIDGE

IN WITNESS WHEREOF the parties hereto have executed this Agreement as of the day and year first above written.

WESTCOAST ENERGY INC.

per: ______________________

per: ______________________

NORTHWEST NATURAL GAS COMPANY

per: ______________________

per: ______________________

ENBRIDGE

Contract No. FI-3807-B-000

SCHEDULE A

This Schedule A is attached to and forms part of the Firm Service Agreement dated as of June 8, 2017 between Westcoast Energy Inc. and Northwest Natural Gas Company

GMS No.:	3807
Firm Service:	Firm Transportation Service - Southern
Receipt Point:	Compressor Station No. 2
Delivery Points (within the HDA):	Huntingdon – NWP (261)
Contract Demand (10^3M^3):	672.9
Service Commencement Date:	The later of (i) November 1, 2020, and (ii) the actual date upon which Westcoast is able to commence providing the Expansion Service under this Agreement, as specified by Westcoast in a written notice given to Shipper.
Service Expiry Date:	40 years and 0 months after Service Commencement Date