Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

FREEDOM OF INFORMATION ACT/PRIVACY PROGRAM

January 3, 2017

In reply refer to: FOIA #BPA-2017-00212-F

Michael Ravnitzky
(b)(6)

Dear Mr. Ravnitzky:

This communication serves as the Bonneville Power Administration's (BPA) response to your request for agency records made under the Freedom of Information Act, 5 U.S.C. § 552 (FOIA). Your records request was received in this office on November 20, 2016 and acknowledged on December 8, 2016.

Request

"...any unpublished BPA reports or memoranda concerning threats to the electric grid system from solar electromagnetic storm activity such as a Carrington Event type phenomenon, and/or any steps being taken by BPA to address this potential problem."

Response

In accord with the FOIA requirements and practices, BPA has conducted electronic searches of records associated with the following agency offices:

Transmission Service Planning
Operations Support
Technology Innovation
Trans Infrastructure Development Planning
Transmission Project Mgmt.
Operations Control
Substation Engineering
System Operations
National Relations
Org. Delivery & Performance

A total of 97 pages of agency records responsive to your request were located; these records were previously posted on BPA's FOIA web portal at this Internet location: https://www.bpa.gov/news/FOIA/library/Pages/2016-FOIA.aspx

You will find the records at this location in the following on-line index: BPA-2016-00637-F - Meyer - BPA records re significant impacts on the grid from EMP/GMD/GIC - FOIA Release in Full.

In addition, BPA's Transmission Operations Support (TOO) organization offers the following information and Internet links, which you may find useful:

> BPA has an operating plan for GMDs, which includes how to receive advanced warning from the Space Weather Prediction Center (see www.swpc.noaa.gov), and BPA monitors Geomagnetically-Induced Currents (GIC) at more than a dozen locations. The public has access to the last four days of GIC data at: http://transmission.bpa.gov/Business/Operations/gic/gic.aspx.
>
> A previous BPA Officer, Mr. Earl Gjelde, served on the Commission for the April, 2008 "Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack". http://www.empcommission.org/docs/A2473-EMP_Commission-7MB.pdf

In accord with the FOIA, BPA is herein providing you with 97 pages of previously released responsive agency records. Your FOIA request BPA-2017-00212-F is closed with all available agency records provided. Pursuant to 10 C.F.R. § 1004.7(b)(2), I am the individual responsible for the determinations described above.

FOIA Fee

There are no FOIA fees applicable to the fulfillment of your request for BPA records.

FOIA Appeal

This decision, as well as the adequacy of the search, may be appealed within 90 calendar days from your receipt of this letter pursuant to 10 C.F.R. § 1004.8. Appeals should be addressed to:

Director, Office of Hearings and Appeals,
HG-1, L'Enfant Plaza
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585-1615

The written appeal, including the envelope, must clearly indicate that a FOIA appeal is being made. You may also submit your appeal to OHA.filings@hq.doe.gov, including the phrase "Freedom of Information Appeal" in the subject line. The appeal must contain all of the elements required by 10 C.F.R. § 1004.8, including a copy of the determination letter. Thereafter, judicial review will be available to you in the Federal District Court either: 1) in the

district where you reside; 2) where you have your principal place of business; 3) where DOE's records are situated; or 4) in the District of Columbia.

You may also contact BPA's FOIA Public Liaison, Sarah Westenberg, at the address on this letter header for any further assistance and to discuss any aspect of your request. Additionally, you may contact the Office of Government Information Services (OGIS) at the National Archives and Records Administration to inquire about the FOIA mediation services they offer. The contact information for OGIS is as follows:

Office of Government Information Services
National Archives and Records Administration
8601 Adelphi Road-OGIS
College Park, Maryland 20740-6001
E-mail:ogis@nara.gov
Phone: 202-741-5770; Toll-free: 1-877-684-6448; Fax: 202-741-5769

If you have questions about this communication, you may contact James King (CorSource Technology Group, Inc.), assigned to the BPA FOIA office, at 503-230-7621.

Sincerely,

C. M. Frost
Freedom of Information/Privacy Act Officer

Responsive Records Provided via Internet Links

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

FREEDOM OF INFORMATION ACT/PRIVACY PROGRAM

October 17, 2016

In reply refer to: FOIA #BPA-2016-00637-F

John C. Meyer
Senior Researcher
Consumers' Research
1801 F Street NW, Third Floor
Washington, DC 20006
jmeyer@consumersresearch.org

Dear Mr. Meyer:

This communication serves as the Bonneville Power Administration's (BPA) final response to your Freedom of Information Act (FOIA) request BPA-2016-00637-F. Your request was submitted to BPA on March 14, 2016, and acknowledged on March 29, 2016.

Request

"1) All documentation of any actions Bonneville Power Administration has taken to protect its generating capacity, transformers, substations and/or power lines against the effects of an Electromagnetic Pulse event (EMP), whether against natural EMP or against man-made EMP, including nuclear and other artificially generated EMP events, and the costs thereof.
2) All documentation of any actions Bonneville Power Administration currently has underway to protect its generating capacity, transformers, substations and/or power lines against the effects of EMP, whether against natural EMP or against man-made EMP, including nuclear and other artificially generated EMP events, and the likely costs thereof.
3) All documentation of any actions Bonneville Power Administration is currently considering to protect its generating capacity, transformers, substations and/or power lines against the effects of EMP, whether against natural EMP or against man-made EMP, including nuclear and other artificially generated EMP events, and any information on the projected costs of these actions.
4) Any studies, analyses or other reviews in your records of the likely effects of EMP, whether natural or man-made, on Bonneville Power Administration's generating capacity, transformers, substations and/or power lines.
5) Any records of any actual damage to the generating capacity, transformers, substations and/or power lines … from any natural EMP event that has occurred in the past."

Response

In accord with the FOIA requirements and practices, BPA has conducted electronic searches of records associated with the following agency offices:

Transmission Service Planning	Operations Control
Operations Support	Substation Engineering
Technology Innovation	System Operations
Trans Infrastructure Development Planning	National Relations
Transmission Project Mgmt.	Org. Delivery & Performance

Records responsive to your request were located. In addition, Transmission Planning (TPP) provided the following enumerated responses to your concomitantly enumerated requests:

1) TPP is not currently involved in any actions.
2) TPP is not currently involved in any actions.
3) TPP is not currently considering any actions.
4) There is a Technology Innovation project (TIP 359) which has been tasked with modeling and assessing the effects of EMP & GMD events on BPA's electrical system. This project was proposed by Tom Overbye and the University of Illinois. The associated documents are attached to this email.
5) There are no records of damage to BPA's electrics system from any natural EMP event in the past.

In addition, Operations Support (TOO) provided the following enumerated responses, and Internet links, to your concomitantly enumerated requests:

1) BPA has not to date installed any equipment in its transformers or on power lines or generators to protect against the effects of EMP events.
2) BPA has an operating plan for GMDs, which includes how to receive advanced warning from the Space Weather Prediction Center (see www.swpc.noaa.gov), and BPA monitors Geomagnetically-Induced Currents (GIC) at more than a dozen locations. The public has access to the last four days of GIC data at: http://transmission.bpa.gov/Business/Operations/gic/gic.aspx.
3) Refer to the response to item 1 above.
4) BPA sponsored Technology Innovation Project, "TIP 264: Modeling GIC for Evaluation and Mitigation" (see Attachments 2-4). BPA's share of the budget is $126,000.00. https://www.bpa.gov/Doing%20Business/TechnologyInnovation/TIPProjectBriefs/TIP-264-Modeling-Geomagnetically-Induced-Current-for-Evaluation-and-Mitigation.pdf

   BPA is currently funding, "TIP 359: Improved System Modeling for GMD and EMP Assessments".

https://www.bpa.gov/Doing%20Business/TechnologyInnovation/TIPProjectBriefs/2016-TIP-359.pdf

BPA's share of the budget is $132,000.00, and the project is still in progress.

BPA is also actively involved in NERC Standard TPL-007-1, "Transmission System Planned Performance during Geomagnetic Disturbances".

A previous BPA Officer, Mr. Earl Gjelde, served on the Commission for the April, 2008 "Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack".

http://www.empcommission.org/docs/A2473-EMP_Commission-7MB.pdf

There are no records, nor evidence of, damage to BPA's electric system from any natural EMP event in the past.

In accord with the FOIA, BPA is herein releasing 97 pages of responsive agency records to you with no redactions. Your FOIA request BPA-2016-00637-F is closed, with all available agency records provided. Pursuant to 10 C.F.R. § 1004.7(b)(2), I am the individual responsible for the determination of the information described above.

Fee

There are no FOIA fees applicable to the fulfillment of your request for BPA records.

Appeal

This decision, as well as the adequacy of the search, may be appealed within 90 calendar days from your receipt of this letter pursuant to DOE FOIA regulations at 10 C.F.R. § 1004.8. Appeals should be addressed to:

Director, Office of Hearings and Appeals,
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1000 Independence Avenue, S.W.
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district where you reside; 2) where you have your principal place of business; 3) where DOE's records are situated; or 4) in the District of Columbia.

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If you have questions about this communication you may contact James King (CorSource Technology Group, Inc.), assigned to the BPA FOIA office, at 503-230-7621.

Sincerely,

C. M. Frost
Freedom of Information/Privacy Act Officer

Responsive Records Attached

BONNEVILLE POWER ADMINISTRATION
SYSTEM DISPATCHERS'
STANDING ORDER NO. 350

Mitigating the Effects of Geomagnetic Disturbances

Approved: *Chris Sanford* — *July 15, 2015*
Dittmer Dispatch Process Manager — Date

I. Purpose

Related Standing Orders - No. 135 was superseded by DSO 350
Related Standard: EOP-010-1, Geomagnetic Disturbance Operations

The purpose of this Dispatchers' Standing Order (DSO) is to provide operational procedures to identify and mitigate the effects of Geomagnetic Disturbances (GMDs) and the resulting Geomagnetically Induced Currents (GICs) on BPA's electric system.

II. Procedure

A. Normal Operating Procedure: The GIC monitor display on SCADA (at Overviews\Geo Mag Current, see Attachment 5) shows GIC currents at selected transformers, along with other background information about the monitors. GIC monitors will alarm when current exceeds 20 A for greater than 20 seconds

B. Contingency Operations Section
   1. **GIC Alarm:**
      a. Determine the validity of the alarm by trending the alarmed GIC reading over the last 20 minutes. Fluctuations or increases in current are indicative of GIC activity. A momentary spike in current is indicative of some other type of problem.
      b. Check for current space weather alerts from one of the following sources:
         1.) WECCnet from Peak Reliability, the Reliability Coordinator (RC)
         2.) http://www.swpc.noaa.gov
      c. Monitor that transformer for abnormal temperature rise that is inconsistent with loading or ambient temperature.
      d. Note locations reported to have abnormal transformer noise or vibration.
      e. Log the conditions.

2. **GMD K-index of 7 or greater**: Upon receiving notification from the RC of a GMD with a K-index of 7 or greater, the BPA Dispatchers at both Dittmer and Munro Control Centers will make an entry in the Dispatch Log. See Attachments 1, 2 and 3 for examples of RC notifications.

   The Dispatch Log Entry should include:
   a. The K-index as reported
   b. The anticipated duration of the GMD
   c. A request that unusual operating conditions attributed to the GMD be reported to the RC.

      NOTE: Examples of problems that may be detected during a GMD:
      - Real and Reactive power swings
      - Frequency excursions or voltage fluctuations
      - Tripping of capacitor banks by neutral ground current
      - Communication system problems
      - Unusual Noises and heating in transformers.
      - Elevated neutral currents in transformers
      - Oscillograph or Digital Fault Recorder (DFR) operations
      - Harmonic currents

3. **GMD K-index of 8 or greater.** Upon receiving notification from the RC of a GMD with a K-index of 8 or greater, the Dispatcher will evaluate the situation and implement the following actions as appropriate for the power system.
   a. Declare a Restricted Maintenance Operation (RMO; see DSO 150) for shunt and series capacitors, and static var compensators.
   b. Delay planned outages of 500 kV lines and 500 kV transformers until the K-index goes below 7 as per a WECCnet from RC.
   c. Turn Reactive Reserve zeroing off (go to Overviews\Reactive\Reactive Reserve, select the "Details" button for COI/PDCI Support, and select the "Turn Zeroing OFF" button).
   d. Log actions

4. **Extreme GMD - K index of 9**.
   Note that at this level, while strong, the K index of 9 can vary from relatively moderate impacts to voltage collapse or long term equipment damage.
   a. Continue or implement practices for a K-index of 8 or greater
   b. Reduce or curtail transfers across the BPA grid that do not directly feed BPA Balancing Authority load.
   c. Add as much reactive support as possible that can be absorbed
   d. If the GIC of any transformer bank 345 kV or above exceeds 90 Amps, give strong consideration to isolating the bank.

5. **Restoring the system to normal** Begin the process of returning the system to the pre-event status once a WECCnet is received from the RC declaring that the conditions for the alert no longer exist.

III. Background Information

A. The National Oceanic and Atmospheric Administration (NOAA) Space Weather Prediction Center (SWPC) issues space weather alerts using scales for three types of space weather: Solar Radiation Storms, Radio Blackouts and Geomagnetic Storms. (See Attachment 4) Solar Radiation Storms can arrive in as little as 10 minutes, and can affect persons in high altitude aircraft, as well as astronauts. Radio blackouts, also called X-ray emissions, can arrive in as little as 8 minutes, and can affect high frequency radio communications and low frequency navigation signals on the day side of the earth. Geomagnetic Storms take 14 hours to 4 days to arrive from the sun, can last for a day or two, and can affect power systems, spacecraft operations, and satellite navigation.

B. The two major potential effects on power systems are:
   1. Induced DC currents in transformers, resulting in excessive heating and VAR consumption.
   2. Loss of reactive power support, which could lead to voltage instability and power system collapse

C. Modeling the effects of GMD on power systems is still being developed, and the power industry is still working on the best way to mitigate the effects of GMDs on transformers. However, a major GMD event could occur at any time, and FERC issued a Notice of Proposed Rulemaking in 2013, requiring that operators of the bulk power system develop operating procedures to mitigate the effects of GMDs.

D. The locations of the GIC monitors and the GIC currents are displayed on SCADA/IPS screen Overviews\Geo Mag Current. The display, based on the information in Attachment 5, also shows the Geomagnetic latitude, because the WECC NOAA GMD Report (see Attachment 1) includes a statement in the "Potential Impacts" section about where the impacts are located. Geomagnetic latitude is different than geographic latitude, in that it depends on the location of the earth's magnetic pole. For example, the northeast corner of Washington is 49 degrees geographic latitude but is 55 degrees geomagnetic latitude.

VI. History

July 8, 2014: The purpose of this Dispatchers' Standing Order (DSO) is to mitigate the effects of Geomagnetic Disturbances (GMDs) and the resulting Geomagnetically Induced Currents (GICs) on BPA's electric system. This DSO supersedes DSO 135, Notification Procedure for Geomagnetic Storm Warnings, which was cancelled with the distribution of DSO 350.

July 15, 2015: Reviewed and added new attachments for a Peak RC GMD Warning, Alert, and Alert Cancellation (*D. Goodrich*).

Technical Approval: *John Anasis* John G. Anasis — *July 15, 2015*

Technical Operations Process Manager — Date

SRenne:smr:2912:07/15/15: (DFTP01)Z:\DSO's Official\300 series\DSO350.doc

BPA1

From: PEAK1
Sent: Tuesday, March 17, 2015 5:38 AM
To: ALL WECC
Subject: GMD WARNING: K-index of 7 (G3)

SWPC GMD WARNING K7 (G3)

SWPC Message Code: WARK07

Issue Time: 03/17/15 at 0616 MST

WARNING: Geomagnetic K-index of 7 or greater expected

Valid From: 2015 MAR 17 0615 MST

Valid To: 2015 MAR 17 1300 MST

Warning Condition: Onset

Potential Impacts: Primarily poleward of 50 degrees Geomagnetic Latitude

Induced Current Effects: Power system voltage irregularities possible, false alarms may be triggered on some protection devices.

Please report all unusual operating conditions in real-time attributed to the GMD to Peak RC (voltage fluctuations, communication system disruptions, etc.).

PEAKRELIABILITY

Area A	Area B	Area C
360.713.9097	970.776.5747	360.713.9093

BPA1

From: PEAK1
Sent: Tuesday, March 17, 2015 1:46 PM
To: ALL WECC
Subject: GMD ALERT: K-index of 7

SWPC GMD ALERT K7 (G3)

SWPC Message Code: ALTK07

Issue Time: 3/17/15 at 1334 PDT

ALERT: Geomagnetic K-index of 7

Active Warning: Yes

Threshold Reached: 2015 March 17 1330 PDT

Potential Impacts: Primarily poleward of 50 degrees Geomagnetic Latitude

Comments: Space Weather Operations (SWO) observed a K7 GMD at 1330 PDT.

PEAKRELIABILITY

Area A	Area B	Area C
360.713.9097	970.776.5747	360.713.9093

BPA1

From: PEAK1
Sent: Wednesday, March 18, 2015 1:19 AM
To: ALL WECC
Subject: EXPIRED: GMD (WARNING/WATCH/ALERT): K-index of 7 (G3)

SWPC GMD (WARNING/WATCH/ALERT) HAS EXPIRED

The Geomagnetic Disturbance (GMD) of K-index 7 and G-3 warning posted on WECCnet on 3/17 at 0521 PDT terminated at 0600 UTC 3/18(3/17 2300 PDT). PeakRC will continue to monitor and post any changes in GMD status.

The latest Alert of K-index 6 and G-2 was posted at 0119 UTC(1819 PDT).

PEAKRELIABILITY

Area A	Area B	Area C
360.713.9097	970.776.5747	360.713.9093

NOAA Space Weather Scales

Category		Effect	Physical measure	Average Frequency (1 cycle = 11 years)
Scale	Descriptor	Duration of event will influence severity of effects		
Geomagnetic Storms			Kp values* determined every 3 hours	Number of storm events when Kp level was met; (number of storm days)
G 5	Extreme	Power systems: widespread voltage control problems and protective system problems can occur, some grid systems may experience complete collapse or blackouts. Transformers may experience damage. Spacecraft operations: may experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites. Other systems: pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).**	Kp=9	4 per cycle (4 days per cycle)
G 4	Severe	Power systems: possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid. Spacecraft operations: may experience surface charging and tracking problems, corrections may be needed for orientation problems. Other systems: induced pipeline currents affect preventive measures, HF radio propagation sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).**	Kp=8	100 per cycle (60 days per cycle)
G 3	Strong	Power systems: voltage corrections may be required, false alarms triggered on some protection devices. Spacecraft operations: surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems. Other systems: intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).**	Kp=7	200 per cycle (130 days per cycle)
G 2	Moderate	Power systems: high-latitude power systems may experience voltage alarms, long-duration storms may cause transformer damage. Spacecraft operations: corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions. Other systems: HF radio propagation can fade at higher latitudes, and aurora has been seen as low as New York and Idaho (typically 55° geomagnetic lat.).**	Kp=6	600 per cycle (360 days per cycle)
G 1	Minor	Power systems: weak power grid fluctuations can occur. Spacecraft operations: minor impact on satellite operations possible. Other systems: migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).**	Kp=5	1700 per cycle (900 days per cycle)

* Based on this measure, but other physical measures are also considered.

** For specific locations around the globe, use geomagnetic latitude to determine likely sightings (see www.swpc.noaa.gov/Aurora)

Solar Radiation Storms			Flux level of ≥ 10 MeV particles (ions)*	Number of events when flux level was met**
S 5	Extreme	Biological: unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk. *** Satellite operations: satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources; permanent damage to solar panels possible. Other systems: complete blackout of HF (high frequency) communications possible through the polar regions, and position errors make navigation operations extremely difficult.	10^5	Fewer than 1 per cycle
S 4	Severe	Biological: unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.*** Satellite operations: may experience memory device problems and noise on imaging systems; star-tracker problems may cause orientation problems, and solar panel efficiency can be degraded. Other systems: blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.	10^4	3 per cycle
S 3	Strong	Biological: radiation hazard avoidance recommended for astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.*** Satellite operations: single-event upsets, noise in imaging systems, and slight reduction of efficiency in solar panel are likely. Other systems: degraded HF radio propagation through the polar regions and navigation position errors likely.	10^3	10 per cycle
S 2	Moderate	Biological: passengers and crew in high-flying aircraft at high latitudes may be exposed to elevated radiation risk.*** Satellite operations: infrequent single-event upsets possible. Other systems: effects on HF propagation through the polar regions, and navigation at polar cap locations possibly affected.	10^2	25 per cycle
S1	Minor	Biological: none. Satellite operations: none. Other systems: minor impacts on HF radio in the polar regions.	10	50 per cycle

* Flux levels are 5 minute averages. Flux in particles·s^{-1}·$ster^{-1}$·cm^{-2} Based on this measure, but other physical measures are also considered.

** These events can last more than one day.

*** High energy particle (>100 MeV) are a better indicator of radiation risk to passenger and crews. Pregnant women are particularly susceptible.

Radio Blackouts			GOES X-ray peak brightness by class and by flux*	Number of events when flux level was met; (number of storm days)
R 5	Extreme	HF Radio: Complete HF (high frequency**) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and en route aviators in this sector. Navigation: Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.	X20 ($2x10^{-3}$)	Fewer than 1 per cycle
R 4	Severe	HF Radio: HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time. Navigation: Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.	X10 (10^{-3})	8 per cycle (8 days per cycle)
R 3	Strong	HF Radio: Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth. Navigation: Low-frequency navigation signals degraded for about an hour.	X1 (10^{-4})	175 per cycle (140 days per cycle)
R 2	Moderate	HF Radio: Limited blackout of HF radio communication on sunlit side of the Earth, loss of radio contact for tens of minutes. Navigation: Degradation of low-frequency navigation signals for tens of minutes.	M5 ($5x10^{-5}$)	350 per cycle (300 days per cycle)
R 1	Minor	HF Radio: Weak or minor degradation of HF radio communication on sunlit side of the Earth, occasional loss of radio contact. Navigation: Low-frequency navigation signals degraded for brief intervals.	M1 (10^{-5})	2000 per cycle (950 days per cycle)

* Flux, measured in the 0.1-0.8 nm range, in $W \cdot m^{-2}$. Based on this measure, but other physical measures are also considered.
** Other frequencies may also be affected by these conditions.

This information is dated April 7, 2011 from the NOAA Space Weather Scales site located at http://www.swpc.noaa.gov/NOAAscales/.

DSO 350, Attachment 5

Screenshot of the GIC display

10:08:14
02-Jul-2014

Geomagnetically Induced Current (GIC)

DSO 350

STATION	INDUCED CURRENT/AMP	GEOMAGNETIC LATITUDE *
ALVEY	** 1.20	50
BELL	0.10	54
BIG_EDDY	** 5.30	51
HATWAI	** 0.10	53
HOT_SPRG	** 7.80	54
KEELER	** 62.30	51
MONROE	** 1.10	54
PEARL	** 153.70	51
ROSS	** 6.80	51
SACAJWEA	-0.20	52
SICKLER	** 0.00	53
SNO_KING	** 0.00	53
	** 0.00	53
	** 0.00	53
	** 0.00	53
TILLAMOK	0.00	51
VANTAGE	0.00	53
	-0.20	53

* Approximate Geomagnetic latitude based on Space Weather web site: http://www.swpc.noaa.gov/Aurora/globeNW.html
** Older bank induced currents that are less accurate, for information only and will not alarm

BPA GMD Impact Assessment
TIP 264 GIC R&D

Author:	PowerWorld Corporation Scott Dahman
Client:	Bonneville Power Administration
Date:	August 26, 2013
Revised:	September 30, 2013

Purpose

The study seeks to characterize the impact of geomagnetic disturbances (GMD) on the BPA high voltage transmission grid. The focus is on transmission line and transformer geomagnetic-induced currents (GIC), GIC reactive power losses due to transformer half-cycle saturation, and the resulting AC voltage profile of the power system. Several options for mitigating GIC flow, reactive power losses, and AC voltage drop are also examined.

Study Methodology

This study incorporates models of the physical operation of the Western Interconnect power grid (WECC) under summer 2013 peak conditions, with different transfer levels on the Summer Lake-Hemingway (HMSL) interface. One model features 550 MW from Summer Lake to Hemingway (HMSL +550) and the other features 400 MW of flow from Hemingway to Summer Lake (HMSL -400).

A set of baseline GIC calculations and power flow simulations are performed, using PowerWorld Simulator GIC software. Network mitigation measures, including opening transmission lines and installing transformer capacitive neutral blocking, are considered in the next study phase.

Uniform Field Scenarios

The uniform field scenarios assume electric fields of 1 volt/km at orientations varying from south-north (zero degrees) and at 15 degree increments through 165 degrees as illustrated in Figure 1.

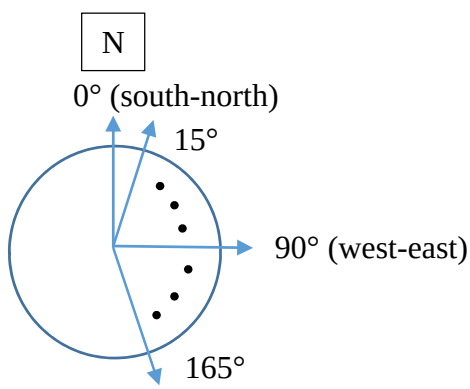


Figure 1 - Electric Field Orientation

Electric fields of identical magnitude separated by 180 degrees have identical effects, except the sign of the GICs is reversed. Thus it is only necessary to simulate half of the spectrum of field orientations. The quasi-DC GIC quantities scale linearly with field strength, so a 2 volt/km field would produce twice the GIC and transformer reactive power losses as a 1 volt/km field.

Full power flow simulation is also performed under each GMD storm scenario to quantify the extent of transformer reactive power losses, voltage drop, and risk of large-scale voltage

collapse. Geomagnetic-induced current (GIC) is calculated for the BPA network, and the control areas that comprise BPA's first-tier neighbors (areas with at least one tie-line connection to a BPA area). The uniform field strength that causes operating voltage limit violations and large scale voltage collapse is also identified for each field orientation.

GIC Network Modeling

Quasi-DC GICs flow through circuits formed by grounded transformer coils, transmission lines, and the earth. The effects are modeled as DC voltage sources in transmission lines as illustrated in Figure 2 with a simple example with two generators connected to a common transmission line through step-up transformers.

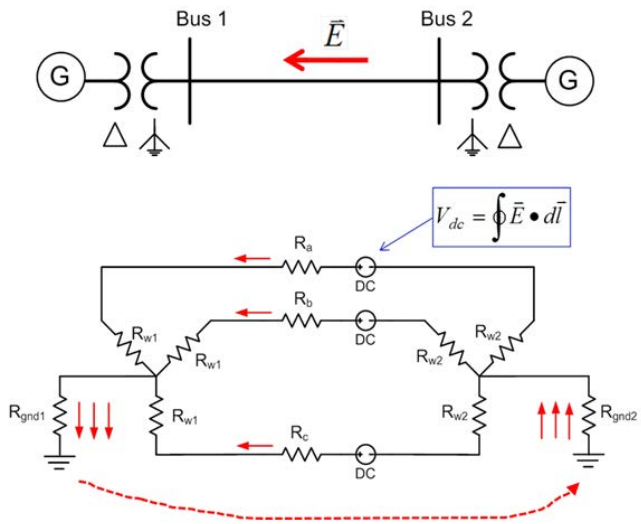


Figure 2 - Simple GIC Flow in a Two Generator Example

For purposes of this study, GIC equivalent DC voltage sources are modeled in transmission lines at operated at nominal voltages of 115 kV and above, in areas in which contain at least one transformer identified as BPA-owned in the FERC 715 power flow models, and in neighboring areas that have a connection to the zones within these areas and zones to which such BPA-owned transformers belong. The areas that contain BPA-owned transformers are shown in Table 1. Transformer GIC reactive power losses are also modeled in these areas.

Table 1 – Areas with BPA-owned Transformers at 115 kV and above

FERC 715 Name	FERC 715 Number
Northwest	40
Idaho	60
PACE	65

First-tier neighboring areas with high-voltage connections to the areas and zones that contain BPA-owned transformers are shown in Table 2.

Table 2 – First-Tier Neighboring Areas

FERC 715 Name	FERC 715 Number
PG and E	30
B.C. Hydro	50
Montana	62
Sierra	64

GIC equivalent DC voltage sources are modeled in transmission lines at operated at nominal voltages of 115 kV and above in these areas to capture the effect of GIC currents flowing into the BPA network from neighbors. Transformer GIC Mvar losses are not considered in these external areas. The study thus focuses on AC voltage issues only within the BPA system.

The study footprint is shown graphically in Figure 3, with the emphasized transmission representing the areas and zones containing BPA transformers at 115 kV and above. This includes all of area 40 and zones within areas 60 and 65 that contain such transformers. The arrows depict GIC flow through the transmission network during a 1 V/km, 0 degree uniform field GIC event.

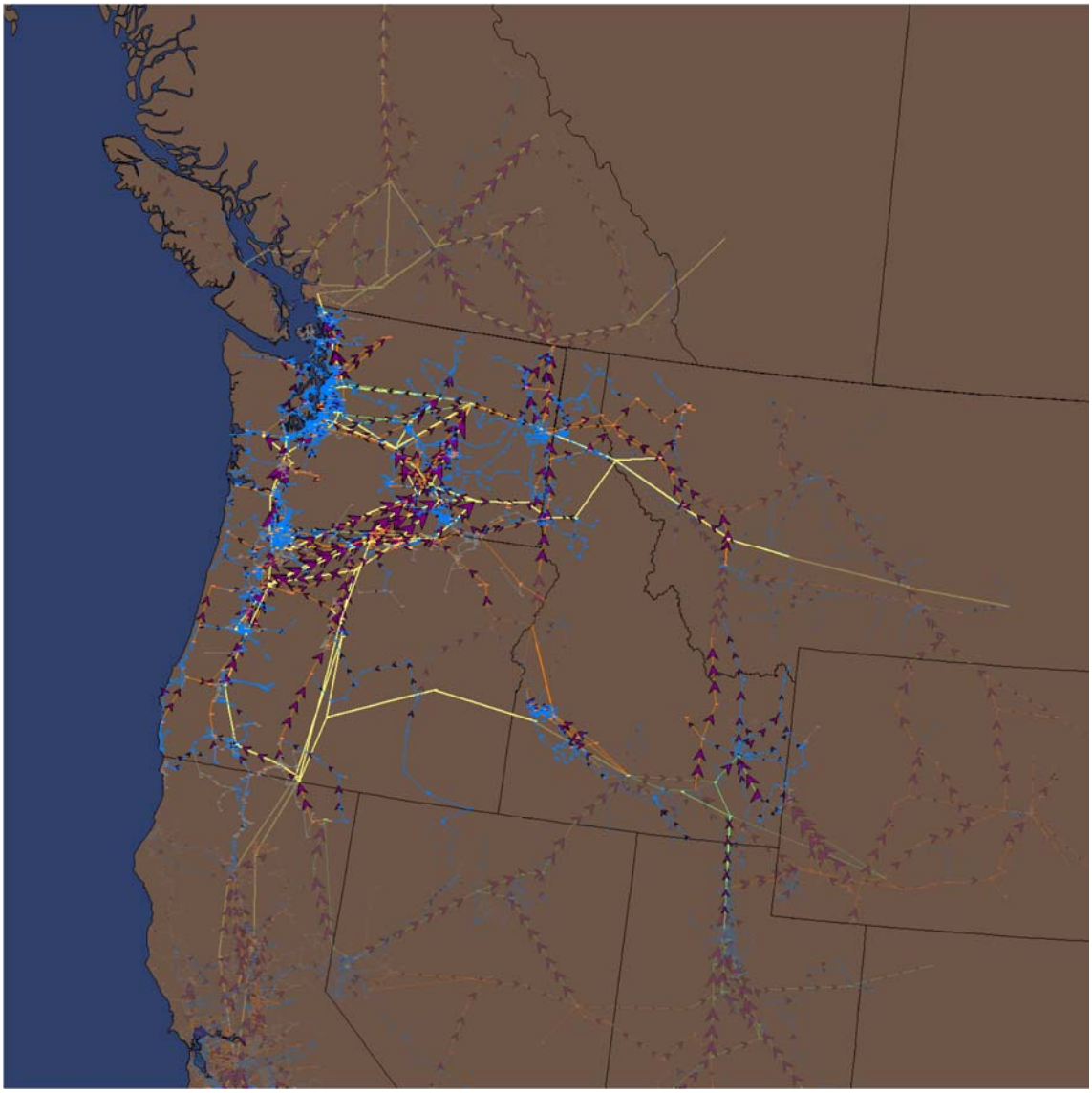


Figure 3 - Study System

Transformer Modeling

Key transformer parameters for GIC modeling include grounding configuration, coil resistance, whether the transformer is an autotransformer, and core type. PowerWorld requested these transformer parameters, as well as substation grounding resistance, from BPA and several foreign utilities. Data were provided by Avista Corporation, Chelan PUD, Clark PUD, Cowlitz PUD, Douglas PUD, Eugene Water and Electric Board, Idaho Power Company, PacifiCorp, Portland General Electric, Puget Sound Energy, Seattle City Light, Snohomish PUD, Tacoma Power, and the US Army Corps of Engineers, in addition to BPA.

There are a total of 842 transformers in the study footprint with primary voltages of 115 kV and above. Known parameter coverage rates are shown in Table 3.

Table 3 - Coverage Rates of Known Transformer Parameters, Primary Voltage of 115 kV and above (842 units total)

Parameter	Number of Units
Grounding Configuration	545 (65%)
Coil Resistance	249 (30%)
Is an Autotransformer?	557 (66%)
Core Type	289 (34%)

PowerWorld Simulator software applies a set of assumptions as follows to transformers when owner-provided data is not available:

1. Configuration: All windings are assumed to be either delta or grounded wye. If the high voltage side is greater than 100 kV and the low voltage is less than 100 kV, it is assumed the high side is grounded wye and the low side is delta. GSUs are generally subsets of this class, where the generator is connected to the low side, which is assumed delta. If the high and low voltage sides are both less than or both greater than 100 kV, both sides are assumed to be grounded wye.
2. Coil resistance is derived from the positive-sequence AC per-unit series resistance in the power flow model. The value in the power flow model contains the total series resistance for both high and low voltage windings. Simulator estimates the split between each winding as:

$$\frac{R_{pu}}{R_{Base,HighSide}} = R_{HighSide} + a_t^2 R_{LowSide} \quad (1)$$

$$R_{HighSide} = a_t^2 R_{LowSide} \quad (2)$$

3. Units are assumed to be autotransformers if all of the following criteria are met:
    a. the unit is not a phase-shifting transformer,
    b. the high side and low side are at different nominal voltages,
    c. the high side nominal voltage is at least 100 kV, and
    d. the turns ratio is less than or equal to 4.

4. K-Factor: The K-Factor relates the transformer's effective GIC current to its reactive power losses caused by GIC half-cycle saturation at nominal voltage (1.0 pu). [1] The total three-phase GIC reactive power loss, or Q_{Loss}, is computed as:

$$Q_{Loss} = V_{pu} K \left(\frac{V_{NomkV}}{500kV}\right) I_{GIC} \qquad (3)$$

where I_{GIC} is per-phase effective GIC amps. (500 kV is the assumed K-Factor base in PowerWorld Simulator software.) I_{GIC} is computed from the current flowing in the primary and secondary windings as:

$$I_{GIC} = \left| \frac{a_t I_H + I_L}{a_t} \right| \qquad (4)$$

where a_i is the turns ratio, I_H is the primary (high-side) per-phase current and I_L is the secondary (medium-side in a 3-winding transformer) per-phase current.

Simulator applies the K-Factor assumptions shown in Table 4 to compute GIC Mvar losses from GIC effective current.

Table 4 - PowerWorld Simulator K-Factor Assumptions

Core Type	Primary (Highest) Voltage	K-Factor for 500 kV Primary
Single Phase (3 separate cores)	All	1.10
Three Phase, Shell Form	All	0.82
Three Phase, Core Form Generic	All	0.50
Three Phase, 3-Legged	All	0.29
Three Phase, 5-Legged	All	0.66
Three Phase, 7-Legged	All	0.66
Unknown (not owner-specified)	>400	1.10
Unknown (not owner-specified)	<=400	0.60

GIC Mvar Losses are modeled only in BPA control areas (identified in Table 1).

[1] T. J. Overbye, T. R. Hutchins, K. Shetye, J. Weber, S. Dahman, "Integration of Geomagnetic Disturbance Modeling into the Power Flow: A Methodology for Large-Scale System Studies", *IEEE North American Power Symposium*, September 9-11, 2012.

Substation Modeling

Key substation parameters are geographic coordinates and grounding resistance. PowerWorld maintains a database of substation geographic coordinates which are applied to the study footprint. The grounding resistance is defined as the resistance, in ohms, between the substation neutral and earth ground. The best method of determining grounding resistance is from an actual measurement, such as taken during a fall of potential test. There are a total of 398 substations in the study area with at least one transformer with a primary of 115 kV or above. BPA and foreign utilities provided grounding resistance for 148 substations, or 37% of these. Simulator software applies an assumed grounding resistance to substations for which no data is provided, based on the size of the substation. The values assigned range from 0.1Ω to 2.0Ω. Substations with more buses and higher nominal voltages are assumed to have lower values.

Study Limitations

The analytic methods used in this study are highly dependent and sensitive to the transmission models and transformer and substation parameter inputs collected for the study. In particular, recent research has shown that substation grounding resistance has a significant impact on GIC network modeling and that estimated substation grounding resistance is subject to a significant standard error.[2] Furthermore, the characteristics of transformer half-cycle saturation characteristics are not well understood and are also the subject of ongoing research.

[2] U. Bui, T. J. Overbye, K. Shetye, H. Zhu, J. Weber, "Geomagnetically Induced Current Sensitivity to Assumed Substation Grounding Resistance", submitted for *IEEE North American Power Symposium*, Sept 22-24 2013.

Uniform Field Modeling Results

Uniform field simulations were performed across all orientations and for both the HMSL -400 and HMSL 500 transfer levels. Table 5 shows the total GIC transformer neutral current and GIC Mvar losses for each orientation at 1 V/km. All quantities are 3-phase, for transformers in the study footprint with high side nominal voltages of at least 115 kV.

Table 5 - GIC Transformer Neutral Current and Mvar Losses at 1 V/km Uniform Electric Field, by Orientation

	GIC 3-phase transformer neutral current (Amps)		GIC 3-phase transformer Mvar Losses (Q_{Loss})	
Orientation	HMSL -400	HMSL +550	HMSL -400	HMSL +550
0	4,789	4,800	912	911
15	5,050	5,062	1,011	1,010
30	5,506	5,502	1,131	1,130
45	6,037	6,014	1,245	1,243
60	6,431	6,403	1,325	1,323
75	6,572	6,553	1,335	1,334
90	6,499	6,484	1,284	1,283
105	6,191	6,184	1,185	1,186
120	5,739	5,741	1,051	1,053
135	5,367	5,380	960	962
150	5,019	5,034	884	887
165	4,822	4,830	863	864

The highest GIC currents and highest GIC Mvar losses tend to occur in GSUs connected to EHV transmission on the high-side. Long transmission lines have relatively high GIC DC equivalent voltages (Figure 2) and relatively low series resistance and thus can induce high GIC currents. Table 6 below shows the 20 transformers with the highest average per-unit neutral GICs[3], averaged across all simulated electric field orientations from 0 to 165 degrees. All quantities are 3-phase, except as noted.

[3] Per-unitization is applied only to rank the GIC current with consideration of the nominal voltage level and size of each transformer. As GIC is quasi-DC, there is no transformation of current or voltage in the GIC circuit model.

Table 6 – Transformers with highest GIC neutral amps under uniform field simulation at 1 V/km, averaged across all orientations and HMSL loading cases

Transformer Description	Neutral Current, pu	Neutral Amps	I_{GIC} (per phase)	Mvar Losses
Ashe 500/25 #1	0.648	74.782	24.927	29.614
Dworshak 500/13.8/13.8 #1	0.567	65.495	21.832	25.744
Lane 500/230 #1	0.524	60.458	26.479	31.960
McNary 345/230 #1	0.359	60.019	18.140	14.502
Santiam 500/230 #1	0.482	55.689	35.722	42.961
Lower Granite 500/13.8/13.8 #1	0.456	52.694	17.565	20.838
South Bremerton 230/115 #1	0.208	52.269	11.543	3.262
Aberdeen 230/115 #5	0.203	50.862	13.139	3.138
Novelty 230/115 #1	0.195	48.824	10.926	3.109
Ostrander 500/230 #1	0.410	47.380	21.906	26.186
Lower Monumental 500/13.8/13.8 #1	0.373	43.122	14.374	17.075
Slatt 500/230 #1	0.359	41.445	17.466	20.838
East Omak 230/115 #1	0.160	40.091	11.005	2.630
Bell 500/230 #1	0.343	39.581	25.165	30.090
Boardman (PGE) 500/24 #1	0.342	39.518	13.173	14.218
Aberdeen 115/13.8 #1	0.078	39.290	13.097	1.850
Salem 230/115 #1	0.152	38.062	9.921	2.847
Shelton 230/115 #1	0.150	37.553	9.698	2.327
Tacoma 500/230 #1	0.316	36.479	13.596	16.232
Snohomish 345/230 #1	0.215	35.941	12.152	9.540

Figure 4 graphically depicts concentrations of transformer neutral GIC current averaged across all simulated orientations. The flow arrows on the transmission network (de-emphasized to better reveal the contour) depict GIC flows during a 75 degree uniform field event, under which the maximum transformer neutral GIC occurs. The red contouring depicts the highest GIC currents.

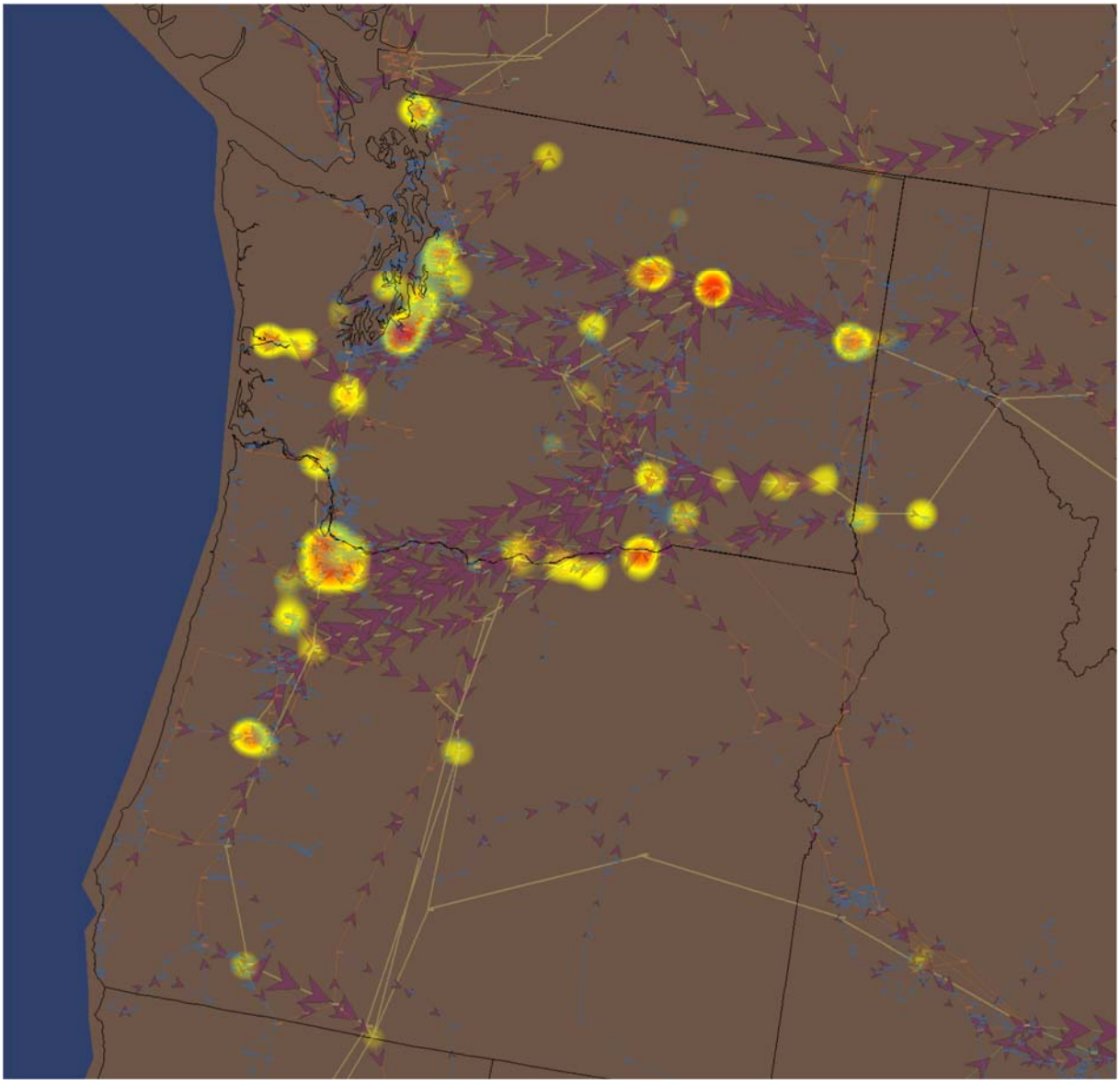


Figure 4 - Contour of Per-Unit Transformer Neutral GIC Density, Averaged Over All Simulated Orientations

Table 7 shows the same quantities for the 20 transformers with the highest GIC Mvar losses.

Table 7 – Transformers with highest GIC Mvar losses under uniform field simulation at 1 V/km

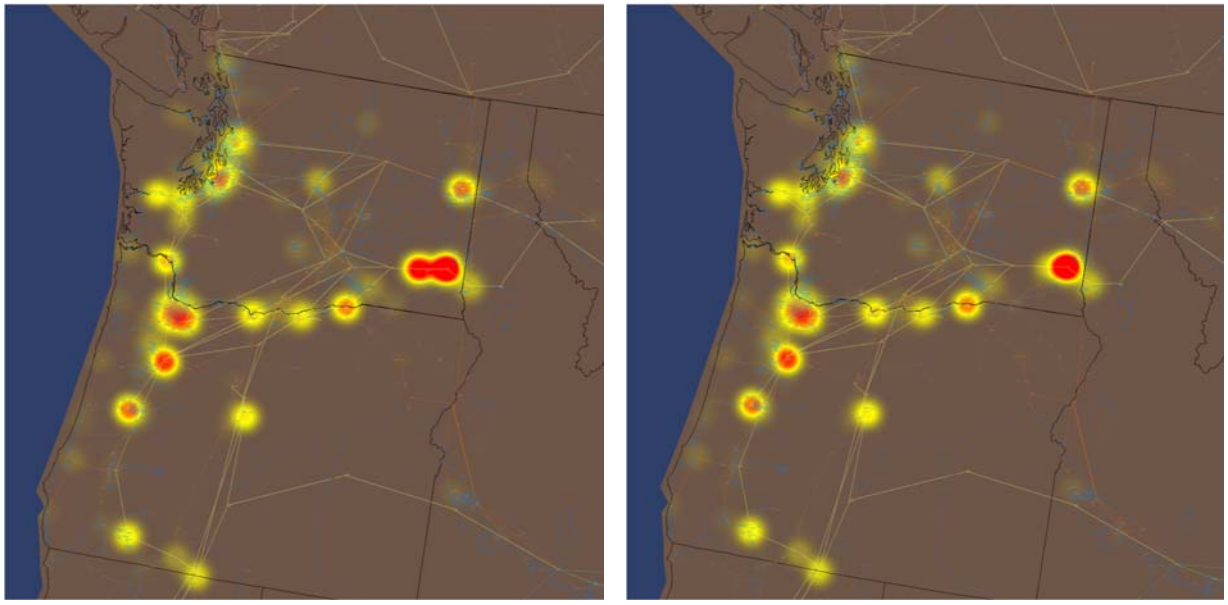
Transformer Description	Neutral Current, pu	Neutral Amps	I_{GIC} (per phase)	Mvar Losses
Santiam 500/230 #1	0.482	55.689	35.722	42.961
Lane 500/230 #1	0.524	60.458	26.479	31.960
Bell 500/230 #1	0.343	39.581	25.165	30.090
Ashe 500/25 #1	0.648	74.782	24.927	29.614
Ostrander 500/230 #1	0.410	47.380	21.906	26.186
Dworshak 500/13.8/13.8 #1	0.567	65.495	21.832	25.744
Satsop 500/230 #1	0.210	24.198	19.175	22.880
Lower Granite 500/13.8/13.8 #1	0.456	52.694	17.565	20.838
Slatt 500/230 #1	0.359	41.445	17.466	20.838
Malin 500/230 #1	0.281	32.466	15.369	17.544
Olympia 500/230 #1	0.026	3.047	14.351	17.094
Lower Monumental 500/13.8/13.8 #1	0.373	43.122	14.374	17.075
Tacoma 500/230 #1	0.316	36.479	13.596	16.232
Pearl 500/230 #1	0.240	27.753	13.273	15.949
Big Eddy 500/230 #2	0.054	6.209	12.835	15.293
McNary 345/230 #1	0.359	60.019	18.140	14.502
Boardman (PGE) 500/24 #1	0.342	39.518	13.173	14.218
Chief Joseph 500/230 #3	0.074	8.503	11.610	13.793
Ponderosa 500/230 #1	0.208	24.053	10.986	13.179
Central Ferry 500/230 #1	0.231	26.667	11.109	13.165

Some locations with high simulated GIC reactive losses have generator reactive power reserves under normal operating conditions to compensate for losses. Table 8 shows the substations with the lowest simulated difference between generation reactive reserves and average GIC reactive losses at 1 V/km across all simulated orientations. This difference is termed “Net Mvar Reserves” in the table.

Table 8 – Substations with lowest average net GIC Mvar reserves under uniform field simulation at 1 V/km

	Average Net Mvar Reserves	
Station and Voltage (kV)	HMSL -400	HMSL 550
Lower Granite 500	-77.386	-77.009
Little Goose Ph 500	-48.576	
Santiam 500	-43.305	-43.369
McNary 500	-35.185	-35.161
Lane 500	-34.344	-34.395
Bell 500	-30.666	-30.757
Big Eddy 500	-26.778	-26.790
Ostrander 500	-26.184	-26.189
Ponderosa 500	-25.085	-25.103
Allston 500	-24.696	-24.695
Satsop 500	-22.880	-22.879
Slatt 500	-20.840	-20.835
Meridian 500	-20.389	-20.411
Olympia 500	-19.951	-19.949
Pearl 500	-19.560	-19.564
Malin 500	-18.641	-18.638
Tacoma 500	-17.689	-17.696
Maple Valley 500	-13.337	-13.346
Central Ferry 500	-13.187	-13.142
Snohomish 345	-12.107	-12.124
Hatwai 500	-11.470	-11.425

Figure 5 depicts locations with negative net Mvar reserves with a geospatial contour. The red contouring depicts the most negative reserves.



(a) HMSL -400 **(b) HMSL 550**

Figure 5 - Contour of Net Mvar Reserve Density (HMSL -400), Averaged Over All Simulated Orientations

Full AC power flow solutions were also performed at each orientation with increasing electric field strength until voltage collapse. Field strengths were recorded where 0.95 pu and 0.90 pu thresholds were first crossed and where voltage collapse occurred. A summary of the results is shown in Table 9.

Table 9 – Field Strength (V/km) resulting in voltage limit violation and voltage collapse

HMSL	Voltage Level (pu)	Field Orientation (degrees)											
		0	15	30	45	60	75	90	105	120	135	150	165
-400	0.95	2.4	2.4	2.1	2.0	1.8	1.8	1.8	2.0	2.1	2.0	2.1	2.2
	0.90	4.5	4.3	4.0	3.7	3.4	3.4	3.6	3.7	3.9	4.0	4.1	4.3
	Collapse	5.6	5.2	4.7	4.2	3.9	3.9	4.0	4.4	5.1	5.7	6.0	6.1
+550	0.95	2.4	2.4	2.2	2.0	2.0	1.8	2.0	2.0	2.0	2.0	2.1	2.2
	0.90	4.6	4.3	4.0	3.7	3.6	3.6	3.6	3.7	4.0	4.0	4.0	4.3
	Collapse	5.6	5.0	4.5	4.2	3.9	3.9	4.0	4.3	5.0	5.6	6.0	6.0

A trace of the lowest per-unit voltage buses at each simulated electric field magnitude and orientation for HMSL -400 and HMSL +550 are shown in Figure 6 and Figure 7, respectively.

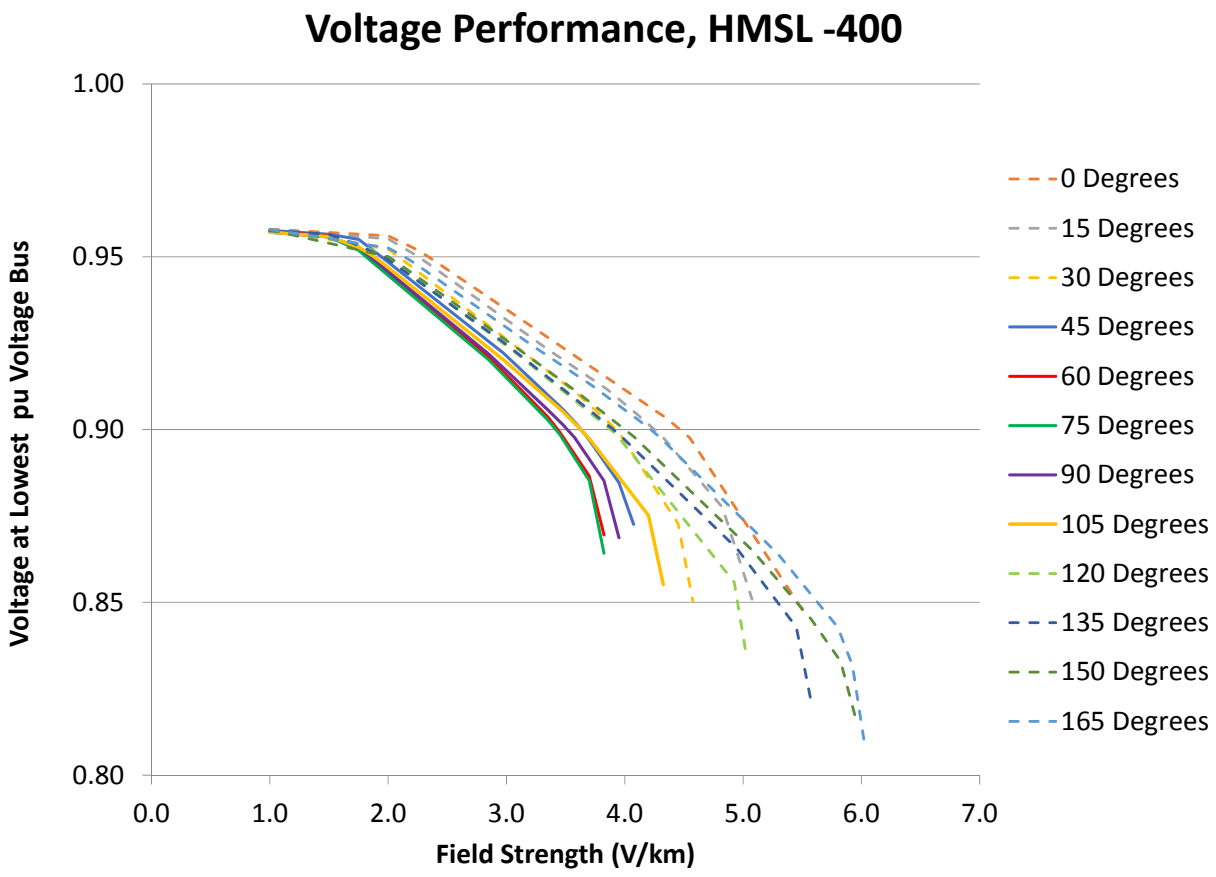

Voltage Performance, HMSL -400
1.00
0.95
0.90
0.85
0.80
Voltage at Lowest pu Voltage Bus
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
Field Strength (V/km)
0 Degrees
15 Degrees
30 Degrees
45 Degrees
60 Degrees
75 Degrees
90 Degrees
105 Degrees
120 Degrees
135 Degrees
150 Degrees
165 Degrees

Figure 6

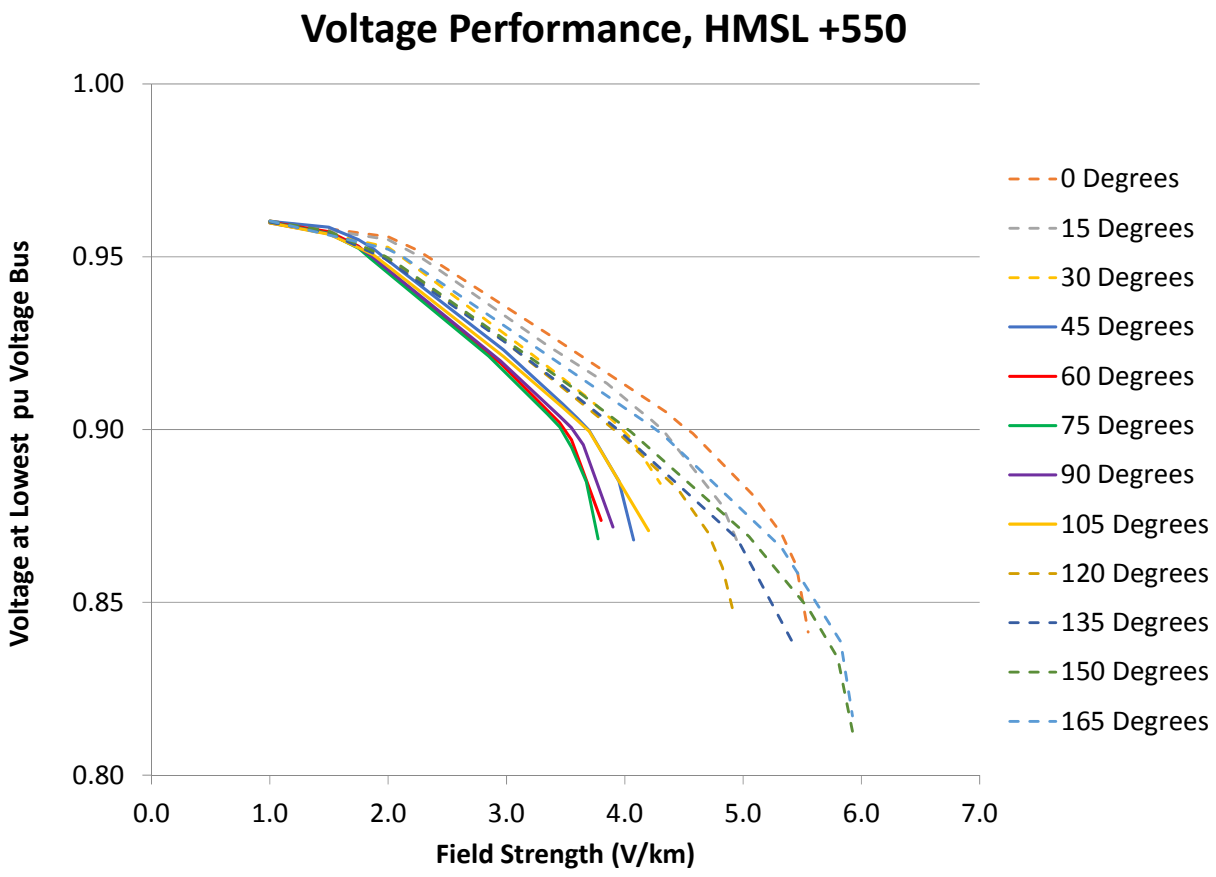
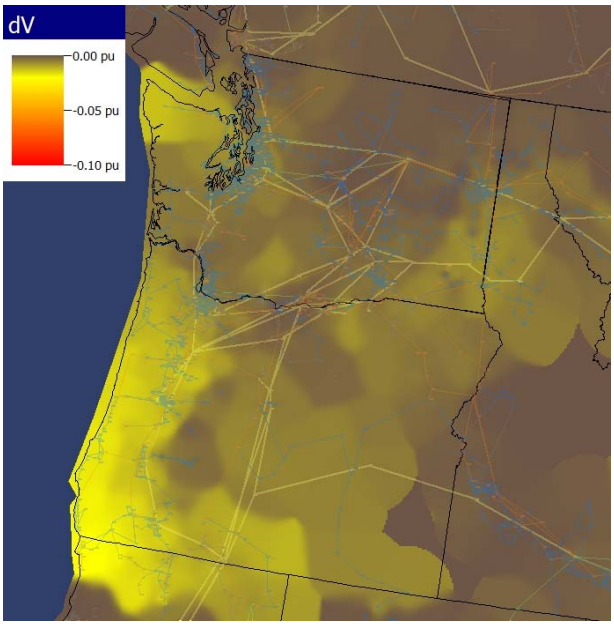
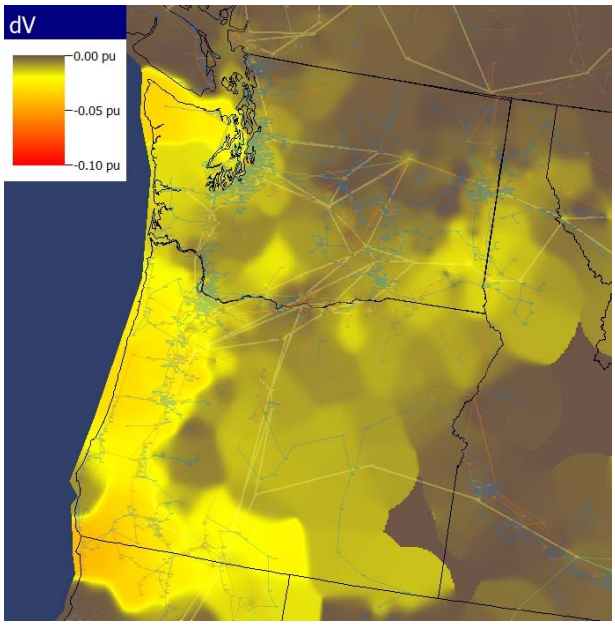


Figure 7

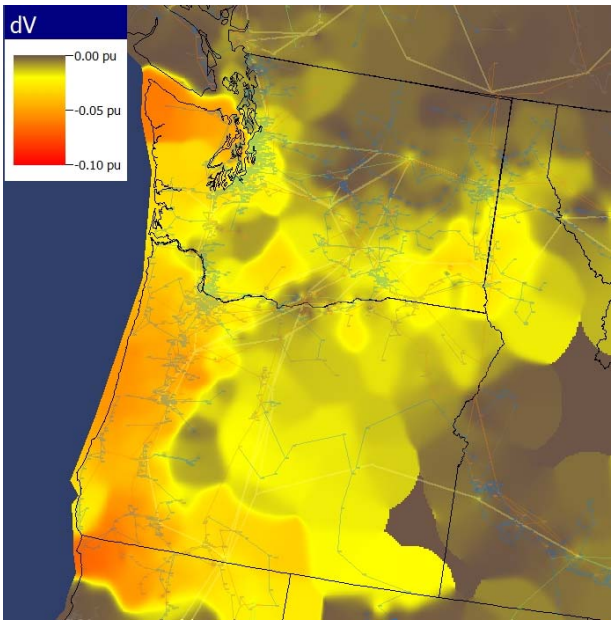
The simulations show that 60-90 degrees is the most stressful field orientation for voltage performance, with similar results for 45-105 degrees. The contours in the following figures illustrate voltage drop for the 75 degree orientation at increasing field strengths in each case.



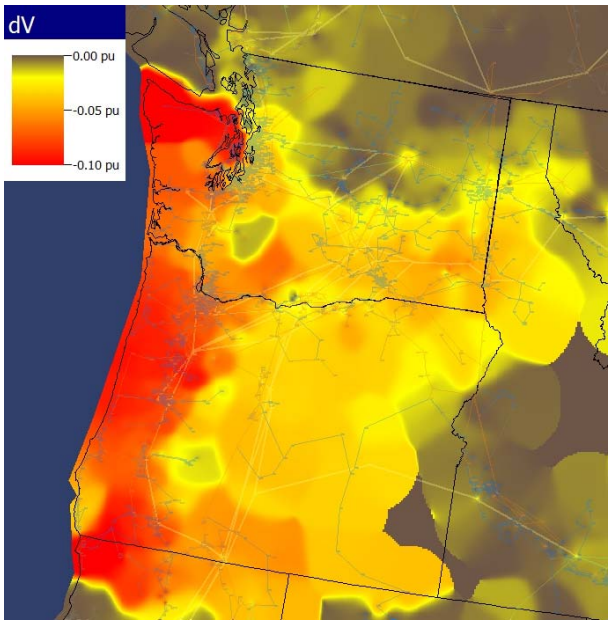
(a) 1 V/km



(b) 2 V/km

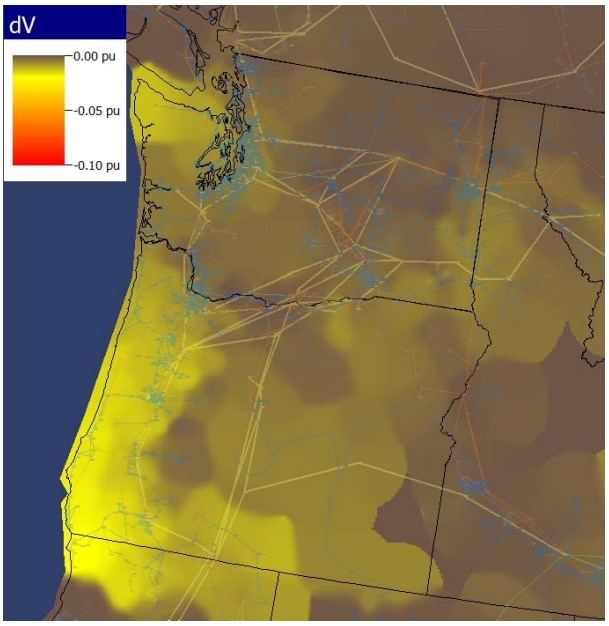


(c) 3 V/km

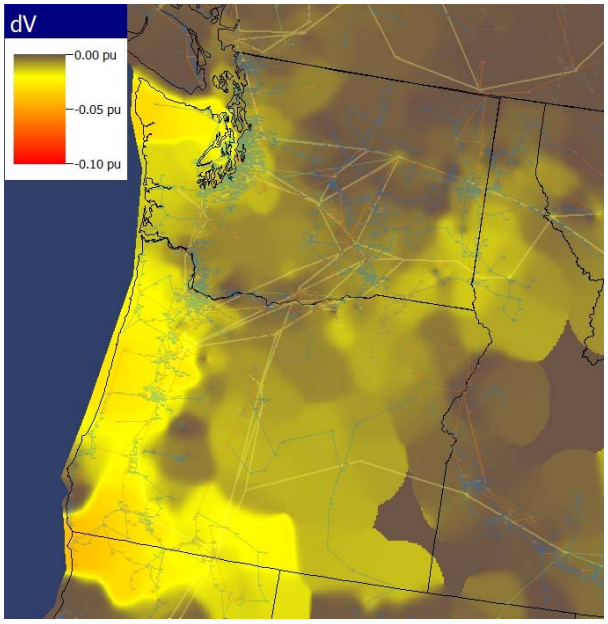


(d) 3.85 V/km - last valid solution

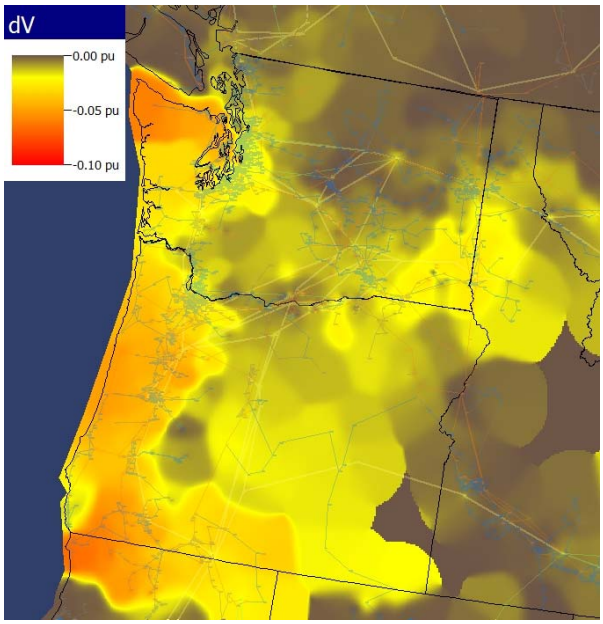
Figure 8 - Voltage Change Contours, HMSL -400, 75 degrees Electric Field Orientation



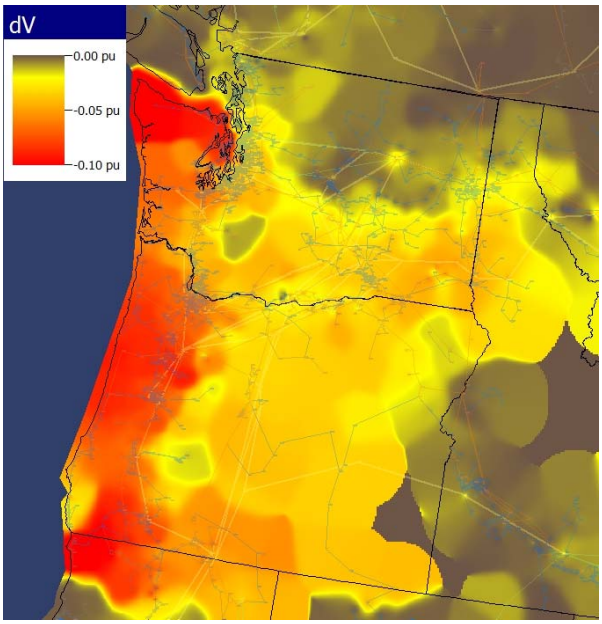
(a) 1 V/km



(b) 2 V/km



(c) 3 V/km



(d) 3.78 V/km - last valid solution

Figure 9 - Voltage Change Contours, HMSL +550, 75 degrees Electric Field Orientation

Uniform Field Analysis Conclusions

The uniform field analysis reveals some vulnerability of the Pacific Northwest power grid due to GIC transformer reactive power losses. The Olympic peninsula and coastal 115 kV networks are especially susceptible to voltage drop. The HMSL +550 scenario performs slightly better than the HMSL -400 scenario, likely a result of it having more spinning generator reactive power reserves. GMD electric field orientations of 60-90 degrees pose the greatest threat in both scenarios. The next phase of analysis will examine methods to increase the ability of the network to withstand GMD events.

Mitigation

Several mitigation strategies were examined for reducing GIC flow, GIC transformer Mvar losses, and voltage drop due to GIC during extreme events. These strategies fell into 2 broad classes: install capacitive transformer neutral blocking at select substations and open or de-energize select transmission lines. With each mitigation measure, the objective is to reduce stress on equipment by reducing GIC flow through the power system and to improve voltage performance during GMD. Voltage performance is evaluated by AC voltage drop caused by GIC transformer reactive power losses and the GIC electric field magnitude that causes widespread voltage collapse at each field orientation. Effective mitigation measures would reduce voltage drop and increase margins to voltage collapse.

Capacitive Neutral Blocking

Capacitive devices in series with grounded transformer neutrals can effectively block flow of quasi-DC GIC. For transformers that are not autotransformers, blocking the neutral effectively eliminates all GIC flow in the transformer, as the windings are electrically isolated. For autotransformers, blocking neutral usually reduces the effective GIC flow, but GIC can still flow through the series winding. Blocking GIC flow through one substation neutral causes GIC to re-distribute through the network and may even cause an increase in GIC flow and GIC reactive power losses in other substations, making it challenging to identify a globally optimum neutral blocking scheme.

Method 1: Iterative selection based on neutral current

Substations are selected one at a time, through an iterative process as follows:

```
Do until all BPA 115 kV+ transformers are protected
   Calculate average neutral current at 1 V/km, for each
   simulated storm orientation (0 to 165 degrees, in 15 degree
   increments)
   Place capacitive neutral protection in the substation(s)
   with the 5 transformers with highest average neutral
   current
Repeat
```

Only transformers with high-side voltages of 115 kV and higher are considered for capacitive neutral DC protection. Though the iterative selection is made based on the highest currents in

each transformer, it is assumed that neutral protection would be applied to all transformers in a substation, as the incremental cost is small relative to that of protecting a single transformer. Also, if a transformer with high neutral current is blocked, but other transformers in the same substation are not blocked, those other transformers would experience an increase in GIC current in many circumstances. Thus it makes sense to apply neutral blocking to entire substations.

This method, hereafter referred to as "Neutral Current Iterative Selection" seeks to identify where a transmission owner might place the first several capacitive neutral protection devices for maximum improvement in reactive power margin. This process is performed repeated on each HMSL scenario.

The iterative simulation is run on each HMSL loading case independently, though the results show a lot of common transformers and substations across the cases. Table 10 shows the selection set for each and the neutral current observed in the prior iteration (prior to blocking). The order of transformer selection and most numbers in the table are taken from a simulation on the HMSL -400 case. The first column, “Iter.” gives the iteration number in the algorithm described above. The “Station and Transformer” column lists the selected transformer (up to 5 per iteration). The GIC neutral amps, averaged across all simulated orientations at 1 V/km, are shown for each selected transformer, in the iteration prior to its selection (prior to neutral blocking). The next 2 columns show the total GIC neutral amps and GIC transformer reactive power losses in all BPA-owned transformers with primary nominal voltages of 115 kV and higher, after the neutral protection is applied in that iteration. (These numbers are given once per iteration, on the line of the first station and transformer.) The last column shows the iteration that the transformer was selected in the same simulation using the HMSL +550 case, if different from the HMSL -400 case. In most instances, they are the same.

Table 10 – Iterative Selection and GIC Neutral Current in Iteration Prior to Selection

		HMSL -400			HMSL +550
		This unit, prior iter.	All BPA xfrs, this iteration		
Iter.	Station and Transformer	GIC Neutral Amps	GIC Neutral Amps	GIC Q Losses	Iter. (if different)
0			2,106	601	
1	Lane 500/230 #1	60.46	1,856	547	
1	McNary 345/230 #1	60.09			
1	Santiam 500/230 #1	55.69			
1	Aberdeen 230/115 #5	50.86			

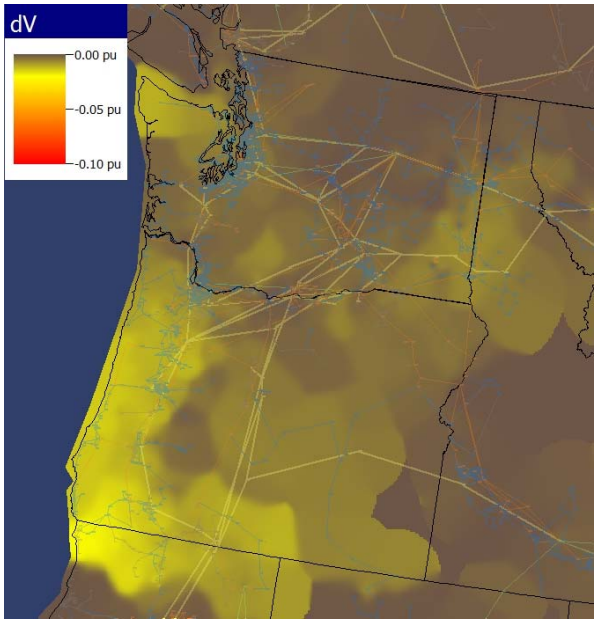
		HMSL -400			HMSL +550
		This unit, prior iter.	All BPA xfrs, this iteration		
Iter.	Station and Transformer	GIC Neutral Amps	GIC Neutral Amps	GIC Q Losses	Iter. (if different)
1	Ostrander 500/230 #1	47.38			
2	Satsop 500/230 #1	63.59	1,661	517	
2	Slatt 500/230 #1	41.57			
2	Salem 230/115 #1	41.50			
2	Shelton 230/115 #1	41.20			
2	East Omak 230/115 #1	40.08			
3	Bell 500/230 #1	39.39	1,479	478	
3	Tacoma 500/230 #1	37.05			
3	Carlton 230/115 #1	36.86			
3	Snohomish 345/230 #1	35.78			
3	Maple Valley 345/230 #1	34.12			4
4	Tillamook 230/115 #1	35.19	1,312	457	
4	Chief Joseph 345/230 #1	35.14			
4	Pearl 500/230 #1	35.06			
4	Rogue 230/115 #1	33.76			
4	Clatsop 230/115 #1	32.82			5
5	Hatwai 500/230 #1	32.40	1,153	431	3
5	Fairview 230/115 #1	31.37			
5	Sacajawea 500/115 #1	28.75			
5	Chemawa 115/59.8 #1	27.66			

Table 11 compares the voltage collapse margin for each capacitive neutral blocking set for each simulation model. Performance generally improves as transformers in more substations are blocked, though marginal improvement is generally reduced with successive iterations.

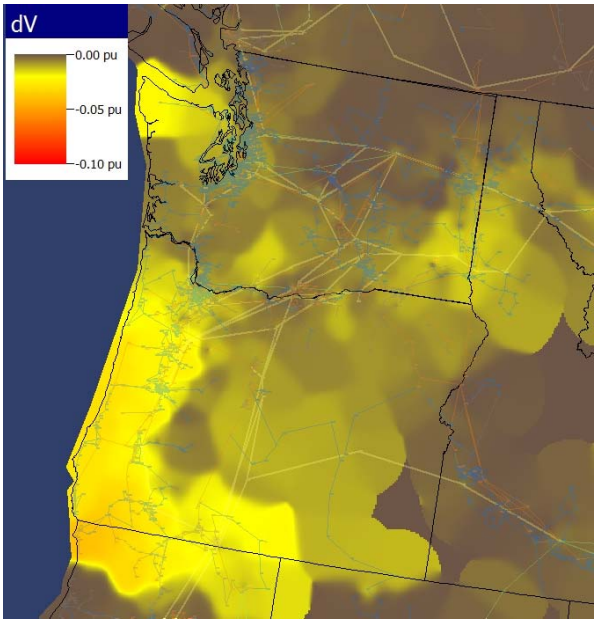
Table 11 - Field strength that causes voltage collapse with each iteration, with selection based on transformer neutral current

HMSL and substations blocked		Field Orientation (degrees)													
		0	15	30	45	60	75	90	105	120	135	150	165	Min	Avg
-400	Base	5.6	5.2	4.7	4.2	3.9	3.9	4.0	4.4	5.1	5.7	6.0	6.1	3.9	4.9
	5	6.1	5.6	5.1	4.6	4.3	4.2	4.4	4.7	5.4	6.0	6.6	6.5	4.2	5.3
	10	6.2	5.7	5.1	4.7	4.5	4.4	4.6	5.1	5.7	6.2	7.0	6.7	4.4	5.5
	15	6.3	5.7	5.2	4.8	4.6	4.5	4.7	5.1	5.8	6.4	7.1	6.8	4.5	5.6
	20	6.4	5.8	5.3	4.9	4.6	4.6	4.8	5.2	5.8	6.6	7.1	6.8	4.6	5.7
	25	6.4	5.8	5.4	5.0	4.7	4.7	4.9	5.4	6.1	6.7	7.2	7.0	4.7	5.8
	50	6.8	6.4	5.7	5.2	5.1	5.1	5.4	5.8	6.6	7.4	8.1	7.8	5.1	6.3
	75	7.4	6.6	5.8	5.4	5.1	5.1	5.4	6.0	6.8	7.6	8.5	8.2	5.1	6.5
	100	7.7	7.0	6.2	5.7	5.5	5.4	5.7	6.2	7.1	7.8	8.5	8.4	5.4	6.8
	125	7.7	7.0	6.2	5.7	5.5	5.5	5.7	6.2	7.1	7.8	8.5	8.4	5.5	6.8
	all	7.7	7.0	6.2	5.7	5.5	5.5	5.7	6.2	7.1	7.8	8.5	8.4	5.5	6.8
+550	Base	5.6	5.0	4.5	4.2	3.9	3.9	4.0	4.3	5.0	5.6	6.0	6.0	3.9	4.8
	5	6.0	5.6	5.0	4.6	4.2	4.2	4.4	4.7	5.4	5.8	6.5	6.4	4.2	5.2
	10	6.2	5.6	5.1	4.7	4.4	4.4	4.6	5.0	5.6	6.1	6.7	6.6	4.4	5.4
	15	6.2	5.7	5.1	4.7	4.5	4.4	4.6	5.0	5.6	6.2	6.8	6.7	4.4	5.5
	20	6.3	5.7	5.2	4.8	4.5	4.5	4.7	5.1	5.7	6.4	6.8	6.7	4.5	5.5
	25	6.4	5.8	5.3	4.9	4.6	4.6	4.8	5.2	5.8	6.5	7.1	6.8	4.6	5.7
	50	6.7	6.4	5.6	5.2	5.0	5.0	5.2	5.7	6.5	7.2	7.8	7.7	5.0	6.2
	75	7.3	6.5	5.8	5.2	5.1	5.1	5.3	5.8	6.7	7.4	8.2	8.1	5.1	6.4
	100	7.6	6.8	6.1	5.6	5.4	5.4	5.6	6.1	6.8	7.6	8.2	8.2	5.4	6.6
	125	7.6	6.8	6.1	5.6	5.4	5.4	5.6	6.1	6.8	7.6	8.2	8.2	5.4	6.6
	all	7.6	6.8	6.1	5.6	5.4	5.4	5.6	6.1	6.8	7.6	8.2	8.2	5.4	6.6

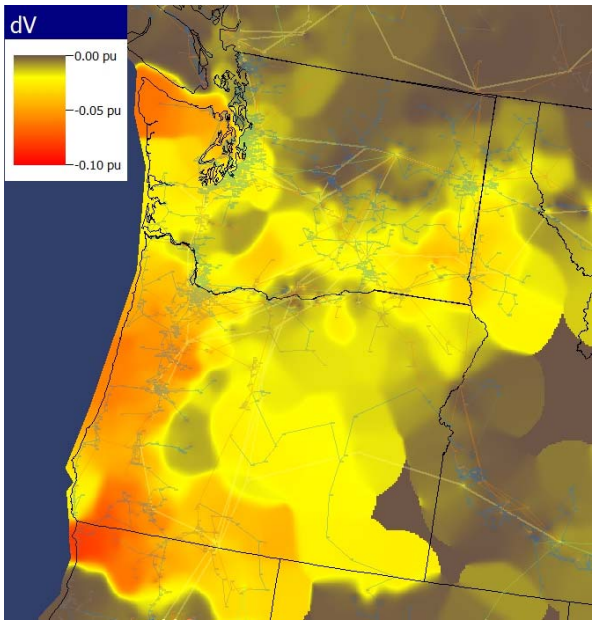
The contours in the following figures illustrate voltage drop at the 5th selection iteration (25 stations blocked) for the 75 degree orientation at increasing field strengths.



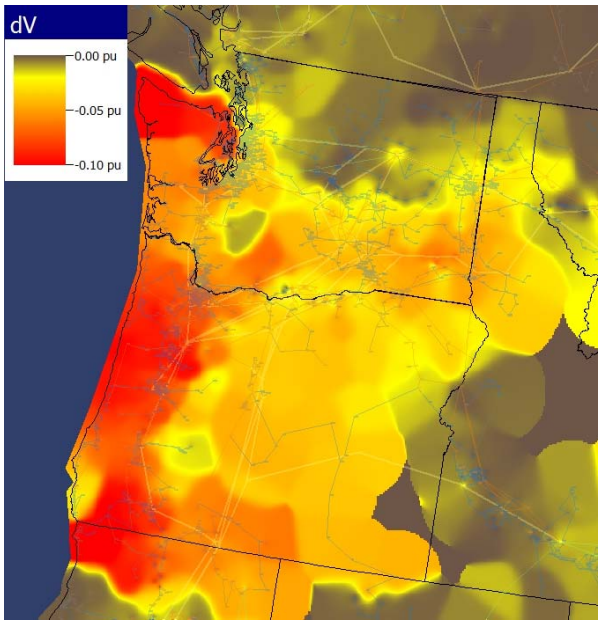
(a) 1 V/km



(b) 2 V/km

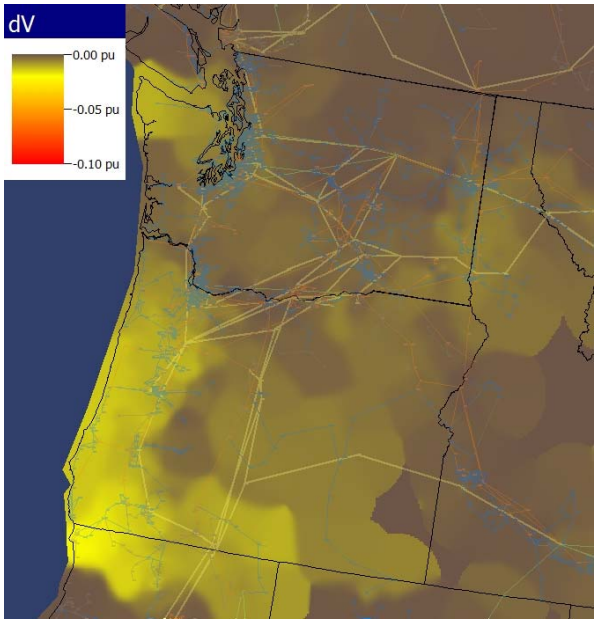


(c) 3.85 V/km – last valid solution without neutral protection

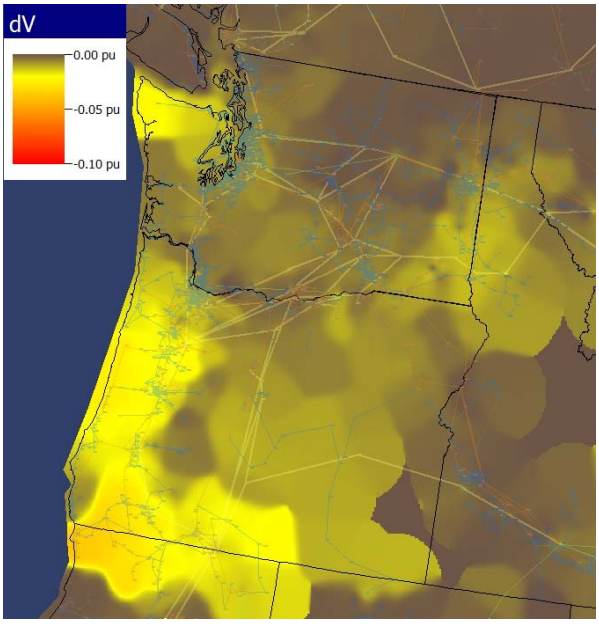


(d) 4.6 V/km - last valid solution

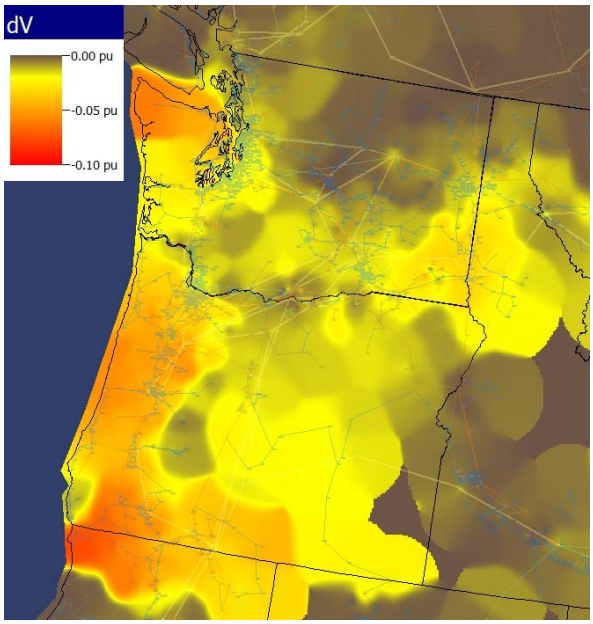
Figure 10 - Voltage Change Contours, HMSL -400, 75 degrees Electric Field Orientation, iteration with selection based on neutral current, 25 stations blocked



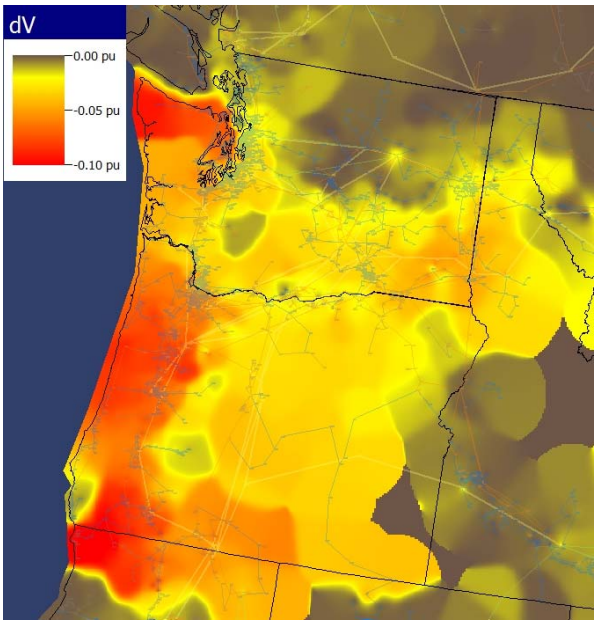
(a) 1 V/km



(b) 2 V/km



(c) 3.78 V/km – last valid solution without neutral protection



(d) 4.5 V/km - last valid solution

Figure 11 - Voltage Change Contours, HMSL +550, 75 degrees Electric Field Orientation, iteration with selection based on neutral current, 25 stations blocked

Method 2: Iterative selection by substation Mvar reserve margin

Substations are selected one at a time, through an iterative process as follows:

```
Do until 35 substations with BPA transformers protected
   Estimate the change in average net reactive power margin
   (generator reserves less GIC Mvar losses) that would be
   achieved with blocked transformer neutrals at 1 V/km,
   averaged across all uniform field orientations
   Place capacitive neutral protection on all transformers in
   the substation with the greatest estimated change in
   average reactive power margin
Repeat
```

This method, hereafter referred to as "iterative Mvar reserve" seeks to identify where a transmission owner might place the first several capacitive neutral protection devices for maximum improvement in reactive power margin. This process is repeated on each HMSL base power flow model independently, though the results show a lot of common substations across seasonal cases. Table 12 shows the selection set for each. “EAMB” refers to the estimated average margin benefit provided by blocking the neutrals of transformers in that substation at the next iteration.

Table 12 – Iterative Mvar Reserve Selection Substations and Estimated Average Reactive Power Margin Benefits

Station	Zone	HMSL -400	HMSL +550
McNary 500	Lower Columbia Basin	13.93	13.87
Lane 500	Western Oregon	12.44	12.46
Santiam 500	Western Oregon	11.17	11.19
Ostrander 500	Portland Area	8.16	8.16
Ponderosa 500	Southern Oregon	8.13	8.13
Tacoma 500	Seattle Area, Olympic Peninsula	7.78	7.78
Maple Valley 500	Seattle Area, Olympic Peninsula	7.79	7.79
Pearl 500	Portland Area	7.66	7.66
Slatt 500	Lower Columbia Basin	7.44	7.44
Bell 500	Spokane Area, N Idaho, W Montana	6.51	6.53
Alvey 500	Western Oregon	5.98	5.99
Snohomish 345	Seattle Area, Olympic Peninsula	5.85	5.86

Hatwai 500	AVA: Lewiston/Clarkston	5.72	6.29
Central Ferry 500	Southeast Washington	4.81	4.77
Keeler 500	Portland Area	4.41	4.41
Satsop 500	Seattle Area, Olympic Peninsula	4.41	4.41
Sno-king 500	Seattle Area, Olympic Peninsula	4.27	4.27
Anaconda Mill Creek 230	BUTTE_MT	4.14	4.13
Allston 500	Portland Area	3.93	3.93
Troutdale 500	PAC:PTLD	3.18	3.18
Garrison 500	Western Montana	3.05	3.07
Walla Walla 230	PAC:WALA	3.04	-
Clatsop 230	Portland Area	2.73	2.73
Intalco 230	Seattle Area, Olympic Peninsula	2.71	2.71
Sacajawea 500	Lower Columbia Basin	2.67	2.64
Longview 230	Cowlitz County, WA	2.49	2.49
Chehalis 230	Seattle Area, Olympic Peninsula	2.54	2.54
Big Eddy 500	Lower Columbia Basin	2.49	2.49
Aberdeen 230	Seattle Area, Olympic Peninsula	2.29	2.41
Sickler 500	Central Washington	2.20	2.22
Olympia 500	Seattle Area, Olympic Peninsula	2.09	2.09
Shelton 230	Seattle Area, Olympic Peninsula	2.08	2.08
Chemawa 230	Portland Area	2.06	2.06
Salem 230	Portland Area	2.59	2.60
Hot Springs 500	Western Montana	2.04	2.05
Carlton 230	Portland Area	-	1.73

Table 13 compares the voltage collapse margin for each capacitive neutral blocking set for each simulation model. Performance generally improves as transformers in more substations are blocked.

Table 13 - Field strength that causes voltage collapse, iterative Mvar reserve selection

HMSL and stations blocked		Field Orientation (degrees)													
		0	15	30	45	60	75	90	105	120	135	150	165	Min	Avg
-400	Base	5.6	5.2	4.7	4.2	3.9	3.9	4.0	4.4	5.1	5.7	6.0	6.1	3.9	4.9
	5	6.2	5.7	5.1	4.6	4.3	4.2	4.4	4.8	5.6	6.1	6.8	6.7	4.2	5.4
	10	6.4	5.8	5.2	4.7	4.5	4.4	4.6	5.0	5.6	6.2	6.8	6.7	4.4	5.5
	15	6.6	6.0	5.4	4.8	4.6	4.5	4.6	5.1	5.7	6.2	7.0	6.8	4.5	5.6
	20	6.8	6.1	5.5	5.0	4.7	4.6	4.7	5.1	5.8	6.4	7.1	7.1	4.6	5.7
	25	6.8	6.2	5.5	5.0	4.7	4.7	4.8	5.2	5.8	6.5	7.2	7.2	4.7	5.8
	30	7.0	6.2	5.6	5.1	4.8	4.8	5.1	5.5	6.2	6.8	7.6	7.5	4.8	6.0
	35	7.0	6.2	5.6	5.1	4.8	4.8	5.1	5.7	6.4	7.2	7.8	7.6	4.8	6.1
+550	Base	5.6	5.0	4.5	4.2	3.9	3.9	4.0	4.3	5.0	5.6	6.0	6.0	3.9	4.8
	5	6.1	5.6	5.0	4.5	4.2	4.2	4.4	4.7	5.4	6.0	6.6	6.6	4.2	5.3
	10	6.4	5.8	5.2	4.7	4.4	4.4	4.5	4.8	5.5	6.1	6.7	6.7	4.4	5.4
	15	6.5	6.0	5.4	4.8	4.5	4.4	4.6	5.0	5.6	6.1	6.8	6.8	4.4	5.5
	20	6.7	6.1	5.4	4.8	4.6	4.6	4.7	5.1	5.7	6.3	7.1	7.1	4.6	5.7
	25	6.7	6.2	5.5	5.0	4.7	4.6	4.7	5.1	5.7	6.4	7.1	7.1	4.6	5.7
	30	6.8	6.2	5.5	5.0	4.7	4.7	5.0	5.4	6.1	6.7	7.5	7.4	4.7	5.9
	35	6.8	6.2	5.5	5.1	4.8	4.8	5.0	5.5	6.3	7.0	7.6	7.5	4.8	6.0

Method 3: Iterative selection by voltage drop at maximum E-field

Substations are selected one at a time, through an iterative process as follows:

```
Do until 35 substations with BPA transformers protected

    Compute the per-unit voltage drop at the highest nominal
    voltage level in each substation, from the base case (no
    GMD) to the GIC electric field strength at the last valid
    power flow solution (just prior to voltage collapse)

    Place capacitive neutral protection on all transformers in
    the substation with the greatest voltage drop, averaged
    across all orientations

Repeat
```

This method, hereafter referred to as "iterative voltage drop", is repeated on each HMSL base power flow model independently, as with the other selection methods. Table 16 shows the selection set for each. The “dV” column shows the voltage drop just prior to voltage collapse and “dV/dQ mult.” shows the maximum bus dV/dQ multiple within each substation (the dV/dQ sensitivity taken just prior to voltage collapse, divided by that taken in the base case, with no GMD.)

Table 14 – Iterative Voltage Drop Selection Substations, Voltage Drop, and dV/dQ multiple

		HMSL -400		HMSL +550	
Station	Zone	dV	dV/dQ mult.	dV	dV/dQ mult.
Sappho 115	Seattle Area, Olympic Peninsula	-0.132	1.406	-0.120	1.394
Port Angeles 230	Seattle Area, Olympic Peninsula	-0.115	1.820	-0.102	2.034
Happy Valley 230	Seattle Area, Olympic Peninsula	-0.103	1.977	-0.095	1.940
Fairmount 230	Seattle Area, Olympic Peninsula	-0.096	2.209	-0.085	1.828
Toledo 230	Western Oregon	-0.095	1.656	-0.088	1.646
Kitsap 230	Seattle Area, Olympic Peninsula	-0.091	2.421	-0.086	2.383
Lane 500	Western Oregon	-0.091	3.351	-0.085	3.519
Tahkenitch 230	Western Oregon	-0.087	1.571	-0.081	1.603
Wendson 230	Western Oregon	-0.086	1.730	-0.080	1.761
Tillamook 230	Portland Area	-0.083	1.888	-0.073	1.970
Shelton 230	Seattle Area, Olympic Peninsula	-0.083	3.442	-0.075	3.976
Albany 230	Western Oregon	-0.080	2.162	-0.073	2.415
Salem 230	Portland Area	-0.079	2.165	-0.071	2.757
Aberdeen 230	Seattle Area, Olympic Peninsula	-0.076	3.662	-0.070	3.794
Drain 115	Western Oregon	-0.078	1.267	-0.071	1.315
Carlton 230	Portland Area	-0.078	2.800	-0.068	2.683
Green Valley 230	Western Oregon	-0.077	1.578	-0.069	1.628
Chemawa 230	Portland Area	-0.076	2.515	-0.072	2.406
Parker 115	Western Oregon	-0.076	1.678	-0.071	1.778
Oregon City 115	Portland Area	-0.077	1.589	-0.065	1.697
Martin Creek 230	Western Oregon	-0.074	1.984	-0.069	2.063
Satsop 500	Seattle Area, Olympic Peninsula	-0.077	6.112	-0.067	7.122

Alvey 500	Western Oregon	-0.072	4.021	-0.069	4.068
Fairview 230	Western Oregon	-0.073	1.611	-0.065	1.758
Pearl 500	Portland Area	-0.071	8.467	-0.063	9.640
Santiam 500	Western Oregon	-0.069	6.222	-0.064	8.732
Keeler 500	Portland Area	-0.069	7.854	-0.061	8.926
Troutdale 500	PAC:PTLD	-0.067	5.890	-0.062	6.229
Ostrander 500	Portland Area	-0.064	7.982	-0.060	7.796
Olympia 500	Seattle Area, Olympic Peninsula	-0.064	10.577	-0.057	7.740
Allston 500	Portland Area	-0.058	13.812	-0.048	13.521
Clatsop 230	Portland Area	-0.055	2.204	-0.051	1.816
St. Johns 230	Portland Area	-0.056	4.313	-	-
Bald Mountain 115	Portland Area	-0.056	1.254	-	-
Sifton 230	Portland Area	-0.056	4.749	-	-
Hatwai 500	AVA: Lewiston/Clarkston	-	-	-0.048	2.079
Canby 2 230	Southern Oregon	-	-	-0.046	1.143
La Pine 230	Southern Oregon	-	-	-0.046	1.254

Table 15 compares the voltage collapse margin for each capacitive neutral blocking set for each simulation model. Performance improves as transformers in more substations are blocked, though the method is less effective per blocked substation than the other iterative methods. One shortcoming of the method is that it does not incorporate an estimate of the improvement that blocking could provide for each substation. Some stations that experience the lowest voltage drop are not good candidates for blocking because they still experience voltage drop due to GIC reactive power losses in autotransformers even when the neutrals are blocked.

Table 15 - Field strength that causes voltage collapse, iterative voltage drop selection

HMSL and stations blocked		Field Orientation (degrees)													
		0	15	30	45	60	75	90	105	120	135	150	165	Min	Avg
-400	Base	5.6	5.2	4.7	4.2	3.9	3.9	4.0	4.4	5.1	5.7	6.0	6.1	3.9	4.9
	5	5.7	5.2	4.7	4.2	4.0	4.0	4.1	4.5	5.1	5.7	6.2	6.2	4.0	5.0
	10	5.8	5.4	4.7	4.4	4.1	4.0	4.2	4.6	5.3	5.7	6.3	6.4	4.0	5.1
	15	5.9	5.4	4.8	4.4	4.1	4.1	4.2	4.6	5.4	6.0	6.5	6.4	4.1	5.2
	20	6.0	5.4	4.8	4.4	4.1	4.1	4.2	4.7	5.4	6.1	6.6	6.5	4.1	5.2
	25	6.1	5.5	4.8	4.5	4.2	4.2	4.4	4.8	5.7	6.5	6.8	6.7	4.2	5.4
	30	6.7	6.0	5.2	4.7	4.4	4.4	4.6	5.2	5.8	6.7	7.5	7.4	4.4	5.7
	35	6.8	6.1	5.4	4.8	4.5	4.5	4.7	5.2	6.1	6.7	7.6	7.6	4.5	5.8
+550	Base	5.6	5.0	4.5	4.2	3.9	3.9	4.0	4.3	5.0	5.6	6.0	6.0	3.9	4.8
	5	5.7	5.2	4.6	4.2	4.0	3.8	4.1	4.4	5.1	5.6	6.1	6.1	3.8	4.9
	10	5.8	5.2	4.7	4.2	4.0	4.0	4.1	4.5	5.1	5.7	6.2	6.2	4.0	5.0
	15	5.8	5.3	4.7	4.2	4.1	4.0	4.2	4.6	5.2	5.8	6.4	6.4	4.0	5.1
	20	5.9	5.4	4.7	4.4	4.1	4.1	4.2	4.6	5.4	6.0	6.5	6.5	4.1	5.2
	25	6.2	5.6	5.0	4.6	4.3	4.2	4.5	4.8	5.6	6.4	6.7	6.7	4.2	5.4
	30	6.6	5.8	5.1	4.6	4.4	4.4	4.5	5.0	5.7	6.5	7.2	7.2	4.4	5.6
	35	6.7	6.0	5.2	4.7	4.4	4.4	4.6	5.1	5.8	6.5	7.4	7.4	4.4	5.7

De-energize Transmission Lines

The linear nature of the DC GIC network allows fast computation of sensitivities of transformer effective GIC with respect to GIC electric field across transmission lines (dI_{GIC}/dE_{field}). Sensitivities were computed for transformers in the substations that experienced the largest voltage drops prior to voltage collapse. Table 16 shows the 15 stations with the largest voltage drops system-wide, grouped into 3 general geographic zones.

Table 16 - Voltage Drop at Maximum E-field Prior to Voltage Collapse (average for all orientations)

Zone	Station	HMSL -400	HMSL +550
Seattle, Olympic Peninsula	Sappho 115	-0.1301	-0.1224
	Port Angeles 230	-0.1143	-0.1070
	Happy Valley 230	-0.1099	-0.1028
	Fairmount 230	-0.1060	-0.0990
	Kitsap 230	-0.0969	-0.0901
	South Bremerton 230	-0.0957	-0.0891
Pacificorp/Grants Pass, Crescent City	Del Norte 115	-0.1057	-0.1026
	Cave Junction 115	-0.0970	-0.0941
	Applegate Dam 115	-0.0896	-0.0869
Western Oregon	Toledo 230	-0.0917	-0.0870
	Green Peter 115	-0.0915	-0.0861
	Foster 115	-0.0905	-0.0852
	Tahkenitch 230	-0.0895	-0.0854
	Wendson 230	-0.0886	-0.0845
	Lane 500	-0.0885	-0.0847

Table 17 shows the transmission lines with the highest dI_{GIC}/dE_{field} sensitivities for transformers in these substations. Methods of GIC sensitivity are described in recent research.[4] Sensitivities are identical in both HMSL scenarios. These lines are considered as candidates for opening during a GMD event.

[4] T. J. Overbye, K. S. Shetye, T. R. Hutchins, Q. Qiu, J. D. Weber, "Power Grid Sensitivity Analysis of Geomagnetically Induced Currents", *IEEE Transactions on Power Systems*, March 2013.

Table 17 – dI_{GIC}/dE_{field} Sensitivities for transformer GIC flow in high voltage-drop substations

Zone	Line	dI_{GIC}/dE_{field}
Seattle, Olympic Peninsula	Fairmount-Shelton 230 #3	9.444
	Fairmount-Shelton 230 #4	9.444
	South Bremerton-Shelton 230 #1	8.521
	Kitsap-Shelton 230 #4	8.490
	Shelton-Kitsap 230 #3	8.141
	Fairmount-Port Angeles 230 #1	4.535
Pacificorp/ Grants Pass, Crescent City	Applegate Dam-Grants Pass 115 #1	7.908
	Meridian-Grants Pass 230 #1	1.715
	Applegate Dam-Cave Junction 115 #1	1.621
	Jerome Prairie-Selma 115 #1	1.210
	Glendale-Grants Pass 230 #1	1.166
	Grants Pass-Jerome Prairie 115 #1	1.130
Western Oregon	Lane-Marion 500 #1	36.84
	Ashe-Marion 500 #2	8.787
	Alvey-Lane 230 #1	7.456
	Santiam-Wren 230 #1	6.986

Opening too many lines causes thermal overloads and voltage drop, especially at times of peak demand. Compromises are needed to balance the base case network performance with the potential reduction in GIC flow through critical transformers. Several alternate topologies were tested on each simulation case with different sets of opened lines. The tested topologies are shown in Table 18.

Table 18 – Set of opened transmission lines for alternate topologies

Line	L1	L2	L3	L4
Fairmount-Shelton 230 #4		x	x	x
South Bremerton-Shelton 230 #1			x	x
Kitsap-Shelton 230 #4				x
Applegate Dam-Grants Pass 115 #1		x	x	x
Lane-Marion 500 #1	x	x	x	x

Simulations revealed that opening lines in the heavy summer scenarios is counter-productive. While it reduces GIC flows, especially in transformers that experience the greatest voltage change during simulated GMD events, it also weakens voltage support in zones that are already vulnerable to low voltage. It is possible that such schemes could be effective during light load periods. Table 19 compares the voltage collapse margin for each alternate to the base topology for each simulation model.

Table 19 – Field strength that causes voltage collapse for each alternate topology, system model, and electric field orientation

		Field Orientation (degrees)													
HMSL		0	15	30	45	60	75	90	105	120	135	150	165	Min	Avg
-440	Base	5.6	5.2	4.7	4.2	3.9	3.9	4.0	4.4	5.1	5.7	6.0	6.1	3.9	4.9
	L1	5.4	5.0	4.4	4.0	3.7	3.7	3.8	4.1	4.7	5.4	5.7	5.8	3.7	4.6
	L2	5.4	4.8	4.4	4.0	3.7	3.6	3.7	4.1	4.7	5.3	5.6	5.6	3.6	4.6
	L3	5.2	4.7	4.3	3.8	3.6	3.6	3.7	4.0	4.6	5.2	5.6	5.6	3.6	4.5
	L4	4.8	4.5	4.1	3.7	3.5	3.4	3.6	3.8	4.4	4.8	5.1	5.1	3.4	4.2
+550	Base	5.6	5.0	4.5	4.2	3.9	3.9	4.0	4.3	5.0	5.6	6.0	6.0	3.9	4.8
	L1	5.4	4.8	4.4	4.0	3.7	3.6	3.7	4.1	4.7	5.3	5.7	5.7	3.6	4.6
	L2	5.2	4.7	4.2	3.8	3.6	3.6	3.7	4.0	4.6	5.2	5.6	5.6	3.6	4.5
	L3	5.1	4.7	4.2	3.8	3.6	3.5	3.6	4.0	4.5	5.1	5.5	5.5	3.5	4.4
	L4	4.8	4.5	4.1	3.7	3.5	3.4	3.5	3.7	4.2	4.8	5.1	5.1	3.4	4.2

Mitigation Summary and Conclusions

Several mitigation strategies were examined for reducing GIC flow, GIC transformer Mvar losses, and voltage drop due to GIC during extreme events. These strategies fell into two broad classes: install capacitive transformer neutral blocking at select substations and open or de-energize select transmission lines. With each mitigation measure, the objective is to reduce stress on equipment by reducing GIC flow through the power system and to improve voltage performance during GMD. Voltage performance is evaluated by AC voltage drop caused by GIC transformer reactive power losses and the GIC electric field magnitude that causes widespread voltage collapse at each field orientation. Effective mitigation measures would reduce voltage drop and increase margins to voltage collapse. GIC flow through the power system is examined primarily as the current in transformer neutrals.

Capacitive neutral blocking enhances the margins to voltage collapse across all field orientations. Three different iterative methods of prioritizing substations for installation of capacitive neutral blocking were examined. Selection by neutral current and estimated improvement to Mvar reserve margin produced similar results. Selection by substation voltage drop just prior to voltage collapse did not perform as well as the other methods, but still increased margins to voltage collapse.

The capacitive neutral blocking schemes were initially examined considering only substations with BPA-owned transformers. The simulations were re-run considering all substations in the study footprint. The following figures summarize the voltage and transformer neutral current performance for each method by number of protected substations. Voltage performance generally improves if all regional substations are considered for blocking. The total current in the neutrals of BPA-owned transformers is generally reduced more if only BPA transformers are blocked, as blocking a transformer’s neutral often diverts GIC to other nearby transformers.

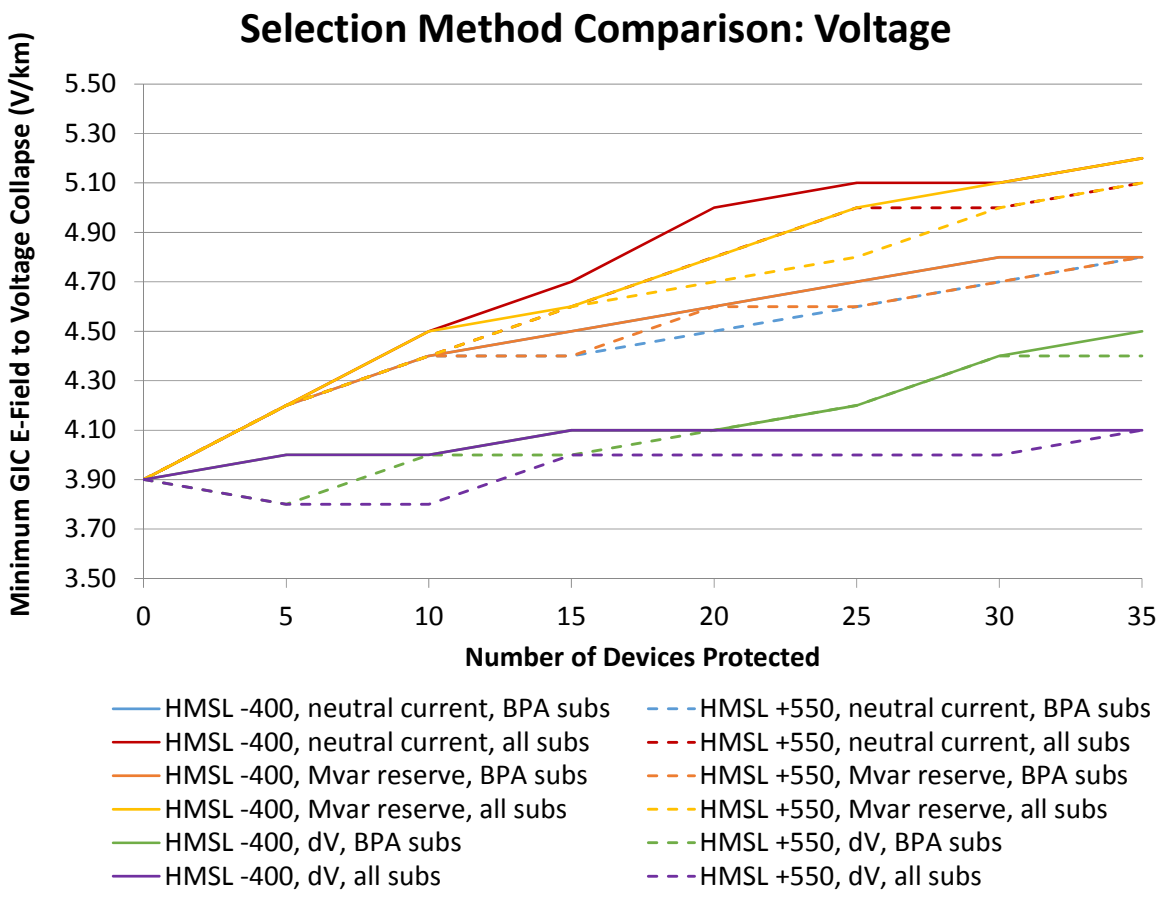

Selection Method Comparison: Voltage
Minimum GIC E-Field to Voltage Collapse (V/km)
5.50
5.30
5.10
4.90
4.70
4.50
4.30
4.10
3.90
3.70
3.50
0
5
10
15
20
25
30
35
Number of Devices Protected
HMSL -400, neutral current, BPA subs
HMSL -400, neutral current, all subs
HMSL -400, Mvar reserve, BPA subs
HMSL -400, Mvar reserve, all subs
HMSL -400, dV, BPA subs
HMSL -400, dV, all subs
HMSL +550, neutral current, BPA subs
HMSL +550, neutral current, all subs
HMSL +550, Mvar reserve, BPA subs
HMSL +550, Mvar reserve, all subs
HMSL +550, dV, BPA subs
HMSL +550, dV, all subs

Figure 12

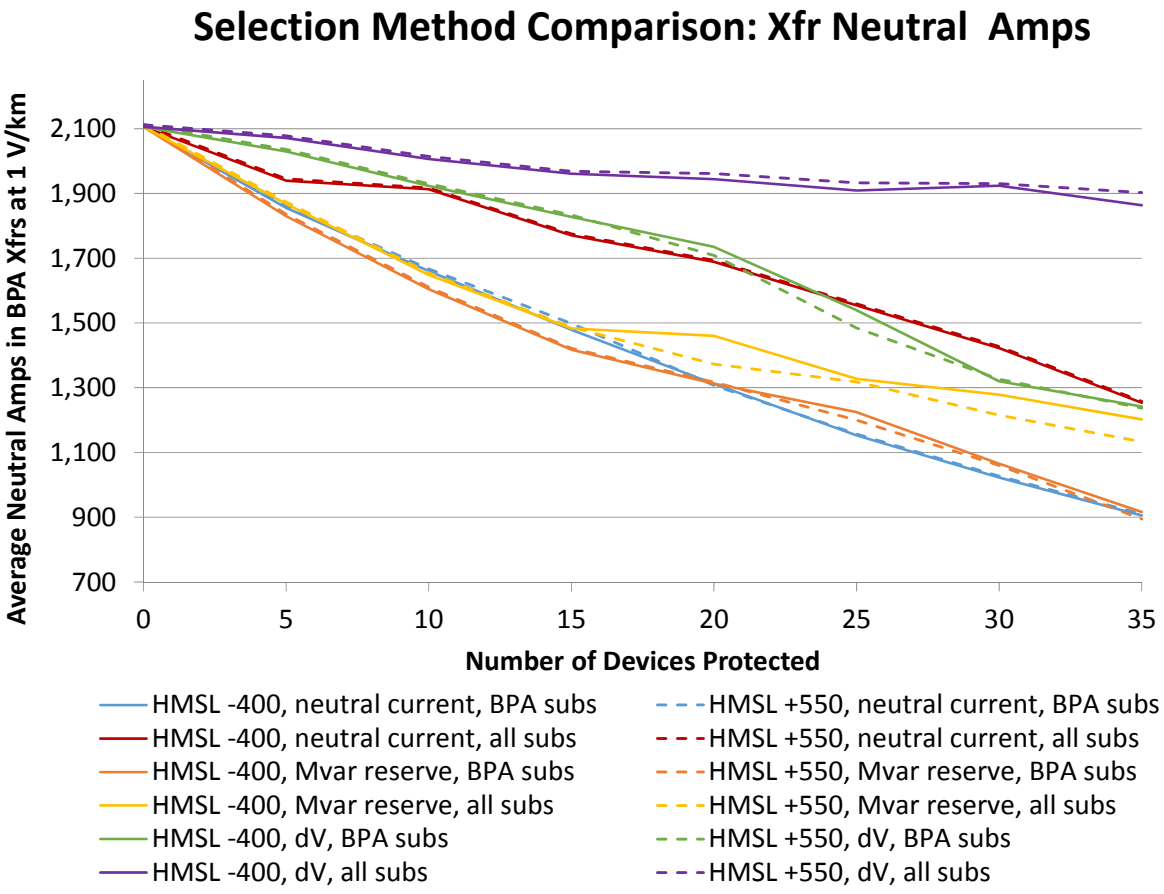


Figure 13

Several operational schemes to open transmission lines with high sensitivities to GIC currents in vulnerable transformers were tested, but none performed well under the simulated conditions. Most such lines with high sensitivities are also important to providing reactive power support. Other methods might also be considered in future work, such as the effects of adding series compensation to lines with high sensitivities to transformer GIC currents.

Appendix

The following tables show variations on Table 5 with different assumptions about GIC DC input voltages or monitored transformers. All tables are based on a 1 V/km uniform electric field.

Table 20 - GIC Transformer Neutral Current and Mvar Losses:
GIC DC voltage inputs applied to transmission lines with nominal voltage of 115 kV and higher; quantities summed on transformers with primary nominal voltage of 200 kV and higher

	GIC 3-phase transformer neutral current (Amps)		GIC 3-phase transformer Mvar Losses (Q_{Loss})	
Orientation	HMSL -400	HMSL +550	HMSL -400	HMSL +550
0	3,802	3,803	860	858
15	4,044	4,053	959	958
30	4,445	4,443	1,076	1,075
45	4,904	4,886	1,188	1,186
60	5,236	5,212	1,265	1,263
75	5,359	5,336	1,274	1,272
90	5,257	5,232	1,220	1,219
105	4,911	4,888	1,119	1,119
120	4,478	4,462	986	987
135	4,173	4,168	897	898
150	3,908	3,910	825	827
165	3,792	3,791	809	809

Table 21 - GIC Transformer Neutral Current and Mvar Losses:
GIC DC voltage inputs applied to transmission lines with nominal voltage of 200 kV and higher; quantities summed on transformers with primary nominal voltage of 200 kV and higher

	GIC 3-phase transformer neutral current (Amps)		GIC 3-phase transformer Mvar Losses (Q_{Loss})	
Orientation	HMSL -400	HMSL +550	HMSL -400	HMSL +550
0	3,539	3,544	855	855

Orientation	GIC 3-phase transformer neutral current (Amps)		GIC 3-phase transformer Mvar Losses (Q_{Loss})	
	HMSL -400	HMSL +550	HMSL -400	HMSL +550
15	3,763	3,774	954	953
30	4,075	4,075	1,060	1,059
45	4,438	4,427	1,171	1,169
60	4,717	4,692	1,249	1,247
75	4,812	4,784	1,265	1,263
90	4,689	4,659	1,216	1,214
105	4,342	4,320	1,116	1,115
120	3,886	3,869	979	978
135	3,603	3,594	888	889
150	3,453	3,452	818	820
165	3,420	3,420	804	804

Voltage Summary	Voltage Detail	Sub Reactive Margin	Xfr Average	Xfr by configuration	Xfr Detail by itr	Xfr Detail by itr BPA only	Itr Select by Neutral Amps	Itr Select by Mvar Reserve	Sub voltage drop		Itr Select by dV		Comparison
StudyID		StudyID											
												Composite (BPA Stations only)	
Case		Description		StudyID	CaseDescription	Record	Composite Key	StudyID	SubNum				StudyID
Notes	StudyID	Notes	Iteration	Description	Iteration	Line (Study and Itr)	StudyID	Case	SubName	**Line Records**	Case		Order
Description	Iteration	SubNum	Transformer Description	Notes	Transformer Description	StudyID	Description	Description	BusNomkV		Description		Xfr/Itr
Iteration	Orientation	Station and Voltage	Area	Iteration	Area	CaseDescription	Notes	Iteration	AreaName	From Number	Iteration	SubNum	Case
Threshold	FieldStrength	AvgNetMvarReserves	Avg Neutral Current, pu (3 phase)	Orientation	Avg Neutral Current, pu (3 phase)	Iteration	Iteration	SubNum	ZoneName	From Name	SubNum	Station	Description
VThreshold	BusNum	CountOfMvarReservesNet	Avg Neutral Amps (3 phase)	TotXfrNeutralAmps	Avg Neutral Amps (3 phase)	Transformer Description	NextTransformerProtected	SubName	AvgOfMinPUHighestNomkV	To Number	SubName	Zone	Desc Short
0	SubName		Avg Effective Amps (per phase)	TotGICQLosses	Avg Effective Amps (per phase)	Area	AvgNeutralAmps	AreaName		To Name	BusNomkV	dV	SelectionMethod
15	BusName	Summary	Avg Mvar Losses (3 phase)	TotXfrIEff	Avg Mvar Losses (3 phase)	Avg Neutral Current, pu (3 phase)	GICNeutralAmps	BusNomkV	SubNum	From Sub Name	AreaName	dVdQMult	
30	BusNomVolt	Sub Num	Avg High-Side Current, pu (per phase)		Avg High-Side Current, pu (per phase)	Avg Neutral Amps (3 phase)	GICQLosses		SubName	From Nom kV	Station	dV	
45	BusPUVolt	Station and kV	Avg High-Side Amps (per phase)		Avg High-Side Amps (per phase)	Avg Effective Amps (per phase)	BusNum3W	ZoneName	BusNomkV	To Sub Name	ZoneName	dVdQMult	
60	VThreshold	HMSL -400	Avg Med-Side Current, pu (per phase)		Avg Med-Side Current, pu (per phase)	Avg Mvar Losses (3 phase)	BusNum3W1	AvgMarginBenefit	AreaName	To Nom kV	dVMaxNomKV		
75	VTCross	HMSL +550	Avg Med-Side Amps (per phase)		Avg Med-Side Amps (per phase)	Avg High-Side Current, pu (per phase)	BusNum3W2	AvgNeutralAmps	ZoneName	Circuit	dVdQMultMax		
90	PFFail	include	High Bus Number		High Bus Number	Avg High-Side Amps (per phase)	BusNum3W3	AvgQLosses	AvgOfMinPUHighestNomkV	Status	dVAvg		
105	Case		Med Bus Number		Med Bus Number	Avg Med-Side Current, pu (per phase)	LineCircuit			dIeffective/dEField	dVdQMultAvg		
120	Notes		Ter Bus Number		Ter Bus Number	Avg Med-Side Amps (per phase)	Iteration		SubNum	Line	AvgMarginBenefit		
135			Star Bus Number		Star Bus Number	High Bus Number	AvgNeutralAmps		selected?	Selected?	AvgNeutralAmps		
150			Circuit		Circuit	Med Bus Number	GICNeutralAmps		SubName		AvgQLosses		
165			High-Side Config		High-Side Config	Ter Bus Number	GICQLosses		AreaName		From Name		
Min			Med-Side Config		Med-Side Config	Star Bus Number			ZoneName		To Number		
Avg			Core Type		Core Type	Circuit			HMSL -400		To Name		
			K Factor		K Factor	High-Side Config			HMSL +550		Circuit		
					Max Amps	Med-Side Config					From Sub Name		
					Amps in Top 10	Core Type					From Nom kV		
					Amps in Top 20	K Factor					To Sub Name		
						Max Amps					To Nom kV		
						Amps in Top 10					dIeffective/dEField		
						Amps in Top 20							
						Record							
						Line (Study and Itr)							
						StudyID							
						CaseDescription							
						Iteration							
						Transformer Description							
						Area							
						Avg Neutral Current, pu (3 phase)							
						Avg Neutral Amps (3 phase)							
						Avg Effective Amps (per phase)							
						Avg Mvar Losses (3 phase)							
						Avg High-Side Current, pu (per phase)							
						Avg High-Side Amps (per phase)							
						Avg Med-Side Current, pu (per phase)							
						Avg Med-Side Amps (per phase)							
						High Bus Number							
						Med Bus Number							
						Ter Bus Number							
						Star Bus Number							
						Circuit							
						High-Side Config							
						Med-Side Config							
						Core Type							
						K Factor							
						Max Amps							
						Amps in Top 10							
						Amps in Top 20							

Averaged over all orientations and HMSL -400 and HMSL +550, with all available transformer/substation data

Iteration	Transformer Description	Area	Avg Neutral Current, pu (3 phase)	Avg Neutral Amps (3 phase)	Avg Effective Amps (per phase)	Avg Mvar Losses (3 phase)	Avg High-Side Current, pu (per phase)	Avg High-Side Amps (per phase)	Avg Med-Side Current, pu (per phase)	Avg Med-Side Amps (per phase)	High Bus Number	Med Bus Number	Ter Bus Number	Star Bus Number	Circuit	High-Side Config	Med-Side Config	Core Type	K Factor
0	Ashe 500/2	NORTHWE	0.648	74.782	24.927	29.614	0.216	24.927	0.000	0.000	40061	40063	0	0	1	Unknown	Unknown	Unknown	1.10
0	Dworshak	NORTHWE	0.567	65.495	21.832	25.744	0.189	21.832	0.000	0.000	40369	40363	40365	41201	1	Gwye	Delta	Single Pha	1.10
0	Lane 500/2	NORTHWE	0.524	60.458	26.479	31.960	0.276	31.926	0.052	13.146	40629	40627	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Santiam 50	NORTHWE	0.482	55.689	35.722	42.961	0.436	50.339	0.127	31.829	40941	40939	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Lower Gra	NORTHWE	0.456	52.694	17.565	20.838	0.152	17.565	0.000	0.000	44237	44231	44232	44235	1	Gwye	Delta	Single Pha	1.10
0	Ostrander	NORTHWE	0.410	47.380	21.906	26.186	0.244	28.132	0.065	16.267	40808	40810	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Lower Mor	NORTHWE	0.373	43.122	14.374	17.075	0.124	14.374	0.000	0.000	44257	44251	44252	44255	1	Gwye	Delta	Single Pha	1.10
0	McNary 34	NORTHWE	0.359	60.019	18.140	14.502	0.086	14.408	0.023	5.659	40721	41353	0	0	1	Gwye	Gwye	Single Pha	0.76
0	Slatt 500/2	NORTHWE	0.359	41.445	17.466	20.838	0.181	20.850	0.030	7.486	40989	40986	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Bell 500/23	NORTHWE	0.343	39.581	25.165	30.090	0.318	36.664	0.105	26.309	40091	40092	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Boardman	NORTHWE	0.342	39.518	13.173	14.218	0.114	13.173	0.000	0.000	43049	43047	0	0	1	Gwye	Delta	Unknown	1.10
0	Tacoma 50	NORTHWE	0.316	36.479	13.596	16.232	0.128	14.819	0.012	3.107	41051	41049	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Hatwai 500	NORTHWE	0.291	33.584	9.720	11.447	0.074	8.565	0.014	3.550	40521	40519	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Little Goos	NORTHWE	0.286	33.076	11.025	13.094	0.095	11.025	0.000	0.000	44217	44211	44212	44215	1	Gwye	Delta	Single Pha	1.10
0	Malin 500/	NORTHWE	0.281	32.466	15.369	17.544	0.167	19.272	0.035	8.877	40687	45189	0	0	1	Gwye	Gwye	Unknown	1.10
0	Sacajawea	NORTHWE	0.248	28.667	4.382	5.189	0.025	2.837	0.014	6.781	40913	40911	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Pearl 500/2	NORTHWE	0.240	27.753	13.273	15.949	0.155	17.899	0.047	11.891	40827	40824	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Central Fer	NORTHWE	0.231	26.667	11.109	13.165	0.114	13.184	0.020	4.999	40666	40664	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Snohomish	NORTHWE	0.215	35.941	12.152	9.540	0.076	12.670	0.009	2.313	40994	41328	0	0	1	Gwye	Gwye	Single Pha	0.76
0	Pearl 500/2	NORTHWE	0.214	24.726	6.616	3.613	0.052	5.949	0.021	5.202	40827	40826	0	0	2	Unknown	Unknown	Core, Thre	0.50
0	Satsop 500	NORTHWE	0.210	24.198	19.175	22.880	0.249	28.705	0.085	21.217	40949	40947	0	0	1	Gwye	Gwye	Single Pha	1.10
0	South Bren	NORTHWE	0.208	52.269	11.543	3.262	0.023	5.663	0.023	11.760	42900	42901	0	0	1	Gwye	Gwye	Unknown	0.28
0	Ponderosa	NORTHWE	0.208	24.053	10.986	13.179	0.120	13.816	0.026	6.637	40837	40838	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Aberdeen 2	NORTHWE	0.203	50.862	13.139	3.138	0.037	9.324	0.015	7.630	40011	40007	0	0	5	Gwye	Gwye	Core, Thre	0.23
0	Maple Vall	NORTHWE	0.201	33.686	11.203	8.929	0.067	11.153	0.009	2.229	40691	40692	0	0	1	Gwye	Gwye	Single Pha	0.76
0	Novelty 23	NORTHWE	0.195	48.824	10.926	3.109	0.040	10.104	0.032	16.100	42304	42305	0	0	1	Gwye	Gwye	Unknown	0.28
0	Sno-king 50	NORTHWE	0.188	21.705	6.156	7.321	0.048	5.547	0.014	3.432	41007	41006	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Chief Josep	NORTHWE	0.179	29.872	10.768	8.544	0.075	12.565	0.016	3.925	40223	40230	0	0	1	Gwye	Gwye	Single Pha	0.76
0	Keeler 500	NORTHWE	0.177	20.390	7.684	9.187	0.083	9.546	0.027	6.746	40601	40599	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Grand Cou	NORTHWE	0.170	19.579	5.788	6.877	0.045	5.160	0.006	1.383	40287	41357	0	0	1	Unknown	Unknown	Unknown	1.10
0	Chief Josep	NORTHWE	0.166	27.782	9.997	7.932	0.076	12.670	0.027	6.775	40225	40232	0	0	2	Gwye	Gwye	Single Pha	0.76
0	East Omak	NORTHWE	0.160	40.091	11.005	2.630	0.036	9.049	0.011	5.594	40373	40371	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Ponderosa	NORTHWE	0.157	18.082	8.526	10.214	0.094	10.894	0.022	5.493	40834	40836	0	0	1	Unknown	Unknown	Unknown	1.10
0	Troutdale 5	NORTHWE	0.156	17.966	6.603	7.869	0.062	7.126	0.005	1.161	41095	41094	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Salem 230/	NORTHWE	0.152	38.062	9.921	2.847	0.030	7.494	0.012	5.882	40923	40921	0	0	1	Unknown	Unknown	Unknown	0.28
0	Shelton 23	NORTHWE	0.150	37.553	9.698	2.327	0.028	7.023	0.012	5.947	40971	40969	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Carlton 23	NORTHWE	0.141	35.316	10.329	2.460	0.035	8.886	0.007	3.395	40181	40179	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Mcloughlin	NORTHWE	0.137	34.486	13.277	3.796	0.060	15.163	0.010	4.974	43314	43309	0	0	1	Gwye	Gwye	Unknown	0.28
0	Rogue 230,	NORTHWE	0.134	33.722	8.132	1.951	0.020	5.023	0.012	6.218	40895	40893	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Clatsop 23	NORTHWE	0.127	31.960	9.892	5.089	0.037	9.326	0.005	2.382	40243	45314	0	0	1	Gwye	Gwye	Single Pha	0.51
0	Meridian 5	NORTHWE	0.127	14.680	9.012	10.200	0.108	12.521	0.032	7.923	45197	45195	0	0	2	Gwye	Gwye	Unknown	1.10
0	Meridian 5	NORTHWE	0.127	14.680	9.012	10.200	0.108	12.521	0.032	7.923	45197	45195	0	0	1	Gwye	Gwye	Unknown	1.10
0	Tillamook 2	NORTHWE	0.122	30.660	8.303	1.988	0.026	6.480	0.009	4.511	41075	41073	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Alvey 500/	NORTHWE	0.117	13.491	2.068	2.461	0.000	0.000	0.018	4.497	40051	40049	0	0	5	Gwye	Gwye	Single Pha	1.10
0	Boardman	NORTHWE	0.116	29.033	10.680	2.997	0.047	11.683	0.004	2.110	40129	40127	0	0	1	Unknown	Unknown	Unknown	0.28
0	Hermiston	NORTHWE	0.111	12.871	4.290	5.097	0.037	4.290	0.000	0.000	47638	47639	0	0	1	Unknown	Unknown	Unknown	1.10
0	Hermiston	NORTHWE	0.111	12.871	4.290	5.097	0.037	4.290	0.000	0.000	47638	47641	0	0	1	Unknown	Unknown	Unknown	1.10
0	Hermiston	NORTHWE	0.111	12.871	4.290	5.097	0.037	4.290	0.000	0.000	47638	47640	0	0	1	Unknown	Unknown	Unknown	1.10
0	Cowlitz 23	NORTHWE	0.107	26.907	9.486	1.316	0.040	10.004	0.004	2.138	46609	46607	0	0	8	Gwye	Gwye	3-Legged C	0.13
0	Lower Gra	NORTHWE	0.107	12.377	4.126	4.894	0.036	4.126	0.000	0.000	44237	44233	44234	44236	1	Gwye	Delta	Single Pha	1.10
0	Custer 500	NORTHWE	0.107	12.341	1.271	1.467	0.037	4.257	0.032	8.017	40323	40321	0	0	2	Gwye	Gwye	Single Pha	1.10
0	Cowlitz 23	NORTHWE	0.106	26.553	9.391	1.302	0.040	9.931	0.004	2.144	46609	46607	0	0	9	Gwye	Gwye	3-Legged C	0.13
0	Custer 500	NORTHWE	0.106	12.241	1.273	1.468	0.037	4.307	0.032	8.040	40323	40322	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Allston 500	NORTHWE	0.105	12.102	11.042	13.076	0.149	17.159	0.053	13.297	40045	40044	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Rocky Reac	NORTHWE	0.101	16.927	7.056	5.560	0.067	11.153	0.031	7.717	40891	46832	0	0	1	Gwye	Gwye	Single Pha	0.76
0	Sickler 500	NORTHWE	0.099	11.382	4.707	5.606	0.048	5.548	0.009	2.310	40973	47031	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Anaconda	NORTHWE	0.095	23.770	7.923	4.216	0.032	7.923	0.000	0.000	40458	40456	0	0	1	Gwye	Gwye	Single Pha	0.51
0	McNary 50	NORTHWE	0.095	11.001	10.724	12.701	0.146	16.829	0.054	13.561	40723	41351	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Kittitas Val	NORTHWE	0.094	23.710	7.903	2.191	0.031	7.903	0.000	0.000	44276	44277	0	0	1	Unknown	Unknown	Unknown	0.28
0	John Day P	NORTHWE	0.091	10.469	2.135	2.546	0.060	6.927	0.041	10.416	40585	40584	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Tahkenitch	NORTHWE	0.089	22.457	7.412	1.772	0.029	7.338	0.003	1.321	41061	41059	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Hot Spring	IDAHO	0.089	22.219	7.406	1.012	0.030	7.406	0.000	0.000	60396	60397	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Lower Mor	NORTHWE	0.088	10.118	3.373	4.006	0.029	3.373	0.000	0.000	44257	44253	44254	44256	1	Gwye	Delta	Single Pha	1.10
0	Grand Cou	NORTHWE	0.087	10.031	3.344	3.973	0.029	3.344	0.000	0.000	41743	40297	0	0	1	Unknown	Unknown	Unknown	1.10
0	Grand Cou	NORTHWE	0.087	10.031	3.344	3.973	0.029	3.344	0.000	0.000	41742	40296	0	0	1	Unknown	Unknown	Unknown	1.10
0	Grand Cou	NORTHWE	0.087	10.031	3.344	3.973	0.029	3.344	0.000	0.000	41744	40298	0	0	1	Unknown	Unknown	Unknown	1.10
0	Round Butt	NORTHWE	0.086	9.978	6.313	7.538	0.079	9.162	0.026	6.508	43485	43483	0	0	1	Gwye	Gwye	Unknown	1.10
0	Garrison 50	NORTHWE	0.086	9.950	1.526	1.807	0.000	0.000	0.013	3.317	40459	40457	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Alcoa 230/	NORTHWE	0.083	20.799	4.956	1.164	0.013	3.163	0.009	4.274	40033	40031	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Maple Vall	NORTHWE	0.083	9.636	4.978	4.412	0.061	6.992	0.021	5.192	40693	40689	0	0	1	Unknown	Unknown	Three Pha	0.83
0	Albany 230	NORTHWE	0.081	20.295	6.786	1.543	0.028	6.934	0.004	1.823	40027	40025	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Rock Creek	NORTHWE	0.079	9.153	0.242	0.288	0.019	2.170	0.021	5.220	41401	41402	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Aberdeen 1	NORTHWE	0.078	39.290	13.097	1.850	0.026	13.097	0.000	0.000	40007	46792	0	0	1	Gwye	Delta	Unknown	0.14
0	Allston 500	NORTHWE	0.078	8.984	9.404	11.135	0.130	14.975	0.048	12.112	40045	40043	0	0	2	Gwye	Gwye	Single Pha	1.10
0	Napavine 5	NORTHWE	0.078	8.969	2.990	3.357	0.026	2.990	0.000	0.000	40774	47584	0	0	1	Gwye	Gwye	Unknown	1.10
0	Andrew Yo	NORTHWE	0.075	18.775	3.572	0.492	0.007	1.763	0.011	5.740	46860	46862	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Grand Cou	NORTHWE	0.075	8.627	2.876	3.417	0.025	2.876	0.000	0.000	41739	40291	0	0	1	Unknown	Unknown	Unknown	1.10
0	Grand Cou	NORTHWE	0.075	8.627	2.876	3.417	0.025	2.876	0.000	0.000	41741	40295	0	0	1	Unknown	Unknown	Unknown	1.10
0	Grand Cou	NORTHWE	0.075	8.627	2.876	3.417	0.025	2.876	0.000	0.000	41740	40293	0	0	1	Unknown	Unknown	Unknown	1.10
0	Grays Harb	NORTHWE	0.074	18.658	6.219	1.789	0.025	6.219	0.000	0.000	47595	47596	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grays Harb	NORTHWE	0.074	18.658	6.219	1.789	0.025	6.219	0.000	0.000	47595	47598	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grays Harb	NORTHWE	0.074	18.658	6.219	1.789	0.025	6.219	0.000	0.000	47595	47597	0	0	1	Unknown	Unknown	Unknown	0.28
0	Chief Josep	NORTHWE	0.074	8.503	11.610	13.793	0.177	20.425	0.076	19.178	40233	40232	0	0	3	Gwye	Gwye	Single Pha	1.10
0	Centralia S	NORTHWE	0.071	8.215	2.738	3.252	0.024	2.738	0.000	0.000	47745	47744	0	0	1	Unknown	Unknown	Unknown	1.10
0	Shawnee 2	NORTHWE	0.070	17.580	3.880	1.097	0.008	2.093	0.008	4.145	48385	48383	0	0	1	Unknown	Unknown	Unknown	0.28
0	Vantage 50	NORTHWE	0.070	8.138	6.241	7.331	0.080	9.246	0.026	6.533	41113	41111	0	0	2	Gwye	Gwye	Single Pha	1.10
0	Happy Vall	NORTHWE	0.069	17.410	4.250	1.201	0.012	3.116	0.008	3.841	40505	47561	0	0	1	Unknown	Unknown	Unknown	0.28
0	Ross Dam 2	NORTHWE	0.069	17.374	5.791	3.067	0.023	5.791	0.000	0.000	46461	46439	0	0	1	Gwye	Delta	Single Pha	0.51
0	Ross Dam 2	NORTHWE	0.069	17.298	5.766	3.053	0.023	5.766	0.000	0.000	46460	46441	0	0	1	Gwye	Delta	Single Pha	0.51
0	Fairmount	NORTHWE	0.069	17.286	4.740	1.114	0.015	3.718	0.004	2.093	40403	40401	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Centralia S	NORTHWE	0.068	7.794	2.598	3.086	0.023	2.598	0.000	0.000	47741	47740	0	0	1	Unknown	Unknown	Unknown	1.10
0	Fairview 23	NORTHWE	0.067	16.779	6.295	3.309	0.030	7.438	0.008	3.825	40409	40407	0	0	1	Gwye	Gwye	Single Pha	0.51
0	Little Goos	NORTHWE	0.067	7.769	2.590	3.075	0.022	2.590	0.000	0.000	44217	44213	44214	44216	1	Gwye	Delta	Single Pha	1.10
0	Wind Ridge	NORTHWE	0.065	16.352	5.451	1.565	0.022	5.451	0.000	0.000	42361	42362	0	0	1	Gwye	Gwye	Unknown	0.28
0	Hot Spring	NORTHWE	0.065	7.539	1.155	1.376	0.000	0.002	0.010	2.515	40553	40551	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Napavine 5	NORTHWE	0.065	7.526	2.509	2.783	0.022	2.509	0.000	0.000	40774	47582	0	0	1	Gwye	Gwye	Unknown	1.10
0	Napavine 5	NORTHWE	0.065	7.526	2.509	2.783	0.022	2.509	0.000	0.000	40774	47583	0	0	1	Gwye	Gwye	Unknown	1.10
0	Paul 500/1	NORTHWE	0.065	7.454	4.409	5.169	0.043	4.984	0.005	2.499	40821	42806	0	0	1	Gwye	Gwye	Unknown	1.10
0	Beacon (Sp	NORTHWE	0.063	15.909	5.073	1.430	0.019	4.844	0.002	0.839	48031	48029	0	0	1	Gwye	Gwye	Unknown	0.28
0	Alvey 230/	NORTHWE	0.063	15.797	4.178	0.994	0.012	3.127	0.005	2.280	40049	40047	0	0	4	Gwye	Gwye	Core, Thre	0.23
0	Beacon (Sp	NORTHWE	0.062	15.523	4.948	1.395	0.019	4.722	0.002	0.836	48025	48023	0	0	1	Gwye	Gwye	Unknown	0.28
0	Monroe 50	NORTHWE	0.062	7.193	5.395	6.413	0.082	9.434	0.037	9.289	40749	40747	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Sedro Woo	NORTHWE	0.061	15.397	4.099	1.174	0.024	6.077	0.015	7.728	42100	42119	0	0	1	Gwye	Gwye	Unknown	0.28
0	Beaver 230	NORTHWE	0.061	15.309	5.103	1.407	0.020	5.103	0.000	0.000	43021	43017	0	0	1	Gwye	Delta	Unknown	0.28
0	Aberdeen 2	NORTHWE	0.061	15.307	5.440	1.298	0.023	5.778	0.001	0.698	40009	40007	0	0	4	Gwye	Gwye	Core, Thre	0.23
0	Lane 230/1	NORTHWE	0.060	15.072	3.656	1.451	0.012	2.910	0.007	3.716	40627	40625	0	0	1	Gwye	Gwye	Three Pha	0.38
0	Toledo 230	NORTHWE	0.060	15.052	5.017	1.423	0.020	5.017	0.000	0.000	41083	41081	0	0	1	Unknown	Unknown	Unknown	0.28
0	Paul 115/1	NORTHWE	0.059	29.731	9.910	1.457	0.005	2.499	0.025	12.407	42806	42807	0	0	1	Gwye	Gwye	Unknown	0.14
0	J.D. Ross 3	NORTHWE	0.058	9.630	6.943	5.374	0.086	14.408	0.045	11.198	40901	40899	0	0	1	Gwye	Gwye	Single Pha	0.76
0	COB Energ	NORTHWE	0.058	6.730	2.243	2.686	0.019	2.243	0.000	0.000	45262	45452	0	0	1	Unknown	Unknown	Unknown	1.10
0	Big Eddy 50	NORTHWE	0.057	6.600	9.420	11.224	0.135	15.571	0.053	13.371	40111	41343	0	0	5	Gwye	Gwye	Single Pha	1.10
0	Danskin W	IDAHO	0.056	14.057	4.686	0.640	0.019	4.686	0.000	0.000	60394	60391	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Franklin 23	NORTHWE	0.056	13.961	5.446	2.057	0.035	8.818	0.018	8.954	40443	40440	0	0	1	Gwye	Gwye	Three Pha	0.38
0	Blue Lake 2	NORTHWE	0.054	13.618	5.631	1.617	0.032	7.928	0.013	6.297	43685	43684	0	0	1	Gwye	Gwye	Unknown	0.28
0	Sammamis	NORTHWE	0.054	13.462	3.440	0.982	0.024	5.973	0.016	8.059	42319	42323	0	0	1	Gwye	Gwye	Unknown	0.28
0	Southwest	NORTHWE	0.054	13.443	4.764	0.660	0.020	5.048	0.002	1.039	46645	46643	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Big Eddy 50	NORTHWE	0.054	6.209	12.835	15.293	0.191	22.005	0.079	19.936	40111	41341	0	0	2	Gwye	Gwye	Single Pha	1.10
0	Drummond	PACE	0.053	18.881	6.234	1.012	0.017	6.084	0.001	0.562	66843	65470	0	0	1	Gwye	Gwye	Core, Thre	0.16
0	Sherwood	NORTHWE	0.053	13.402	1.836	0.525	0.006	1.465	0.011	5.542	43527	43523	0	0	1	Gwye	Gwye	Unknown	0.28
0	Chehalis 23	NORTHWE	0.053	13.225	4.789	1.366	0.020	4.952	0.001	0.543	40207	40203	0	0	1	Unknown	Unknown	Unknown	0.28
0	Box Canyo	NORTHWE	0.052	25.868	8.623	1.223	0.005	2.646	0.014	6.860	47126	47009	0	0	1	Unknown	Unknown	Unknown	0.14
0	Vantage 50	NORTHWE	0.052	6.044	3.422	4.020	0.040	4.621	0.010	2.606	41113	41112	0	0	1	Gwye	Gwye	Single Pha	1.10
0	Port Angel	NORTHWE	0.051	12.918	4.860	1.373	0.020	5.098	0.001	0.792	40839	40841	0	0	1	Unknown	Unknown	Unknown	0.28
0	Lane 230/1	NORTHWE	0.051	12.703	3.987	0.959	0.018	4.408	0.007	3.449	40627	40625	0	0	2	Gwye	Gwye	Core, Thre	0.23
0	Hungry Ho	NORTHWE	0.050	12.503	4.168	1.146	0.017	4.168	0.000	0.000	40557	40555	0	0	12	Unknown	Unknown	Unknown	0.28
0	Hungry Ho	NORTHWE	0.050	12.503	4.168	1.137	0.017	4.168	0.000	0.000	40557	40556	0	0	34	Unknown	Unknown	Unknown	0.28
0	Bethel (PG	NORTHWE	0.050	12.496	7.545	2.172	0.044	10.924	0.013	6.759	43039	43037	0	0	2	Gwye	Gwye	Unknown	0.28
0	Chemawa 2	NORTHWE	0.050	12.450	7.941	1.910	0.047	11.731	0.016	7.788	40213	40211	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Malin 230/	NORTHWE	0.049	12.268	4.090	1.096	0.016	4.090	0.000	0.000	45189	45187	0	0	1	Gwye	Gwye	Unknown	0.28
0	Sno-king 23	NORTHWE	0.049	12.264	2.213	0.632	0.011	2.731	0.011	5.347	41004	41002	0	0	3	Unknown	Unknown	Unknown	0.28
0	COB Energ	NORTHWE	0.049	5.645	1.882	2.253	0.016	1.882	0.000	0.000	45262	45450	0	0	1	Unknown	Unknown	Unknown	1.10
0	COB Energ	NORTHWE	0.049	5.645	1.882	2.253	0.016	1.882	0.000	0.000	45262	45451	0	0	1	Unknown	Unknown	Unknown	1.10
0	Toledo 230	NORTHWE	0.048	12.093	4.031	1.143	0.016	4.031	0.000	0.000	41083	41081	0	0	2	Unknown	Unknown	Unknown	0.28
0	N. Lewiston	NORTHWE	0.048	12.082	4.857	1.381	0.028	7.134	0.013	6.361	48255	48253	0	0	1	Gwye	Gwye	Unknown	0.28
0	Sunset 230	NORTHWE	0.047	11.729	3.261	0.937	0.023	5.713	0.015	7.330	43740	43739	0	0	1	Gwye	Gwye	Unknown	0.28
0	Caldwell 23	IDAHO	0.046	11.430	3.670	0.492	0.014	3.460	0.001	0.359	60110	60105	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Lolo 230/1	NORTHWE	0.045	11.399	3.249	0.919	0.011	2.806	0.003	1.358	48197	48195	0	0	2	Gwye	Gwye	Unknown	0.28
0	Murryhill 2	NORTHWE	0.045	11.264	3.506	1.009	0.018	4.511	0.009	4.446	43348	43347	0	0	1	Gwye	Gwye	Unknown	0.28
0	St. Johns 2	NORTHWE	0.044	11.162	4.025	2.088	0.018	4.414	0.002	1.005	41021	41019	0	0	1	Gwye	Gwye	Single Pha	0.51
0	Mont. 230/	NORTHWE	0.044	10.996	3.665	1.054	0.015	3.665	0.000	0.000	47394	47395	0	0	1	Unknown	Unknown	Unknown	0.28
0	Gorge (SCL	NORTHWE	0.044	10.985	3.662	1.853	0.015	3.662	0.000	0.000	46431	46429	0	0	13	Gwye	Delta	Single Pha	0.51
0	Outlook 23	NORTHWE	0.044	10.948	2.628	0.727	0.006	1.628	0.004	2.043	45229	45227	0	0	1	Gwye	Gwye	Unknown	0.28
0	Columbia F	NORTHWE	0.043	10.842	2.923	0.697	0.009	2.231	0.003	1.517	40249	40247	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Union Gap	NORTHWE	0.043	10.814	3.159	0.864	0.011	2.718	0.002	0.894	45317	45315	0	0	1	Gwye	Gwye	Unknown	0.28

GIC Transformers (for pasting to Simulator for contouring)

Bus Num High	Bus Num Med	Bus Num Ter	Bus Num Star	Circuit	GIC Mvar Loss (Baseline Avg)
40941	40939	0	0	1	42.99
40629	40627	0	0	1	31.98
40091	40092	0	0	1	30.14
40061	40063	0	0	1	29.61
40808	40810	0	0	1	26.19
40369	40363	40365	41201	1	25.79
40949	40947	0	0	1	22.88
40989	40986	0	0	1	20.84
44237	44231	44232	44235	1	20.79
40687	45189	0	0	1	17.54
40797	40794	0	0	1	17.09
44257	44251	44252	44255	1	17.06
41051	41049	0	0	1	16.24
40827	40824	0	0	1	15.95
40111	41341	0	0	2	15.30
40721	41353	0	0	1	14.49
43049	43047	0	0	1	14.23
40233	40232	0	0	3	13.79
40837	40838	0	0	1	13.19
40666	40664	0	0	1	13.14
40045	40044	0	0	1	13.08
44217	44211	44212	44215	1	13.08
40723	41351	0	0	1	12.72
40521	40519	0	0	1	11.43
40111	41343	0	0	5	11.23
40045	40043	0	0	2	11.14
40834	40836	0	0	1	10.22
45197	45195	0	0	2	10.21
45197	45195	0	0	1	10.21
40994	41328	0	0	1	9.55
40601	40599	0	0	1	9.19
40691	40692	0	0	1	8.93
40223	40230	0	0	1	8.54
40225	40232	0	0	2	7.93
41095	41094	0	0	1	7.87
43485	43483	0	0	1	7.54
41113	41111	0	0	2	7.34
41007	41006	0	0	1	7.33
40287	41357	0	0	1	6.88
40749	40747	0	0	1	6.42
40306	40304	0	0	5	5.83
40973	47031	0	0	1	5.61
40891	46832	0	0	1	5.56
40901	40899	0	0	1	5.38
40913	40911	0	0	1	5.19
40821	42806	0	0	1	5.17
40243	45314	0	0	1	5.09
47638	47640	0	0	1	5.09
47638	47641	0	0	1	5.09
47638	47639	0	0	1	5.09
44237	44233	44234	44236	1	4.88
40693	40689	0	0	1	4.41
40458	40456	0	0	1	4.21
41113	41112	0	0	1	4.02
44257	44253	44254	44256	1	4.00
41742	40296	0	0	1	3.97
41744	40298	0	0	1	3.97
41743	40297	0	0	1	3.97
43314	43309	0	0	1	3.80
40827	40826	0	0	2	3.61
41741	40295	0	0	1	3.42
41740	40293	0	0	1	3.42
41739	40291	0	0	1	3.42
40774	47584	0	0	1	3.36
40409	40407	0	0	1	3.30
42900	42901	0	0	1	3.26
47745	47744	0	0	1	3.25
40011	40007	0	0	5	3.14
65665	65670	65685	98535	2	3.14
65665	65670	65680	98534	1	3.14
42304	42305	0	0	1	3.11
47741	47740	0	0	1	3.09
44217	44213	44214	44216	1	3.07
46461	46439	0	0	1	3.07
46460	46441	0	0	1	3.05
40129	40127	0	0	1	3.00
40923	40921	0	0	1	2.85
40774	47583	0	0	1	2.78
40774	47582	0	0	1	2.78
45262	45452	0	0	1	2.69
40373	40371	0	0	1	2.63
40585	40584	0	0	1	2.54
40051	40049	0	0	5	2.46
40181	40179	0	0	1	2.46
40302	40303	0	0	4	2.41
41347	40733	0	0	1	2.35
40795	40793	0	0	1	2.34
40971	40969	0	0	1	2.33
45262	45451	0	0	1	2.25
45262	45450	0	0	1	2.25
44276	44277	0	0	1	2.19
43039	43037	0	0	2	2.17
41021	41019	0	0	1	2.09
40443	40440	0	0	1	2.05
41075	41073	0	0	1	1.99
40895	40893	0	0	1	1.95
40213	40211	0	0	1	1.92
40613	40611	0	0	1	1.87
46431	46429	0	0	13	1.85
40007	46792	0	0	1	1.85
40459	40457	0	0	1	1.81
47595	47596	0	0	1	1.79
47595	47598	0	0	1	1.79
47595	47597	0	0	1	1.79
41061	41059	0	0	1	1.78
40993	41329	0	0	1	1.76
40207	40205	0	0	1	1.76
43123	48516	48518	48519	1	1.74
44166	44149	44150	44159	1	1.71
44167	44151	44152	44160	1	1.66
43685	43684	0	0	1	1.62
44167	44153	44154	44161	1	1.60
42361	42362	0	0	1	1.58
40027	40025	0	0	1	1.55
46427	46425	0	0	1	1.53
48255	48253	0	0	1	1.47
40323	40322	0	0	1	1.47
40323	40321	0	0	2	1.47
42806	42807	0	0	1	1.46
40627	40625	0	0	1	1.45
40211	40209	0	0	1	1.44
42700	42701	0	0	1	1.44
48031	48029	0	0	1	1.43
41083	41081	0	0	1	1.43
43021	43017	0	0	1	1.41
45262	47660	0	0	1	1.40
48025	48023	0	0	1	1.40
40553	40551	0	0	1	1.38
40839	40841	0	0	1	1.37
43039	43037	0	0	1	1.37
40207	40203	0	0	1	1.37
48463	48461	0	0	2	1.35
46629	46628	0	0	1	1.35
46629	46627	0	0	1	1.33
60110	60105	0	0	2	1.33
46431	46430	0	0	4	1.32
46609	46607	0	0	8	1.32
46609	46607	0	0	9	1.30
40009	40007	0	0	4	1.30
42700	42701	0	0	2	1.27
46421	46420	0	0	2	1.25
46421	46419	0	0	1	1.25
45183	45181	0	0	1	1.24
40099	40097	0	0	1	1.23

HMSL -400

StudyID	CaseDescription	Iteration	Transformer Description	Area	Avg Neutral Current, pu (3 phase)	Avg Neutral Amps (3 phase)	Avg Effective Amps (per phase)	Avg Mvar Losses (3 phase)	Avg High-Side Current, pu (per phase)	Avg High-Side Amps (per phase)	Avg Med-Side Current, pu (per phase)	Avg Med-Side Amps (per phase)	High Bus Number	Med Bus Number	Ter Bus Number	Star Bus Number	Circuit	High-Side Config	Med-Side Config	Core Type	K Factor
3	-400 Baseli	0	Ashe 500/2	NORTHWE	0.65	74.81	24.94	29.62	0.22	24.94	0.00	0.00	40061	40063	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Dworshak	NORTHWE	0.57	65.46	21.82	25.70	0.19	21.82	0.00	0.00	40369	40363	40365	41201	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Lane 500/2	NORTHWE	0.52	60.46	26.48	31.94	0.28	31.93	0.05	13.15	40629	40627	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	McNary 34	NORTHWE	0.36	60.09	18.15	14.51	0.09	14.41	0.02	5.68	40721	41353	0	0	1	Gwye	Gwye	Single Pha	0.76
3	-400 Baseli	0	Santiam 50	NORTHWE	0.48	55.69	35.72	42.93	0.44	50.34	0.13	31.83	40941	40939	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Lower Gra	NORTHWE	0.46	52.88	17.63	20.89	0.15	17.63	0.00	0.00	44237	44231	44232	44235	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	South Bren	NORTHWE	0.21	52.27	11.54	3.26	0.02	5.66	0.02	11.76	42900	42901	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Aberdeen 2	NORTHWE	0.20	50.86	13.14	3.14	0.04	9.32	0.02	7.63	40011	40007	0	0	5	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Novelty 23	NORTHWE	0.20	48.83	10.93	3.11	0.04	10.10	0.03	16.10	42304	42305	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Ostrander	NORTHWE	0.41	47.38	21.91	26.18	0.24	28.13	0.07	16.27	40808	40810	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Lower Mor	NORTHWE	0.37	43.17	14.39	17.10	0.13	14.39	0.00	0.00	44257	44251	44252	44255	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Slatt 500/2	NORTHWE	0.36	41.44	17.47	20.84	0.18	20.85	0.03	7.49	40989	40986	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	East Omak	NORTHWE	0.16	40.09	11.01	2.63	0.04	9.05	0.01	5.59	40373	40371	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Bell 500/23	NORTHWE	0.34	39.58	25.17	30.05	0.32	36.67	0.11	26.31	40091	40092	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Boardman	NORTHWE	0.34	39.52	13.17	14.21	0.11	13.17	0.00	0.00	43049	43047	0	0	1	Gwye	Delta	Unknown	1.10
3	-400 Baseli	0	Aberdeen	NORTHWE	0.08	39.29	13.10	1.85	0.03	13.10	0.00	0.00	40007	46792	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Salem 230,	NORTHWE	0.15	38.06	9.92	2.84	0.03	7.49	0.01	5.88	40923	40921	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Shelton 23	NORTHWE	0.15	37.55	9.70	2.33	0.03	7.02	0.01	5.95	40971	40969	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Tacoma 50	NORTHWE	0.32	36.48	13.60	16.23	0.13	14.82	0.01	3.11	41051	41049	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Snohomish	NORTHWE	0.22	35.94	12.15	9.53	0.08	12.67	0.01	2.31	40994	41328	0	0	1	Gwye	Gwye	Single Pha	0.76
3	-400 Baseli	0	Carlton 23	NORTHWE	0.14	35.32	10.33	2.46	0.04	8.89	0.01	3.40	40181	40179	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Mcloughlin	NORTHWE	0.14	34.49	13.28	3.80	0.06	15.16	0.01	4.97	43314	43309	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Rogue 230	NORTHWE	0.13	33.72	8.13	1.96	0.02	5.02	0.01	6.22	40895	40893	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Maple Vall	NORTHWE	0.20	33.68	11.20	8.93	0.07	11.15	0.01	2.23	40691	40692	0	0	1	Gwye	Gwye	Single Pha	0.76
3	-400 Baseli	0	Little Goos	NORTHWE	0.29	33.13	11.04	13.11	0.10	11.04	0.00	0.00	44217	44211	44212	44215	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Malin 500/	NORTHWE	0.28	32.47	15.37	17.55	0.17	19.27	0.04	8.88	40687	45189	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Hatwai 500	NORTHWE	0.28	32.39	9.75	11.47	0.08	9.06	0.01	3.58	40521	40519	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Clatsop 23	NORTHWE	0.13	31.96	9.89	5.09	0.04	9.33	0.01	2.38	40243	45314	0	0	1	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	Tillamook	NORTHWE	0.12	30.66	8.30	1.99	0.03	6.48	0.01	4.51	41075	41073	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Chief Josep	NORTHWE	0.18	29.87	10.77	8.54	0.08	12.57	0.02	3.92	40223	40230	0	0	1	Gwye	Gwye	Single Pha	0.76
3	-400 Baseli	0	Paul 115/1	NORTHWE	0.06	29.73	9.91	1.46	0.01	2.50	0.03	12.41	42806	42807	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Boardman	NORTHWE	0.12	29.03	10.68	3.00	0.05	11.68	0.00	2.11	40129	40127	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Sacajawea	NORTHWE	0.25	28.72	4.38	5.19	0.03	2.83	0.01	6.80	40913	40911	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Chief Josep	NORTHWE	0.17	27.78	10.00	7.93	0.08	12.67	0.03	6.78	40225	40232	0	0	2	Gwye	Gwye	Single Pha	0.76
3	-400 Baseli	0	Pearl 500/	NORTHWE	0.24	27.75	13.27	15.95	0.16	17.90	0.05	11.89	40827	40824	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Cowlitz 23	NORTHWE	0.11	26.91	9.49	1.32	0.04	10.00	0.00	2.14	46609	46607	0	0	8	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Central Fer	NORTHWE	0.23	26.74	11.14	13.19	0.11	13.19	0.02	4.99	40666	40664	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Cowlitz 23	NORTHWE	0.11	26.55	9.39	1.30	0.04	9.93	0.00	2.14	46609	46607	0	0	9	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Box Canyo	NORTHWE	0.05	25.87	8.62	1.22	0.01	2.65	0.01	6.86	47126	47009	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Pearl 500/	NORTHWE	0.21	24.73	6.62	3.61	0.05	5.95	0.02	5.20	40827	40826	0	0	2	Unknown	Unknown	Core, Thre	0.50
3	-400 Baseli	0	Satsop 500	NORTHWE	0.21	24.20	19.18	22.88	0.25	28.71	0.09	21.22	40949	40947	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Ponderosa	NORTHWE	0.21	24.05	10.99	13.17	0.12	13.82	0.03	6.64	40837	40838	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Anaconda	NORTHWE	0.10	23.77	7.92	4.23	0.03	7.92	0.00	0.00	40458	40456	0	0	1	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	Kittitas Val	NORTHWE	0.09	23.72	7.91	2.19	0.03	7.91	0.00	0.00	44276	44277	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Tahkenitch	NORTHWE	0.09	22.46	7.41	1.77	0.03	7.34	0.00	1.32	41061	41059	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Sno-king 5	NORTHWE	0.19	21.70	6.16	7.32	0.05	5.55	0.01	3.43	41007	41006	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Hot Spring	IDAHO	0.09	21.62	7.21	0.99	0.03	7.21	0.00	0.00	60396	60397	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Dayton 11	NORTHWE	0.04	20.97	7.90	1.10	0.02	8.91	0.00	2.28	43139	43137	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Alcoa 230/	NORTHWE	0.08	20.80	4.96	1.16	0.01	3.16	0.01	4.27	40033	40031	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Lower Bak	NORTHWE	0.04	20.56	6.85	0.96	0.01	6.85	0.00	0.00	42108	42121	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Keeler 500	NORTHWE	0.18	20.39	7.68	9.19	0.08	9.55	0.03	6.75	40601	40599	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Albany 230	NORTHWE	0.08	20.30	6.79	1.54	0.03	6.93	0.00	1.82	40027	40025	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Grand Cou	NORTHWE	0.17	19.58	5.79	6.88	0.05	5.16	0.01	1.38	40287	41357	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Drummond	PACE	0.05	18.88	6.23	1.01	0.02	6.08	0.00	0.56	66843	65470	0	0	1	Gwye	Gwye	Core, Thre	0.16
3	-400 Baseli	0	Andrew Yo	NORTHWE	0.08	18.77	3.57	0.49	0.01	1.76	0.01	5.74	46860	46862	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Grays Harb	NORTHWE	0.07	18.66	6.22	1.79	0.03	6.22	0.00	0.00	47595	47596	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grays Harb	NORTHWE	0.07	18.66	6.22	1.79	0.03	6.22	0.00	0.00	47595	47598	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grays Harb	NORTHWE	0.07	18.66	6.22	1.79	0.03	6.22	0.00	0.00	47595	47597	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Ponderosa	NORTHWE	0.16	18.08	8.53	10.21	0.09	10.89	0.02	5.49	40834	40836	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Troutdale	NORTHWE	0.16	17.97	6.60	7.87	0.06	7.13	0.01	1.16	41095	41094	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Shawnee 2	NORTHWE	0.07	17.77	3.94	1.11	0.01	2.09	0.01	4.15	48385	48383	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Happy Vall	NORTHWE	0.07	17.41	4.25	1.20	0.01	3.12	0.01	3.84	40505	47561	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Ross Dam	NORTHWE	0.07	17.37	5.79	3.07	0.02	5.79	0.00	0.00	46461	46439	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Ross Dam	NORTHWE	0.07	17.30	5.77	3.05	0.02	5.77	0.00	0.00	46460	46441	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Fairmount	NORTHWE	0.07	17.29	4.74	1.11	0.02	3.72	0.00	2.09	40403	40401	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.10	16.93	7.06	5.56	0.07	11.15	0.03	7.72	40891	46832	0	0	1	Gwye	Gwye	Single Pha	0.76
3	-400 Baseli	0	Chemawa	NORTHWE	0.03	16.88	5.63	1.45	0.01	5.63	0.00	0.00	40211	40209	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Fairview 2	NORTHWE	0.07	16.78	6.30	3.31	0.03	7.44	0.01	3.83	40409	40407	0	0	1	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	La Grande	NORTHWE	0.03	16.76	5.59	0.80	0.01	5.59	0.00	0.00	46734	46733	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Wind Ridge	NORTHWE	0.07	16.32	5.44	1.55	0.02	5.44	0.00	0.00	42361	42362	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Beacon (Sp	NORTHWE	0.06	15.90	5.07	1.43	0.02	4.84	0.00	0.84	48031	48029	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Alvey 230/	NORTHWE	0.06	15.80	4.18	0.99	0.01	3.13	0.01	2.28	40049	40047	0	0	4	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Beacon (Sp	NORTHWE	0.06	15.52	4.95	1.39	0.02	4.72	0.00	0.84	48025	48023	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Sedro Woo	NORTHWE	0.06	15.40	4.10	1.17	0.02	6.08	0.02	7.73	42100	42119	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Beaver 230	NORTHWE	0.06	15.31	5.10	1.41	0.02	5.10	0.00	0.00	43021	43017	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Aberdeen	NORTHWE	0.06	15.31	5.44	1.30	0.02	5.78	0.00	0.70	40009	40007	0	0	4	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Whitehorn	NORTHWE	0.03	15.18	5.06	0.71	0.01	5.06	0.00	0.00	42040	42042	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Lane 230/1	NORTHWE	0.06	15.07	3.66	1.45	0.01	2.91	0.01	3.72	40627	40625	0	0	1	Gwye	Gwye	Three Pha	0.38
3	-400 Baseli	0	Toledo 230	NORTHWE	0.06	15.05	5.02	1.42	0.02	5.02	0.00	0.00	41083	41081	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Whitehorn	NORTHWE	0.03	14.79	4.93	0.69	0.01	4.93	0.00	0.00	42040	42043	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Meridian 5	NORTHWE	0.13	14.68	9.01	10.19	0.11	12.52	0.03	7.92	45197	45195	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Meridian 5	NORTHWE	0.13	14.68	9.01	10.19	0.11	12.52	0.03	7.92	45197	45195	0	0	2	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Applegate	NORTHWE	0.03	14.31	4.77	0.65	0.01	4.77	0.00	0.00	45009	45374	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Walla Wall	NORTHWE	0.06	14.24	4.75	1.31	0.02	4.75	0.00	0.00	45327	45325	0	0	2	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Franklin 23	NORTHWE	0.06	14.13	5.46	2.06	0.04	8.82	0.02	8.98	40443	40440	0	0	1	Gwye	Gwye	Three Pha	0.38
3	-400 Baseli	0	Danskin W	IDAHO	0.06	13.99	4.66	0.64	0.02	4.66	0.00	0.00	60394	60391	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Blue Lake 2	NORTHWE	0.05	13.62	5.63	1.62	0.03	7.93	0.01	6.30	43685	43684	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Alvey 500/	NORTHWE	0.12	13.49	2.07	2.46	0.00	0.00	0.02	4.50	40051	40049	0	0	5	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Sammamis	NORTHWE	0.05	13.46	3.44	0.98	0.02	5.97	0.02	8.06	42319	42323	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Southwest	NORTHWE	0.05	13.44	4.76	0.66	0.02	5.05	0.00	1.04	46645	46643	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Sherwood	NORTHWE	0.05	13.40	1.84	0.53	0.01	1.47	0.01	5.54	43527	43523	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Walla Wall	NORTHWE	0.05	13.36	4.46	1.23	0.02	4.46	0.00	0.00	45327	45325	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Chehalis 2	NORTHWE	0.05	13.23	4.79	1.37	0.02	4.95	0.00	0.54	40207	40203	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Lopez Islar	NORTHWE	0.03	13.06	4.35	1.13	0.01	4.35	0.00	0.00	41235	41234	0	0	4	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Port Angel	NORTHWE	0.05	12.92	4.86	1.37	0.02	5.10	0.00	0.79	40839	40841	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hermiston	NORTHWE	0.11	12.89	4.30	5.11	0.04	4.30	0.00	0.00	47638	47639	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Hermiston	NORTHWE	0.11	12.89	4.30	5.11	0.04	4.30	0.00	0.00	47638	47641	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Hermiston	NORTHWE	0.11	12.89	4.30	5.11	0.04	4.30	0.00	0.00	47638	47640	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Bonneville	PACE	0.04	12.77	4.26	0.83	0.01	4.26	0.00	0.00	65195	65196	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Lane 230/1	NORTHWE	0.05	12.70	3.99	0.96	0.02	4.41	0.01	3.45	40627	40625	0	0	2	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Hungry Ho	NORTHWE	0.05	12.50	4.17	1.15	0.02	4.17	0.00	0.00	40557	40555	0	0	12	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hungry Ho	NORTHWE	0.05	12.50	4.17	1.14	0.02	4.17	0.00	0.00	40557	40556	0	0	34	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Bethel (PG	NORTHWE	0.05	12.50	7.55	2.17	0.04	10.92	0.01	6.76	43039	43037	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Chemawa	NORTHWE	0.05	12.45	7.94	1.90	0.05	11.73	0.02	7.79	40213	40211	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Bald Moun	NORTHWE	0.03	12.42	4.14	0.46	0.01	4.14	0.00	0.00	41184	41185	0	0	1	Unknown	Unknown	Core, Thre	0.12
3	-400 Baseli	0	Lower Gra	NORTHWE	0.11	12.42	4.14	4.91	0.04	4.14	0.00	0.00	44237	44233	44234	44236	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Custer 500	NORTHWE	0.11	12.34	1.27	1.47	0.04	4.26	0.03	8.02	40323	40321	0	0	2	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Malin 230/	NORTHWE	0.05	12.27	4.09	1.10	0.02	4.09	0.00	0.00	45189	45187	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Sno-king 2	NORTHWE	0.05	12.26	2.21	0.63	0.01	2.73	0.01	5.35	41004	41002	0	0	3	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Custer 500	NORTHWE	0.11	12.24	1.27	1.47	0.04	4.31	0.03	8.04	40323	40322	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Allston 500	NORTHWE	0.11	12.10	11.04	13.08	0.15	17.16	0.05	13.30	40045	40044	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Toledo 230	NORTHWE	0.05	12.09	4.03	1.14	0.02	4.03	0.00	0.00	41083	41081	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Pine Creek	NORTHWE	0.02	11.80	3.94	0.52	0.00	1.77	0.01	5.15	48316	48315	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Sunset 230	NORTHWE	0.05	11.73	3.26	0.94	0.02	5.71	0.02	7.33	43740	43739	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Walla Wall	NORTHWE	0.02	11.61	3.87	0.46	0.01	3.87	0.00	0.00	41131	41129	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Caldwell 2	IDAHO	0.05	11.47	3.68	0.49	0.01	3.47	0.00	0.36	60110	60105	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Green Pete	NORTHWE	0.02	11.39	3.80	0.44	0.01	3.80	0.00	0.00	40485	40484	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Sickler 500	NORTHWE	0.10	11.38	4.70	5.60	0.05	5.54	0.01	2.31	40973	47031	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	N. Lewisto	NORTHWE	0.05	11.31	4.57	1.29	0.03	7.01	0.01	6.63	48255	48253	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Murryhill 2	NORTHWE	0.05	11.26	3.51	1.01	0.02	4.51	0.01	4.45	43348	43347	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	St. Johns 2	NORTHWE	0.04	11.16	4.03	2.09	0.02	4.41	0.00	1.01	41021	41019	0	0	1	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	McNary 50	NORTHWE	0.10	11.03	10.71	12.68	0.15	16.78	0.05	13.49	40723	41351	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Mont. 230,	NORTHWE	0.04	11.00	3.67	1.05	0.02	3.67	0.00	0.00	47394	47395	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Gorge (SCL	NORTHWE	0.04	10.99	3.66	1.85	0.02	3.66	0.00	0.00	46431	46429	0	0	13	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Outlook 23	NORTHWE	0.04	10.96	2.63	0.73	0.01	1.63	0.00	2.04	45229	45227	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Columbia F	NORTHWE	0.04	10.84	2.92	0.70	0.01	2.23	0.00	1.52	40249	40247	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Union Gap	NORTHWE	0.04	10.81	3.16	0.86	0.01	2.72	0.00	0.89	45317	45315	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Larson 230	NORTHWE	0.04	10.65	2.30	0.63	0.01	1.40	0.01	2.80	46151	46039	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	John Day P	NORTHWE	0.09	10.46	2.14	2.55	0.06	6.93	0.04	10.42	40585	40584	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Swan Valle	PACE	0.03	10.46	3.64	0.60	0.01	4.03	0.00	0.84	66465	66470	0	0	1	Gwye	Gwye	Core, Thre	0.16
3	-400 Baseli	0	Munro BPA	NORTHWE	0.04	10.37	4.79	1.35	0.02	6.13	0.01	2.75	48463	48461	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Kitsap 230,	NORTHWE	0.04	10.33	4.65	1.87	0.02	5.89	0.01	2.51	40613	40611	0	0	1	Gwye	Gwye	Three Pha	0.38
3	-400 Baseli	0	Mile Hi 11	NORTHWE	0.02	10.33	3.44	0.44	0.01	3.44	0.00	0.00	45203	45348	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	White Rive	NORTHWE	0.04	10.31	4.39	1.26	0.02	5.96	0.01	4.20	42700	42701	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Port Angel	NORTHWE	0.04	10.30	5.22	1.21	0.03	7.21	0.01	4.49	40845	40843	0	0	3	Unknown	Unknown	Core, Thre	0.23
3	-400 Baseli	0	Pelton 230	NORTHWE	0.04	10.22	3.41	0.98	0.01	3.41	0.00	0.00	43409	43407	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Bonneville	NORTHWE	0.04	10.20	3.40	0.81	0.01	3.40	0.00	0.00	44016	44006	44007	44012	1	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Bonneville	NORTHWE	0.04	10.20	3.40	0.81	0.01	3.40	0.00	0.00	44017	44008	44009	44013	1	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Lolo 230/1	NORTHWE	0.04	10.16	2.67	0.75	0.01	2.17	0.00	1.94	48197	48195	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Lower Mor	NORTHWE	0.09	10.13	3.38	4.01	0.03	3.38	0.00	0.00	44257	44253	44254	44256	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Wells (DOI	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47100	47104	0	0	T1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Wells (DOI	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47100	47105	0	0	T2	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Wells (DOI	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47102	47106	0	0	T3	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Wells (DOI	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47102	47108	0	0	T5	Gwye	Delta	3-Legged C	0.13

HMSL +550

StudyID	CaseDescription	Iteration	Transformer Description	Area	Avg Neutral Current, pu (3 phase)	Avg Neutral Amps (3 phase)	Avg Effective Amps (per phase)	Avg Mvar Losses (3 phase)	Avg High-Side Current, pu (per phase)	Avg High-Side Amps (per phase)	Avg Med-Side Current, pu (per phase)	Avg Med-Side Amps (per phase)	High Bus Number	Med Bus Number	Ter Bus Number	Star Bus Number	Circuit	High-Side Config	Med-Side Config	Core Type	K Factor
6	+550 Basel	0	Santiam 50	NORTHWE	0.48	55.69	35.72	42.99	0.44	50.34	0.13	31.83	40941	40939	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Lane 500/2	NORTHWE	0.52	60.46	26.48	31.98	0.28	31.93	0.05	13.15	40629	40627	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Bell 500/2	NORTHWE	0.34	39.58	25.17	30.14	0.32	36.66	0.11	26.31	40091	40092	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Ashe 500/	NORTHWE	0.65	74.76	24.92	29.61	0.22	24.92	0.00	0.00	40061	40063	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Ostrander	NORTHWE	0.41	47.38	21.91	26.19	0.24	28.13	0.07	16.27	40808	40810	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Dworshak	NORTHWE	0.57	65.53	21.84	25.79	0.19	21.84	0.00	0.00	40369	40363	40365	41201	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Satsop 500	NORTHWE	0.21	24.20	19.18	22.88	0.25	28.71	0.09	21.22	40949	40947	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Slatt 500/2	NORTHWE	0.36	41.45	17.47	20.84	0.18	20.85	0.03	7.48	40989	40986	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Lower Gra	NORTHWE	0.46	52.51	17.51	20.79	0.15	17.51	0.00	0.00	44237	44231	44232	44235	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Malin 500/	NORTHWE	0.28	32.46	15.37	17.54	0.17	19.27	0.04	8.88	40687	45189	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Olympia 50	NORTHWE	0.03	3.05	14.35	17.09	0.23	26.30	0.10	26.23	40797	40794	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Lower Mor	NORTHWE	0.37	43.07	14.36	17.06	0.12	14.36	0.00	0.00	44257	44251	44252	44255	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Tacoma 50	NORTHWE	0.32	36.48	13.60	16.24	0.13	14.82	0.01	3.11	41051	41049	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Pearl 500/	NORTHWE	0.24	27.75	13.27	15.95	0.16	17.90	0.05	11.89	40827	40824	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Big Eddy 5	NORTHWE	0.05	6.21	12.84	15.30	0.19	22.01	0.08	19.94	40111	41341	0	0	2	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	McNary 34	NORTHWE	0.36	59.95	18.13	14.49	0.09	14.41	0.02	5.64	40721	41353	0	0	1	Gwye	Gwye	Single Pha	0.76
6	+550 Basel	0	Boardman	NORTHWE	0.34	39.52	13.17	14.23	0.11	13.17	0.00	0.00	43049	43047	0	0	1	Gwye	Delta	Unknown	1.10
6	+550 Basel	0	Chief Josep	NORTHWE	0.07	8.50	11.61	13.79	0.18	20.43	0.08	19.18	40233	40232	0	0	3	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Ponderosa	NORTHWE	0.21	24.05	10.99	13.19	0.12	13.82	0.03	6.64	40837	40838	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Central Fer	NORTHWE	0.23	26.60	11.08	13.14	0.11	13.18	0.02	5.01	40666	40664	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Allston 500	NORTHWE	0.11	12.10	11.04	13.08	0.15	17.16	0.05	13.30	40045	40044	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Little Goos	NORTHWE	0.29	33.02	11.01	13.08	0.10	11.01	0.00	0.00	44217	44211	44212	44215	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	McNary 50	NORTHWE	0.10	10.97	10.74	12.72	0.15	16.88	0.05	13.63	40723	41351	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Hatwai 500	NORTHWE	0.30	34.78	9.69	11.43	0.07	8.07	0.01	3.52	40521	40519	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Big Eddy 5	NORTHWE	0.06	6.60	9.42	11.23	0.14	15.57	0.05	13.37	40111	41343	0	0	5	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Allston 500	NORTHWE	0.08	8.98	9.40	11.14	0.13	14.98	0.05	12.11	40045	40043	0	0	2	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Ponderosa	NORTHWE	0.16	18.08	8.53	10.22	0.09	10.89	0.02	5.49	40834	40836	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Meridian 5	NORTHWE	0.13	14.68	9.01	10.21	0.11	12.52	0.03	7.92	45197	45195	0	0	2	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Meridian 5	NORTHWE	0.13	14.68	9.01	10.21	0.11	12.52	0.03	7.92	45197	45195	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Snohomish	NORTHWE	0.22	35.94	12.15	9.55	0.08	12.67	0.01	2.31	40994	41328	0	0	1	Gwye	Gwye	Single Pha	0.76
6	+550 Basel	0	Keeler 500	NORTHWE	0.18	20.39	7.68	9.19	0.08	9.55	0.03	6.75	40601	40599	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Maple Vall	NORTHWE	0.20	33.69	11.20	8.93	0.07	11.15	0.01	2.23	40691	40692	0	0	1	Gwye	Gwye	Single Pha	0.76
6	+550 Basel	0	Chief Josep	NORTHWE	0.18	29.87	10.77	8.54	0.08	12.57	0.02	3.93	40223	40230	0	0	1	Gwye	Gwye	Single Pha	0.76
6	+550 Basel	0	Chief Josep	NORTHWE	0.17	27.78	10.00	7.93	0.08	12.67	0.03	6.78	40225	40232	0	0	2	Gwye	Gwye	Single Pha	0.76
6	+550 Basel	0	Troutdale	NORTHWE	0.16	17.97	6.60	7.87	0.06	7.13	0.01	1.16	41095	41094	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Round But	NORTHWE	0.09	9.98	6.31	7.54	0.08	9.16	0.03	6.51	43485	43483	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Vantage 50	NORTHWE	0.07	8.14	6.24	7.34	0.08	9.24	0.03	6.53	41113	41111	0	0	2	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Sno-king 5	NORTHWE	0.19	21.71	6.16	7.33	0.05	5.55	0.01	3.43	41007	41006	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Grand Cou	NORTHWE	0.17	19.58	5.79	6.88	0.05	5.16	0.01	1.38	40287	41357	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Monroe 50	NORTHWE	0.06	7.19	5.39	6.42	0.08	9.43	0.04	9.29	40749	40747	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Covington	NORTHWE	0.02	2.55	4.90	5.83	0.08	9.52	0.04	10.19	40306	40304	0	0	5	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Sickler 500	NORTHWE	0.10	11.39	4.71	5.61	0.05	5.55	0.01	2.31	40973	47031	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Rocky Rea	NORTHWE	0.10	16.93	7.06	5.56	0.07	11.15	0.03	7.72	40891	46832	0	0	1	Gwye	Gwye	Single Pha	0.76
6	+550 Basel	0	J.D. Ross 3	NORTHWE	0.06	9.63	6.94	5.38	0.09	14.41	0.05	11.20	40901	40899	0	0	1	Gwye	Gwye	Single Pha	0.76
6	+550 Basel	0	Sacajawea	NORTHWE	0.25	28.62	4.38	5.19	0.03	2.84	0.01	6.76	40913	40911	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Paul 500/1	NORTHWE	0.07	7.45	4.41	5.17	0.04	4.98	0.01	2.50	40821	42806	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Clatsop 23	NORTHWE	0.13	31.96	9.89	5.09	0.04	9.33	0.01	2.38	40243	45314	0	0	1	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Hermiston	NORTHWE	0.11	12.85	4.28	5.09	0.04	4.28	0.00	0.00	47638	47640	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Hermiston	NORTHWE	0.11	12.85	4.28	5.09	0.04	4.28	0.00	0.00	47638	47641	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Hermiston	NORTHWE	0.11	12.85	4.28	5.09	0.04	4.28	0.00	0.00	47638	47639	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Lower Gra	NORTHWE	0.11	12.33	4.11	4.88	0.04	4.11	0.00	0.00	44237	44233	44234	44236	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Maple Vall	NORTHWE	0.08	9.64	4.98	4.41	0.06	6.99	0.02	5.19	40693	40689	0	0	1	Unknown	Unknown	Three Pha	0.83
6	+550 Basel	0	Anaconda	NORTHWE	0.10	23.77	7.92	4.21	0.03	7.92	0.00	0.00	40458	40456	0	0	1	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Vantage 50	NORTHWE	0.05	6.04	3.42	4.02	0.04	4.62	0.01	2.61	41113	41112	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Lower Mor	NORTHWE	0.09	10.11	3.37	4.00	0.03	3.37	0.00	0.00	44257	44253	44254	44256	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Grand Cou	NORTHWE	0.09	10.03	3.34	3.97	0.03	3.34	0.00	0.00	41742	40296	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Grand Cou	NORTHWE	0.09	10.03	3.34	3.97	0.03	3.34	0.00	0.00	41744	40298	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Grand Cou	NORTHWE	0.09	10.03	3.34	3.97	0.03	3.34	0.00	0.00	41743	40297	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Mcloughlin	NORTHWE	0.14	34.49	13.28	3.80	0.06	15.16	0.01	4.97	43314	43309	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Pearl 500/	NORTHWE	0.21	24.73	6.62	3.61	0.05	5.95	0.02	5.20	40827	40826	0	0	2	Unknown	Unknown	Core, Thre	0.50
6	+550 Basel	0	Grand Cou	NORTHWE	0.08	8.63	2.88	3.42	0.03	2.88	0.00	0.00	41741	40295	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Grand Cou	NORTHWE	0.08	8.63	2.88	3.42	0.03	2.88	0.00	0.00	41740	40293	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Grand Cou	NORTHWE	0.08	8.63	2.88	3.42	0.03	2.88	0.00	0.00	41739	40291	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Napavine 5	NORTHWE	0.08	8.97	2.99	3.36	0.03	2.99	0.00	0.00	40774	47584	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Fairview 2	NORTHWE	0.07	16.78	6.30	3.30	0.03	7.44	0.01	3.83	40409	40407	0	0	1	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	South Bren	NORTHWE	0.21	52.27	11.54	3.26	0.02	5.66	0.02	11.76	42900	42901	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Centralia S	NORTHWE	0.07	8.22	2.74	3.25	0.02	2.74	0.00	0.00	47745	47744	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Aberdeen	NORTHWE	0.20	50.86	13.14	3.14	0.04	9.32	0.02	7.63	40011	40007	0	0	5	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Goshen 34	PACE	0.04	7.05	7.42	3.14	0.08	12.64	0.03	11.25	65665	65670	65685	98535	2	Unknown	Unknown	Unknown	0.41
6	+550 Basel	0	Goshen 34	PACE	0.04	7.05	7.42	3.14	0.08	12.64	0.03	11.25	65665	65670	65680	98534	1	Unknown	Unknown	Unknown	0.41
6	+550 Basel	0	Novelty 23	NORTHWE	0.19	48.82	10.93	3.11	0.04	10.10	0.03	16.10	42304	42305	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Centralia S	NORTHWE	0.07	7.79	2.60	3.09	0.02	2.60	0.00	0.00	47741	47740	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Little Goos	NORTHWE	0.07	7.76	2.59	3.07	0.02	2.59	0.00	0.00	44217	44213	44214	44216	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Ross Dam	NORTHWE	0.07	17.37	5.79	3.07	0.02	5.79	0.00	0.00	46461	46439	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Ross Dam	NORTHWE	0.07	17.30	5.77	3.05	0.02	5.77	0.00	0.00	46460	46441	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Boardman	NORTHWE	0.12	29.04	10.68	3.00	0.05	11.69	0.00	2.11	40129	40127	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Salem 230,	NORTHWE	0.15	38.06	9.92	2.85	0.03	7.49	0.01	5.88	40923	40921	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Napavine 5	NORTHWE	0.07	7.53	2.51	2.78	0.02	2.51	0.00	0.00	40774	47583	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Napavine 5	NORTHWE	0.07	7.53	2.51	2.78	0.02	2.51	0.00	0.00	40774	47582	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	COB Energ	NORTHWE	0.06	6.73	2.24	2.69	0.02	2.24	0.00	0.00	45262	45452	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	East Omak	NORTHWE	0.16	40.09	11.01	2.63	0.04	9.05	0.01	5.59	40373	40371	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	John Day P	NORTHWE	0.09	10.47	2.13	2.54	0.06	6.92	0.04	10.41	40585	40584	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Alvey 500/	NORTHWE	0.12	13.49	2.07	2.46	0.00	0.00	0.02	4.50	40051	40049	0	0	5	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Carlton 23	NORTHWE	0.14	35.32	10.33	2.46	0.04	8.89	0.01	3.40	40181	40179	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Covington	NORTHWE	0.03	2.97	4.45	2.41	0.08	8.69	0.04	9.40	40302	40303	0	0	4	Unknown	Unknown	Core, Thre	0.50
6	+550 Basel	0	Midway 23	NORTHWE	0.03	8.32	4.55	2.35	0.03	6.38	0.01	3.74	41347	40733	0	0	1	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Olympia 3	NORTHWE	0.02	4.10	3.40	2.34	0.05	10.17	0.04	8.91	40795	40793	0	0	1	Gwye	Gwye	Single Pha	0.66
6	+550 Basel	0	Shelton 23	NORTHWE	0.15	37.55	9.70	2.33	0.03	7.02	0.01	5.95	40971	40969	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	COB Energ	NORTHWE	0.05	5.65	1.88	2.25	0.02	1.88	0.00	0.00	45262	45451	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	COB Energ	NORTHWE	0.05	5.65	1.88	2.25	0.02	1.88	0.00	0.00	45262	45450	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Kittitas Val	NORTHWE	0.09	23.71	7.90	2.19	0.03	7.90	0.00	0.00	44276	44277	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bethel (PG	NORTHWE	0.05	12.50	7.55	2.17	0.04	10.92	0.01	6.76	43039	43037	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	St. Johns 2	NORTHWE	0.04	11.16	4.03	2.09	0.02	4.41	0.00	1.01	41021	41019	0	0	1	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Franklin 23	NORTHWE	0.06	13.79	5.43	2.05	0.04	8.82	0.02	8.93	40443	40440	0	0	1	Gwye	Gwye	Three Pha	0.38
6	+550 Basel	0	Tillamook	NORTHWE	0.12	30.66	8.30	1.99	0.03	6.48	0.01	4.51	41075	41073	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Rogue 230	NORTHWE	0.13	33.72	8.13	1.95	0.02	5.02	0.01	6.22	40895	40893	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Chemawa	NORTHWE	0.05	12.45	7.94	1.92	0.05	11.73	0.02	7.79	40213	40211	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Kitsap 230,	NORTHWE	0.04	10.33	4.65	1.87	0.02	5.89	0.01	2.51	40613	40611	0	0	1	Gwye	Gwye	Three Pha	0.38
6	+550 Basel	0	Gorge (SCL	NORTHWE	0.04	10.99	3.66	1.85	0.02	3.66	0.00	0.00	46431	46429	0	0	13	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Aberdeen	NORTHWE	0.08	39.29	13.10	1.85	0.03	13.10	0.00	0.00	40007	46792	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Garrison 5	NORTHWE	0.09	9.95	1.53	1.81	0.00	0.00	0.01	3.32	40459	40457	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Grays Harb	NORTHWE	0.07	18.66	6.22	1.79	0.03	6.22	0.00	0.00	47595	47596	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grays Harb	NORTHWE	0.07	18.66	6.22	1.79	0.03	6.22	0.00	0.00	47595	47598	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grays Harb	NORTHWE	0.07	18.66	6.22	1.79	0.03	6.22	0.00	0.00	47595	47597	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Tahkenitch	NORTHWE	0.09	22.46	7.41	1.78	0.03	7.34	0.00	1.32	41061	41059	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Snohomish	NORTHWE	0.00	0.74	4.12	1.76	0.08	12.57	0.05	12.67	40993	41329	0	0	1	Unknown	Unknown	Unknown	0.41
6	+550 Basel	0	Chehalis 2	NORTHWE	0.04	10.02	3.34	1.76	0.01	3.34	0.00	0.00	40207	40205	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Coyote Spr	NORTHWE	0.04	4.40	1.47	1.74	0.01	1.47	0.00	0.00	43123	48516	48518	48519	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Chief Josep	NORTHWE	0.04	4.31	1.44	1.71	0.01	1.44	0.00	0.00	44166	44149	44150	44159	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Chief Josep	NORTHWE	0.04	4.20	1.40	1.66	0.01	1.40	0.00	0.00	44167	44151	44152	44160	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Blue Lake 2	NORTHWE	0.05	13.62	5.63	1.62	0.03	7.93	0.01	6.30	43685	43684	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Chief Josep	NORTHWE	0.04	4.05	1.35	1.60	0.01	1.35	0.00	0.00	44167	44153	44154	44161	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Wind Ridge	NORTHWE	0.07	16.39	5.46	1.58	0.02	5.46	0.00	0.00	42361	42362	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Albany 230	NORTHWE	0.08	20.30	6.79	1.55	0.03	6.93	0.00	1.82	40027	40025	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Eastpine 2	NORTHWE	0.04	9.83	5.44	1.53	0.04	10.16	0.02	10.51	46427	46425	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	N. Lewisto	NORTHWE	0.05	12.85	5.15	1.47	0.03	7.26	0.01	6.09	48255	48253	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Custer 500	NORTHWE	0.11	12.24	1.27	1.47	0.04	4.31	0.03	8.04	40323	40322	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Custer 500	NORTHWE	0.11	12.34	1.27	1.47	0.04	4.26	0.03	8.02	40323	40321	0	0	2	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Paul 115/1	NORTHWE	0.06	29.73	9.91	1.46	0.01	2.50	0.03	12.41	42806	42807	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Lane 230/1	NORTHWE	0.06	15.07	3.66	1.45	0.01	2.91	0.01	3.72	40627	40625	0	0	1	Gwye	Gwye	Three Pha	0.38
6	+550 Basel	0	Chemawa	NORTHWE	0.03	16.88	5.63	1.44	0.01	5.63	0.00	0.00	40211	40209	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	White Rive	NORTHWE	0.03	6.74	3.62	1.44	0.02	5.41	0.01	4.10	42700	42701	0	0	1	Gwye	Gwye	Three Pha	0.38
6	+550 Basel	0	Beacon (Sp	NORTHWE	0.06	15.91	5.08	1.43	0.02	4.85	0.00	0.84	48031	48029	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Toledo 230	NORTHWE	0.06	15.05	5.02	1.43	0.02	5.02	0.00	0.00	41083	41081	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Beaver 230	NORTHWE	0.06	15.31	5.10	1.41	0.02	5.10	0.00	0.00	43021	43017	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	COB Energ	NORTHWE	0.03	3.50	1.17	1.40	0.01	1.17	0.00	0.00	45262	47660	0	0	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Beacon (Sp	NORTHWE	0.06	15.53	4.95	1.40	0.02	4.72	0.00	0.84	48025	48023	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Hot Spring	NORTHWE	0.07	7.54	1.16	1.38	0.00	0.00	0.01	2.52	40553	40551	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Port Angel	NORTHWE	0.05	12.92	4.86	1.37	0.02	5.10	0.00	0.79	40839	40841	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bethel (PG	NORTHWE	0.03	8.04	4.86	1.37	0.03	7.03	0.01	4.35	43039	43037	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Chehalis 2	NORTHWE	0.05	13.23	4.79	1.37	0.02	4.95	0.00	0.54	40207	40203	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Munro BPA	NORTHWE	0.04	10.37	4.79	1.35	0.02	6.13	0.01	2.75	48463	48461	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Mossyrock	NORTHWE	0.03	7.59	2.53	1.35	0.01	2.53	0.00	0.00	46629	46628	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Mossyrock	NORTHWE	0.03	7.50	2.50	1.33	0.01	2.50	0.00	0.00	46629	46627	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Caldwell 2	IDAHO	0.04	9.15	3.48	1.33	0.02	4.12	0.00	1.07	60110	60105	0	0	2	Gwye	Gwye	Three Pha	0.38
6	+550 Basel	0	Gorge (SCL	NORTHWE	0.03	7.83	2.61	1.32	0.01	2.61	0.00	0.00	46431	46430	0	0	4	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Cowlitz 23	NORTHWE	0.11	26.91	9.49	1.32	0.04	10.00	0.00	2.14	46609	46607	0	0	8	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Cowlitz 23	NORTHWE	0.11	26.55	9.39	1.30	0.04	9.93	0.00	2.14	46609	46607	0	0	9	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Aberdeen	NORTHWE	0.06	15.31	5.44	1.30	0.02	5.78	0.00	0.70	40009	40007	0	0	4	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	White Rive	NORTHWE	0.04	10.31	4.39	1.27	0.02	5.96	0.01	4.20	42700	42701	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Diablo 230	NORTHWE	0.03	7.38	2.46	1.25	0.01	2.46	0.00	0.00	46421	46420	0	0	2	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Diablo 230	NORTHWE	0.03	7.38	2.46	1.25	0.01	2.46	0.00	0.00	46421	46419	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Lone Pine	NORTHWE	0.04	9.08	4.28	1.24	0.02	5.58	0.01	2.74	45183	45181	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Benton 23	NORTHWE	0.04	9.50	5.45	1.23	0.04	8.97	0.02	7.91	40099	40097	0	0	1	Gwye	Gwye	Core, Thre	0.23

0	Dayton 11!	NORTHWE	0.042	20.967	7.899	1.103	0.018	8.912	0.002	2.279	43139	43137	0	0	1	Gwye	Gwye	Unknown	0.14
0	Larson 230	NORTHWE	0.042	10.643	2.297	0.632	0.006	1.403	0.006	2.801	46151	46039	0	0	1	Unknown	Unknown	Unknown	0.28
0	Goshen 34	PACE	0.042	7.045	7.424	3.121	0.076	12.640	0.031	11.246	65665	65670	65685	98535	2	Unknown	Unknown	Unknown	0.41
0	Goshen 34	PACE	0.042	7.045	7.424	3.121	0.076	12.640	0.031	11.246	65665	65670	65680	98534	1	Unknown	Unknown	Unknown	0.41
0	Lower Bak	NORTHWE	0.041	20.563	6.854	0.960	0.014	6.854	0.000	0.000	42108	42121	0	0	1	Gwye	Delta	Unknown	0.14
0	Munro BPA	NORTHWE	0.041	10.371	4.785	1.352	0.024	6.129	0.005	2.750	48463	48461	0	0	2	Unknown	Unknown	Unknown	0.28
0	Kitsap 230/	NORTHWE	0.041	10.332	4.651	1.869	0.023	5.888	0.005	2.509	40613	40611	0	0	1	Gwye	Gwye	Three Phas	0.38
0	White Rive	NORTHWE	0.041	10.308	4.387	1.264	0.024	5.964	0.008	4.202	42700	42701	0	0	2	Gwye	Gwye	Unknown	0.28
0	Port Angel	NORTHWE	0.041	10.296	5.220	1.212	0.029	7.212	0.009	4.490	40845	40843	0	0	3	Unknown	Unknown	Core, Thre	0.23
0	Pelton 230	NORTHWE	0.041	10.219	3.406	0.978	0.014	3.406	0.000	0.000	43409	43407	0	0	1	Gwye	Delta	Unknown	0.28
0	Bonneville	NORTHWE	0.041	10.195	3.398	0.814	0.014	3.398	0.000	0.000	44016	44006	44007	44012	1	Gwye	Delta	Core, Thre	0.23
0	Bonneville	NORTHWE	0.041	10.195	3.398	0.813	0.014	3.398	0.000	0.000	44017	44008	44009	44013	1	Gwye	Delta	Core, Thre	0.23
0	Wells (DOF	NORTHWE	0.040	10.112	3.371	0.468	0.013	3.371	0.000	0.000	47100	47105	0	0	T2	Gwye	Delta	3-Legged C	0.13
0	Wells (DOF	NORTHWE	0.040	10.112	3.371	0.468	0.013	3.371	0.000	0.000	47100	47104	0	0	T1	Gwye	Delta	3-Legged C	0.13
0	Wells (DOF	NORTHWE	0.040	10.108	3.369	0.467	0.013	3.369	0.000	0.000	47102	47108	0	0	T5	Gwye	Delta	3-Legged C	0.13
0	Wells (DOF	NORTHWE	0.040	10.108	3.369	0.467	0.013	3.369	0.000	0.000	47102	47107	0	0	T4	Gwye	Delta	3-Legged C	0.13
0	Wells (DOF	NORTHWE	0.040	10.108	3.369	0.467	0.013	3.369	0.000	0.000	47102	47106	0	0	T3	Gwye	Delta	3-Legged C	0.13
0	Union Gap	NORTHWE	0.040	10.042	2.934	0.803	0.010	2.524	0.002	0.830	45317	45315	0	0	2	Gwye	Gwye	Unknown	0.28
0	Warner 23	NORTHWE	0.040	10.041	3.490	0.837	0.019	4.857	0.009	4.587	41135	41136	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Chehalis 2	NORTHWE	0.040	10.015	3.338	1.758	0.013	3.338	0.000	0.000	40207	40205	0	0	1	Gwye	Delta	Single Phas	0.51
0	Bowmont 2	IDAHO	0.040	9.921	1.733	0.232	0.003	0.628	0.009	3.936	60064	60065	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Eastpine 2	NORTHWE	0.039	9.833	5.438	1.532	0.040	10.159	0.021	10.509	46427	46425	0	0	1	Gwye	Gwye	Unknown	0.28
0	Wendson 2	NORTHWE	0.039	9.718	3.002	1.185	0.012	3.029	0.004	1.808	41141	41139	0	0	1	Gwye	Gwye	Three Phas	0.38
0	Chehalis 2	NORTHWE	0.038	9.619	3.483	0.993	0.014	3.601	0.000	0.395	40207	40203	0	0	2	Unknown	Unknown	Unknown	0.28
0	Benton 23	NORTHWE	0.038	9.509	5.449	1.231	0.036	8.968	0.016	7.904	40099	40097	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Longview 2	NORTHWE	0.038	9.481	2.658	0.633	0.018	4.462	0.011	5.572	40671	40669	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Windy Poir	NORTHWE	0.038	9.479	3.160	0.917	0.013	3.160	0.000	0.000	47823	47825	0	0	1	Unknown	Unknown	Unknown	0.28
0	Windy Poir	NORTHWE	0.038	9.461	3.154	0.915	0.013	3.154	0.000	0.000	47824	47826	0	0	1	Unknown	Unknown	Unknown	0.28
0	Coyote Spr	NORTHWE	0.038	4.418	1.473	1.750	0.013	1.473	0.000	0.000	43123	48516	48518	48519	1	Unknown	Unknown	Unknown	1.10
0	Sulphur 23	NORTHWE	0.037	9.408	3.136	0.871	0.012	3.136	0.000	0.000	41291	45497	0	0	1	Gwye	Delta	Unknown	0.28
0	Carver 230	NORTHWE	0.037	9.402	2.529	0.728	0.017	4.160	0.011	5.358	43089	43087	0	0	1	Gwye	Gwye	Unknown	0.28
0	Rathdrum	NORTHWE	0.037	9.303	3.149	0.883	0.013	3.266	0.002	1.016	48357	48356	0	0	1	Gwye	Gwye	Unknown	0.28
0	Chiloquin 2	NORTHWE	0.037	9.236	2.019	0.574	0.005	1.257	0.005	2.387	45047	45045	0	0	1	Gwye	Gwye	Unknown	0.28
0	Caldwell 2	IDAHO	0.037	9.186	3.489	1.331	0.016	4.129	0.003	1.067	60110	60105	0	0	2	Gwye	Gwye	Three Phas	0.38
0	Chief Josep	NORTHWE	0.037	4.307	1.436	1.705	0.012	1.436	0.000	0.000	44166	44149	44150	44159	1	Gwye	Delta	Single Phas	1.10
0	Bonneville	PACE	0.036	12.772	4.257	0.829	0.012	4.257	0.000	0.000	65195	65196	0	0	1	Unknown	Unknown	Unknown	0.19
0	Berrydale 2	NORTHWE	0.036	9.088	1.029	0.297	0.014	3.433	0.012	6.145	42507	42508	0	0	1	Gwye	Gwye	Unknown	0.28
0	Lone Pine 2	NORTHWE	0.036	9.083	4.282	1.238	0.022	5.576	0.005	2.742	45183	45181	0	0	1	Gwye	Gwye	Unknown	0.28
0	Custer 230	NORTHWE	0.036	9.054	2.320	0.663	0.019	4.674	0.013	6.353	40322	42001	0	0	1	Gwye	Gwye	Unknown	0.28
0	Ponderosa	NORTHWE	0.036	9.021	3.079	0.885	0.013	3.150	0.000	0.191	40838	45247	0	0	1	Gwye	Gwye	Unknown	0.28
0	Beaver 230	NORTHWE	0.036	8.960	2.987	0.824	0.012	2.987	0.000	0.000	43021	43019	0	0	1	Gwye	Delta	Unknown	0.28
0	Chief Josep	NORTHWE	0.036	4.204	1.401	1.664	0.012	1.401	0.000	0.000	44167	44151	44152	44160	1	Gwye	Delta	Single Phas	1.10
0	Locust 230	IDAHO	0.035	8.827	1.408	0.189	0.009	2.150	0.011	4.617	60207	61254	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Lexington 2	NORTHWE	0.035	8.784	3.444	0.817	0.016	4.053	0.003	1.419	40651	40649	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Dry Gulch 2	NORTHWE	0.035	8.770	1.954	0.557	0.009	2.374	0.007	3.505	48512	48510	0	0	1	Gwye	Gwye	Unknown	0.28
0	Lone Pine 2	NORTHWE	0.035	8.729	4.115	1.190	0.021	5.359	0.005	2.636	45183	45181	0	0	2	Gwye	Gwye	Unknown	0.28
0	Rocky Ford	NORTHWE	0.035	8.709	2.031	0.561	0.009	2.346	0.007	3.374	46156	46155	0	0	1	Unknown	Unknown	Unknown	0.28
0	Amalgamat	IDAHO	0.035	8.695	3.395	0.454	0.016	4.141	0.003	1.260	61829	60255	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Chief Josep	NORTHWE	0.035	4.052	1.351	1.604	0.012	1.351	0.000	0.000	44167	44153	44154	44161	1	Gwye	Delta	Single Phas	1.10
0	Chemawa 1	NORTHWE	0.034	16.882	5.627	1.444	0.011	5.627	0.000	0.000	40211	40209	0	0	1	Gwye	Delta	Single Phas	0.25
0	Munro BPA	NORTHWE	0.034	8.593	3.965	1.120	0.020	5.078	0.005	2.279	48463	48461	0	0	1	Unknown	Unknown	Unknown	0.28
0	Usk 230/11	NORTHWE	0.034	8.580	2.671	0.743	0.013	3.325	0.006	3.115	47091	47254	0	0	1	Unknown	Unknown	Unknown	0.28
0	Big Horn W	NORTHWE	0.034	8.568	2.856	0.786	0.011	2.856	0.000	0.000	47819	47821	0	0	1	Unknown	Unknown	Unknown	0.28
0	Big Horn W	NORTHWE	0.034	8.568	2.856	0.786	0.011	2.856	0.000	0.000	47819	47820	0	0	1	Unknown	Unknown	Unknown	0.28
0	Walla Wall	NORTHWE	0.034	8.566	2.855	0.789	0.011	2.855	0.000	0.000	45327	45325	0	0	2	Gwye	Delta	Unknown	0.28
0	Lolo 230/1	NORTHWE	0.034	8.549	2.437	0.690	0.008	2.104	0.002	1.018	48197	48195	0	0	1	Gwye	Gwye	Unknown	0.28
0	Southwest	NORTHWE	0.034	8.516	3.382	0.970	0.016	3.925	0.002	1.250	46645	46643	0	0	2	Gwye	Gwye	Unknown	0.28
0	Dodge Junc	NORTHWE	0.034	8.504	2.853	0.792	0.011	2.856	0.000	0.022	42991	42992	0	0	1	Gwye	Gwye	Unknown	0.28
0	Ponderosa	NORTHWE	0.034	8.491	2.888	0.815	0.012	2.945	0.000	0.143	40836	45247	0	0	2	Unknown	Unknown	Unknown	0.28
0	Danskin W	IDAHO	0.034	8.414	3.831	0.523	0.027	6.794	0.014	5.951	60394	60390	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	La Grande	NORTHWE	0.033	16.763	5.588	0.796	0.011	5.588	0.000	0.000	46734	46733	0	0	1	Gwye	Delta	Unknown	0.14
0	Juniper 230	NORTHWE	0.033	8.408	2.803	0.815	0.011	2.803	0.000	0.000	47386	47387	0	0	1	Unknown	Unknown	Unknown	0.28
0	Boundary 2	NORTHWE	0.033	8.373	0.078	0.022	0.010	2.635	0.011	5.425	40145	40143	0	0	1	Unknown	Unknown	Unknown	0.28
0	Chenoweth	NORTHWE	0.033	8.347	3.146	0.753	0.014	3.510	0.002	0.765	40219	40217	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Midway 23	NORTHWE	0.033	8.342	4.557	2.357	0.025	6.385	0.007	3.744	41347	40733	0	0	1	Gwye	Gwye	Single Phas	0.51
0	Canyon Rd	NORTHWE	0.033	8.260	5.257	0.729	0.032	7.966	0.011	5.668	46633	46632	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Murray 230	NORTHWE	0.033	8.192	0.651	0.090	0.015	3.711	0.013	6.353	40767	40765	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Kitsap 230/	NORTHWE	0.032	8.148	4.413	1.074	0.024	6.140	0.007	3.475	40615	40612	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Cabinet Go	NORTHWE	0.032	8.110	2.703	0.765	0.011	2.703	0.000	0.000	48059	48063	0	0	1	Unknown	Unknown	Unknown	0.28
0	Alvey 230/	NORTHWE	0.032	8.072	1.850	0.968	0.004	1.029	0.003	1.705	40049	40047	0	0	3	Gwye	Gwye	Single Phas	0.51
0	Bethel (PG	NORTHWE	0.032	8.042	4.856	1.364	0.028	7.030	0.009	4.350	43039	43037	0	0	1	Gwye	Gwye	Unknown	0.28
0	Walla Wall	NORTHWE	0.032	8.042	2.681	0.741	0.011	2.681	0.000	0.000	45327	45325	0	0	1	Gwye	Delta	Unknown	0.28
0	Grand Cou	NORTHWE	0.032	7.950	2.650	0.763	0.011	2.650	0.000	0.000	40280	40278	0	0	1	Unknown	Unknown	Unknown	0.28
0	Talbot 230	NORTHWE	0.032	7.946	1.564	0.451	0.005	1.176	0.005	2.624	42500	42511	0	0	2	Gwye	Gwye	Unknown	0.28
0	Gorge (SCL	NORTHWE	0.031	7.830	2.610	1.321	0.010	2.610	0.000	0.000	46431	46430	0	0	4	Gwye	Delta	Single Phas	0.51
0	Pamona He	NORTHWE	0.031	7.763	2.882	0.793	0.013	3.176	0.001	0.610	45245	45243	0	0	1	Gwye	Gwye	Unknown	0.28
0	Martin Cre	NORTHWE	0.031	7.758	2.744	0.653	0.012	2.902	0.001	0.316	40705	40703	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	March Poir	NORTHWE	0.031	7.737	2.946	0.849	0.013	3.314	0.002	1.015	42104	42107	0	0	1	Gwye	Gwye	Unknown	0.28
0	O'Brien 230	NORTHWE	0.031	7.722	1.911	0.550	0.007	1.801	0.004	2.234	42503	42514	0	0	2	Gwye	Gwye	Unknown	0.28
0	Sherwood	NORTHWE	0.031	7.685	1.543	0.441	0.012	3.101	0.010	4.801	43527	43525	0	0	1	Gwye	Gwye	Unknown	0.28
0	LaGrande 2	NORTHWE	0.031	7.661	2.554	0.712	0.010	2.554	0.000	0.000	40621	40620	0	0	1	Unknown	Unknown	Unknown	0.28
0	Whitehorn	NORTHWE	0.030	15.183	5.061	0.708	0.010	5.061	0.000	0.000	42040	42042	0	0	1	Gwye	Delta	Unknown	0.14
0	Mossyrock	NORTHWE	0.030	7.590	2.530	1.349	0.010	2.530	0.000	0.000	46629	46628	0	0	1	Gwye	Delta	Single Phas	0.51
0	Isthmus 23	NORTHWE	0.030	7.558	2.519	0.717	0.010	2.520	0.000	0.000	45153	45151	0	0	1	Gwye	Gwye	Unknown	0.28
0	Hanna 230	NORTHWE	0.030	7.532	2.179	0.626	0.008	1.961	0.002	1.042	44995	44994	0	0	1	Gwye	Gwye	Unknown	0.28
0	Canby 2 23	NORTHWE	0.030	7.511	2.504	0.717	0.010	2.504	0.000	0.000	40169	40167	0	0	1	Unknown	Unknown	Unknown	0.28
0	Cabinet Go	NORTHWE	0.030	7.508	2.808	0.794	0.014	3.405	0.004	2.006	48059	48057	0	0	1	Unknown	Unknown	Unknown	0.28
0	Phalen Gul	NORTHWE	0.030	7.507	2.515	0.701	0.010	2.518	0.000	0.015	42987	42988	0	0	1	Gwye	Gwye	Unknown	0.28
0	Mossyrock	NORTHWE	0.030	7.499	2.500	1.333	0.010	2.500	0.000	0.000	46629	46627	0	0	1	Gwye	Delta	Single Phas	0.51
0	Troutdale 2	NORTHWE	0.030	7.470	0.747	0.214	0.000	0.000	0.003	2.490	45301	45297	0	0	1	Delta	Gwye	Unknown	0.28
0	COB Energ	NORTHWE	0.030	3.500	1.167	1.397	0.010	1.167	0.000	0.000	45262	47660	0	0	1	Unknown	Unknown	Unknown	1.10
0	Whitehorn	NORTHWE	0.029	14.788	4.929	0.690	0.010	4.929	0.000	0.000	42040	42043	0	0	1	Gwye	Delta	Unknown	0.14
0	Applegate	NORTHWE	0.029	14.310	4.770	0.654	0.010	4.770	0.000	0.000	45009	45374	0	0	1	Gwye	Gwye	Unknown	0.14
0	Swan Valle	PACE	0.029	10.455	3.640	0.601	0.011	4.029	0.002	0.843	66465	66470	0	0	1	Gwye	Gwye	Core, Thre	0.16
0	Diablo 230	NORTHWE	0.029	7.384	2.461	1.251	0.010	2.461	0.000	0.000	46421	46420	0	0	2	Gwye	Delta	Single Phas	0.51
0	Diablo 230	NORTHWE	0.029	7.384	2.461	1.245	0.010	2.461	0.000	0.000	46421	46419	0	0	1	Gwye	Delta	Single Phas	0.51
0	Horse Hea	NORTHWE	0.029	7.228	2.409	0.577	0.010	2.409	0.000	0.000	40549	40547	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Keeler 230	NORTHWE	0.028	7.154	2.059	0.490	0.008	1.961	0.003	1.418	40599	40597	0	0	2	Gwye	Gwye	Core, Thre	0.23
0	Grand Cou	NORTHWE	0.028	7.153	2.384	0.687	0.009	2.384	0.000	0.000	41752	41726	0	0	1	Unknown	Unknown	Unknown	0.28
0	Lost River 2	PACE	0.028	7.102	2.367	0.646	0.009	2.367	0.000	0.000	65910	65911	0	0	1	Unknown	Unknown	Unknown	0.28
0	Rivergate 2	NORTHWE	0.028	7.024	2.338	0.659	0.013	3.308	0.007	3.335	43459	43461	0	0	1	Gwye	Gwye	Unknown	0.28
0	Linden 230	NORTHWE	0.028	6.965	2.322	0.668	0.009	2.322	0.000	0.000	47381	47382	0	0	1	Unknown	Unknown	Unknown	0.28
0	Cascade 23	NORTHWE	0.028	6.956	2.319	0.663	0.009	2.319	0.000	0.000	42312	42315	42313	42314	1	Gwye	Gwye	Unknown	0.28
0	St. Marys 2	NORTHWE	0.028	6.928	2.051	0.590	0.008	2.050	0.003	1.547	43541	43553	0	0	1	Gwye	Gwye	Unknown	0.28
0	Cabinet Go	NORTHWE	0.027	6.862	2.287	0.647	0.009	2.287	0.000	0.000	48059	48061	0	0	1	Unknown	Unknown	Unknown	0.28
0	Pamona He	NORTHWE	0.027	6.773	2.514	0.692	0.011	2.771	0.001	0.532	45245	45243	0	0	2	Gwye	Gwye	Unknown	0.28
0	White Rive	NORTHWE	0.027	6.743	3.619	1.434	0.022	5.409	0.008	4.095	42700	42701	0	0	1	Gwye	Gwye	Three Phas	0.38
0	Tacoma 23	NORTHWE	0.027	6.680	2.227	0.639	0.009	2.227	0.000	0.000	41049	41262	0	0	4	Unknown	Unknown	Unknown	0.28
0	Lopez Islan	NORTHWE	0.026	13.057	4.352	1.126	0.009	4.352	0.000	0.000	41235	41234	0	0	4	Gwye	Delta	Single Phas	0.25
0	Big Grassy	PACE	0.026	9.447	3.149	0.569	0.009	3.149	0.000	0.000	65155	65156	0	0	1	Unknown	Unknown	Unknown	0.19
0	Tacoma 23	NORTHWE	0.026	6.627	2.209	0.634	0.009	2.209	0.000	0.000	41049	41261	0	0	3	Unknown	Unknown	Unknown	0.28
0	Boulder Pa	NORTHWE	0.026	6.580	0.734	0.206	0.008	1.938	0.008	3.851	48524	48520	0	0	1	Gwye	Gwye	Unknown	0.28
0	Grand Cou	NORTHWE	0.026	6.479	2.160	0.622	0.009	2.160	0.000	0.000	41751	41723	0	0	1	Unknown	Unknown	Unknown	0.28
0	Noxon Rap	NORTHWE	0.026	6.448	2.149	0.610	0.009	2.149	0.000	0.000	48281	48285	0	0	1	Unknown	Unknown	Unknown	0.28
0	The Saddle	NORTHWE	0.026	6.414	2.138	0.597	0.009	2.138	0.000	0.000	47851	47852	0	0	1	Unknown	Unknown	Unknown	0.28
0	Troutdale 2	NORTHWE	0.026	6.403	2.134	0.606	0.009	2.134	0.000	0.000	45303	45299	0	0	1	Gwye	Delta	Unknown	0.28
0	Olympia 50	NORTHWE	0.026	3.047	14.351	17.094	0.228	26.301	0.104	26.229	40797	40794	0	0	1	Gwye	Gwye	Single Phas	1.10
0	Covington	NORTHWE	0.026	2.969	4.449	2.406	0.075	8.684	0.037	9.395	40302	40303	0	0	4	Unknown	Unknown	Core, Thre	0.50
0	Bald Moun	NORTHWE	0.025	12.421	4.141	0.468	0.008	4.141	0.000	0.001	41184	41185	0	0	1	Unknown	Unknown	Core, Thre	0.12
0	Parish Gap	NORTHWE	0.025	6.384	1.659	0.462	0.006	1.548	0.001	1.201	45588	45589	0	0	1	Gwye	Gwye	Unknown	0.28
0	Fry 230/11	NORTHWE	0.025	6.350	1.786	0.496	0.008	1.899	0.004	1.879	45111	45109	0	0	2	Gwye	Gwye	Unknown	0.28
0	Pilot Butte	NORTHWE	0.025	6.333	2.111	0.600	0.008	2.111	0.000	0.000	45239	45441	0	0	1	Gwye	Delta	Unknown	0.28
0	Grand Cou	NORTHWE	0.025	6.308	2.103	0.606	0.008	2.103	0.000	0.000	41752	41729	0	0	1	Unknown	Unknown	Unknown	0.28
0	Benewah 2	NORTHWE	0.025	6.304	1.999	0.566	0.008	1.968	0.001	0.688	48037	48035	0	0	1	Unknown	Unknown	Unknown	0.28
0	Boulder Pa	NORTHWE	0.025	6.216	0.702	0.197	0.007	1.834	0.007	3.633	48524	48522	0	0	2	Gwye	Gwye	Unknown	0.28
0	Bell 230/11	NORTHWE	0.025	6.202	2.625	0.621	0.017	4.278	0.008	4.164	40088	40087	0	0	1	Unknown	Unknown	Core, Thre	0.23
0	Bothell 230	NORTHWE	0.025	6.187	3.941	1.127	0.029	7.226	0.014	7.116	46403	46401	0	0	1	Gwye	Gwye	Unknown	0.28
0	Bothell 230	NORTHWE	0.025	6.172	3.949	1.129	0.029	7.246	0.014	7.133	46403	46401	0	0	4	Gwye	Gwye	Unknown	0.28
0	Walla Wall	NORTHWE	0.024	12.125	4.042	0.483	0.008	4.042	0.000	0.000	41131	41129	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Pine Creek	NORTHWE	0.024	11.813	3.938	0.522	0.004	1.771	0.010	5.149	48316	48315	0	0	1	Unknown	Unknown	Unknown	0.14
0	Redmond 2	NORTHWE	0.024	6.131	2.411	0.684	0.011	2.851	0.002	1.053	40876	40873	0	0	1	Unknown	Unknown	Unknown	0.28
0	St. Marys 2	NORTHWE	0.024	6.126	1.412	0.406	0.017	4.230	0.012	6.038	43541	43555	0	0	1	Gwye	Gwye	Unknown	0.28
0	Schnebly 2	NORTHWE	0.024	6.104	2.361	0.679	0.010	2.419	0.000	0.384	42374	42375	0	0	1	Unknown	Unknown	Unknown	0.28
0	Green Vall	NORTHWE	0.024	6.095	2.032	0.578	0.008	2.032	0.000	0.000	40487	41209	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.024	6.051	2.017	0.581	0.008	2.017	0.000	0.000	41751	41722	0	0	1	Unknown	Unknown	Unknown	0.28
0	Mont. 230/	NORTHWE	0.024	6.035	2.012	0.578	0.008	2.012	0.000	0.000	47398	47399	0	0	1	Unknown	Unknown	Unknown	0.28
0	Juniper 230	NORTHWE	0.024	5.998	1.999	0.574	0.008	1.999	0.000	0.000	47390	47391	0	0	1	Unknown	Unknown	Unknown	0.28
0	Pilot Butte	NORTHWE	0.024	5.981	1.994	0.567	0.008	1.994	0.000	0.000	45239	45441	0	0	3	Gwye	Delta	Unknown	0.28
0	Pilot Butte	NORTHWE	0.024	5.981	1.994	0.567	0.008	1.994	0.000	0.000	45239	45441	0	0	2	Gwye	Delta	Unknown	0.28
0	Libby - PAC	NORTHWE	0.024	5.980	1.993	0.477	0.008	1.993	0.000	0.000	44200	44191	44192	44197	1	Gwye	Delta	Core, Thre	0.23
0	Sammamis	NORTHWE	0.024	5.947	2.026	0.579	0.015	3.879	0.009	4.660	42318	42322	0	0	2	Gwye	Gwye	Unknown	0.28
0	Hilltop 345	SIERRA	0.024	4.060	4.607	0.000	0.071	11.947	0.045	11.206	64058	40537	0	0	1	Unknown	Unknown	Unknown	0.41
0	Green Pete	NORTHWE	0.023	11.389	3.796	0.439	0.008	3.796	0.000	0.000	40485	40484	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Jefferson 1	PACE	0.023	8.095	1.966	0.373	0.004	1.418	0.002	1.281	65850	65851	0	0	2	Unknown	Unknown	Unknown	0.19
0	Carver 230	NORTHWE	0.023	5.890	2.529	0.726	0.012	3.094	0.002	1.136	43089	43088	0	0	1	Gwye	Gwye	Unknown	0.28
0	Rocky Read	NORTHWE	0.023	5.865	0.514	0.071	0.004	0.988	0.006	2.919	46831	46821	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Libby - PAC	NORTHWE	0.023	5.858	1.953	0.467	0.008	1.953	0.000	0.000	44201	44193	44194	44198	2	Gwye	Delta	Core, Thre	0.23
0	Ashe 230/2	NORTHWE	0.023	5.815	1.938	0.553	0.008	1.938	0.000	0.000	40059	40060	0	0	1	Unknown	Unknown	Unknown	0.28
0	Massachus	NORTHWE	0.023	5.801	1.658	0.468	0.010	2.496	0.006	2.951	46435	46433	0	0	1	Gwye	Gwye	Unknown	0.28

47126	47009	0	0	1	1.22
40845	40843	0	0	3	1.21
40505	47561	0	0	1	1.20
45183	45181	0	0	2	1.19
41141	41139	0	0	1	1.19
42100	42119	0	0	1	1.18
60250	61805	0	0	1	1.17
40033	40031	0	0	1	1.17
41083	41081	0	0	2	1.15
40557	40555	0	0	12	1.14
40557	40556	0	0	34	1.14
46403	46401	0	0	4	1.13
46403	46401	0	0	1	1.13
41235	41234	0	0	4	1.13
48463	48461	0	0	1	1.12
40403	40401	0	0	1	1.11
43139	43137	0	0	1	1.10
45189	45187	0	0	1	1.10
48197	48195	0	0	2	1.09
48385	48383	0	0	1	1.09
40615	40612	0	0	1	1.07
47394	47395	0	0	1	1.05
60396	60397	0	0	1	1.04
66843	65470	0	0	1	1.01
43348	43347	0	0	1	1.01
40285	41357	0	0	1	1.01
40049	40047	0	0	4	0.99
40207	40203	0	0	2	0.99
42319	42323	0	0	1	0.98
43409	43407	0	0	1	0.98
40345	40344	0	0	1	0.97
46645	46643	0	0	2	0.97
40049	40047	0	0	3	0.97
40345	40344	0	0	2	0.97
42108	42121	0	0	1	0.96
40627	40625	0	0	2	0.96
43740	43739	0	0	1	0.94
47823	47825	0	0	1	0.92
47824	47826	0	0	1	0.91
41149	41147	0	0	1	0.90
41019	41017	0	0	1	0.89
42100	42120	0	0	2	0.89
40838	45247	0	0	1	0.88
48357	48356	0	0	1	0.88
46435	46433	0	0	2	0.87
46435	46433	0	0	3	0.87
41291	45497	0	0	1	0.87
45317	45315	0	0	1	0.87
42104	42107	0	0	1	0.85
41135	41136	0	0	1	0.84
46403	46401	0	0	2	0.83
46403	46401	0	0	3	0.83
65195	65196	0	0	1	0.83
43021	43019	0	0	1	0.82
40945	40943	0	0	1	0.82
40651	40649	0	0	1	0.82
47386	47387	0	0	1	0.82
48197	48195	0	0	1	0.82
40909	40907	0	0	1	0.81
40836	45247	0	0	2	0.81
44016	44006	44007	44012	1	0.81
44017	44008	44009	44013	1	0.81
43313	43311	0	0	1	0.81
45317	45315	0	0	2	0.80
42991	42992	0	0	1	0.80
44165	44147	44148	44158	1	0.80
46734	46733	0	0	1	0.80
48059	48057	0	0	1	0.80
45245	45243	0	0	1	0.79
47819	47821	0	0	1	0.79
47819	47820	0	0	1	0.79
48059	48063	0	0	1	0.77
40280	40278	0	0	1	0.76
48512	48510	0	0	1	0.76
47731	47736	47737	47733	1	0.75
47731	47734	47735	47732	1	0.75
40219	40217	0	0	1	0.75
47091	47254	0	0	1	0.74
44014	44002	0	0	1	0.74
44163	44143	44144	44156	1	0.74
46633	46632	0	0	1	0.73
45229	45227	0	0	1	0.73
43089	43087	0	0	1	0.73
43089	43088	0	0	1	0.73
44162	44141	44142	44155	1	0.72
44015	44004	0	0	1	0.72
40169	40167	0	0	1	0.72
45153	45151	0	0	1	0.72
40621	40620	0	0	1	0.71
44015	44003	0	0	1	0.71
42040	42042	0	0	1	0.71
42987	42988	0	0	1	0.71
40249	40247	0	0	1	0.70
45245	45243	0	0	2	0.69
40599	40597	0	0	1	0.69
42040	42043	0	0	1	0.69
41752	41726	0	0	1	0.69
40843	40841	0	0	1	0.69
42374	42375	0	0	1	0.69
40876	40873	0	0	1	0.68
47381	47382	0	0	1	0.67
40322	42001	0	0	1	0.66
42312	42315	42313	42314	1	0.66
46645	46643	0	0	1	0.66
43459	43461	0	0	1	0.66
40705	40703	0	0	1	0.65
45009	45374	0	0	1	0.65
65910	65911	0	0	1	0.65
48059	48061	0	0	1	0.65
60394	60391	0	0	1	0.64
41049	41262	0	0	4	0.64
41049	41261	0	0	3	0.63
41004	41002	0	0	3	0.63
40671	40669	0	0	1	0.63
46151	46039	0	0	1	0.63
44995	44994	0	0	1	0.63
45063	45061	0	0	1	0.63
45063	45061	0	0	2	0.63
40088	40087	0	0	1	0.62
41751	41723	0	0	1	0.62
40095	40093	0	0	1	0.61
48281	48285	0	0	1	0.61
45303	45299	0	0	1	0.61
41752	41729	0	0	1	0.61
45239	45441	0	0	1	0.60
41353	40717	0	0	1	0.60
66465	66470	0	0	1	0.60
47851	47852	0	0	1	0.60
43329	43327	0	0	1	0.60
43541	43553	0	0	1	0.59
41751	41722	0	0	1	0.58
42318	42322	0	0	2	0.58
40487	41209	0	0	1	0.58
45123	45121	0	0	3	0.58
47398	47399	0	0	1	0.58
40549	40547	0	0	1	0.58
45047	45045	0	0	1	0.57
47390	47391	0	0	1	0.57
45239	45441	0	0	3	0.57
45239	45441	0	0	2	0.57
42363	42365	0	0	1	0.56
46156	46155	0	0	1	0.56
47830	47834	0	0	1	0.56
42363	42370	0	0	1	0.56
48037	48035	0	0	1	0.56
60320	60323	0	0	1	0.55
60320	60321	0	0	1	0.55
60320	60322	0	0	1	0.55
40059	40060	0	0	1	0.55

3	-400 Baseli	0	Wells (DOF	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47102	47107	0	0	T4	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Warner 23	NORTHWE	0.04	10.06	3.49	0.84	0.02	4.85	0.01	4.59	41135	41136	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Union Gap	NORTHWE	0.04	10.04	2.93	0.80	0.01	2.52	0.00	0.83	45317	45315	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.09	10.03	3.34	3.97	0.03	3.34	0.00	0.00	41742	40296	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Grand Cou	NORTHWE	0.09	10.03	3.34	3.97	0.03	3.34	0.00	0.00	41744	40298	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Grand Cou	NORTHWE	0.09	10.03	3.34	3.97	0.03	3.34	0.00	0.00	41743	40297	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Chehalis 2	NORTHWE	0.04	10.02	3.34	1.76	0.01	3.34	0.00	0.00	40207	40205	0	0	1	Gwye	Delta	Single Phas	0.51
3	-400 Baseli	0	Round But	NORTHWE	0.09	9.98	6.31	7.53	0.08	9.16	0.03	6.51	43485	43483	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Sappho 11	NORTHWE	0.02	9.97	3.32	0.82	0.01	3.32	0.00	0.00	40945	40943	0	0	1	Gwye	Gwye	Single Phas	0.25
3	-400 Baseli	0	Garrison 5	NORTHWE	0.09	9.95	1.53	1.80	0.00	0.00	0.01	3.32	40459	40457	0	0	1	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Bowmont 2	IDAHO	0.04	9.94	1.74	0.23	0.00	0.63	0.01	3.94	60064	60065	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	St. Johns 1	NORTHWE	0.02	9.91	3.49	0.89	0.01	3.78	0.00	0.84	41019	41017	0	0	1	Gwye	Gwye	Single Phas	0.25
3	-400 Baseli	0	Eastpine 2	NORTHWE	0.04	9.83	5.44	1.53	0.04	10.16	0.02	10.51	46427	46425	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Wendson 2	NORTHWE	0.04	9.72	3.00	1.18	0.01	3.03	0.00	1.81	41141	41139	0	0	1	Gwye	Gwye	Three Phas	0.38
3	-400 Baseli	0	Maple Vall	NORTHWE	0.08	9.64	4.98	4.41	0.06	6.99	0.02	5.19	40693	40689	0	0	1	Unknown	Unknown	Three Phas	0.83
3	-400 Baseli	0	J.D. Ross 3	NORTHWE	0.06	9.63	6.94	5.37	0.09	14.41	0.05	11.20	40901	40899	0	0	1	Gwye	Gwye	Single Phas	0.76
3	-400 Baseli	0	Chehalis 2	NORTHWE	0.04	9.62	3.48	0.99	0.01	3.60	0.00	0.40	40207	40203	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Dworshak	NORTHWE	0.02	9.53	3.18	0.37	0.01	3.18	0.00	0.00	40367	40361	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Benton 23	NORTHWE	0.04	9.52	5.45	1.23	0.04	8.97	0.02	7.90	40099	40097	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Longview 2	NORTHWE	0.04	9.48	2.66	0.63	0.02	4.46	0.01	5.57	40671	40669	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Windy Poir	NORTHWE	0.04	9.48	3.16	0.92	0.01	3.16	0.00	0.00	47823	47825	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Windy Poir	NORTHWE	0.04	9.46	3.15	0.92	0.01	3.15	0.00	0.00	47824	47826	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Big Grassy	PACE	0.03	9.45	3.15	0.60	0.01	3.15	0.00	0.00	65155	65156	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Green Spri	NORTHWE	0.02	9.44	3.15	0.46	0.01	3.15	0.00	0.00	45125	45213	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Moscow 1	NORTHWE	0.02	9.43	3.14	0.44	0.00	1.61	0.00	1.81	48251	48247	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Sulphur 23	NORTHWE	0.04	9.41	3.14	0.87	0.01	3.14	0.00	0.00	41291	45497	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Carver 230	NORTHWE	0.04	9.40	2.53	0.73	0.02	4.16	0.01	5.36	43089	43087	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Rathdrum	NORTHWE	0.04	9.30	3.15	0.88	0.01	3.27	0.00	1.02	48357	48356	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Chiloquin 2	NORTHWE	0.04	9.24	2.02	0.57	0.01	1.26	0.01	2.39	45047	45045	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Caldwell 2	IDAHO	0.04	9.22	3.50	1.34	0.02	4.14	0.00	1.07	60110	60105	0	0	2	Gwye	Gwye	Three Phas	0.38
3	-400 Baseli	0	Rock Creek	NORTHWE	0.08	9.15	0.24	0.28	0.02	2.17	0.02	5.22	41401	41402	0	0	1	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Berrydale 2	NORTHWE	0.04	9.09	1.03	0.30	0.01	3.43	0.01	6.15	42507	42508	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Lone Pine 2	NORTHWE	0.04	9.08	4.28	1.24	0.02	5.58	0.01	2.74	45183	45181	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Custer 230	NORTHWE	0.04	9.05	2.32	0.66	0.02	4.67	0.01	6.35	40322	42001	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Ponderosa	NORTHWE	0.04	9.02	3.08	0.89	0.01	3.15	0.00	0.19	40838	45247	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Allston 500	NORTHWE	0.08	8.98	9.40	11.14	0.13	14.98	0.05	12.11	40045	40043	0	0	2	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Napavine 5	NORTHWE	0.08	8.97	2.99	3.36	0.03	2.99	0.00	0.00	40774	47584	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Beaver 230	NORTHWE	0.04	8.96	2.99	0.82	0.01	2.99	0.00	0.00	43021	43019	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Locust 230	IDAHO	0.04	8.90	1.42	0.19	0.01	2.14	0.01	4.64	60207	61254	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Hanly Road	NORTHWE	0.02	8.85	2.95	0.42	0.01	2.95	0.00	0.00	47165	47166	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Lexington 2	NORTHWE	0.04	8.78	3.44	0.82	0.02	4.05	0.00	1.42	40651	40649	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Amalgama	IDAHO	0.04	8.78	3.43	0.46	0.02	4.18	0.00	1.27	61829	60255	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Lone Pine 2	NORTHWE	0.04	8.73	4.12	1.19	0.02	5.36	0.01	2.64	45183	45181	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Rocky Ford	NORTHWE	0.04	8.71	2.03	0.56	0.01	2.35	0.01	3.37	46156	46155	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.08	8.63	2.88	3.42	0.03	2.88	0.00	0.00	41741	40295	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Grand Cou	NORTHWE	0.08	8.63	2.88	3.42	0.03	2.88	0.00	0.00	41740	40293	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Grand Cou	NORTHWE	0.08	8.63	2.88	3.42	0.03	2.88	0.00	0.00	41739	40291	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Munro BPA	NORTHWE	0.03	8.59	3.97	1.12	0.02	5.08	0.01	2.28	48463	48461	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Usk 230/11	NORTHWE	0.03	8.58	2.67	0.74	0.01	3.32	0.01	3.12	47091	47254	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Big Horn W	NORTHWE	0.03	8.57	2.86	0.78	0.01	2.86	0.00	0.00	47819	47820	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Big Horn W	NORTHWE	0.03	8.57	2.86	0.78	0.01	2.86	0.00	0.00	47819	47821	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Southwest	NORTHWE	0.03	8.52	3.38	0.97	0.02	3.93	0.00	1.25	46645	46643	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Chief Josep	NORTHWE	0.07	8.50	11.61	13.79	0.18	20.43	0.08	19.18	40233	40232	0	0	3	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Ponderosa	NORTHWE	0.03	8.49	2.89	0.82	0.01	2.95	0.00	0.14	40836	45247	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Dodge Jun	NORTHWE	0.03	8.45	2.84	0.78	0.01	2.84	0.00	0.02	42991	42992	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Juniper 230	NORTHWE	0.03	8.41	2.80	0.82	0.01	2.80	0.00	0.00	47386	47387	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Boundary 2	NORTHWE	0.03	8.37	0.08	0.02	0.01	2.64	0.01	5.43	40145	40143	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Midway 23	NORTHWE	0.03	8.37	4.57	2.36	0.03	6.40	0.01	3.75	41347	40733	0	0	1	Gwye	Gwye	Single Phas	0.51
3	-400 Baseli	0	Chenoweth	NORTHWE	0.03	8.35	3.15	0.75	0.01	3.51	0.00	0.77	40219	40217	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Oak Grove	NORTHWE	0.02	8.31	2.77	0.39	0.01	2.77	0.00	0.00	43372	43373	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Canyon Rd	NORTHWE	0.03	8.26	5.26	0.73	0.03	7.97	0.01	5.67	46633	46632	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Centralia S	NORTHWE	0.07	8.22	2.74	3.25	0.02	2.74	0.00	0.00	47745	47744	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Murray 23	NORTHWE	0.03	8.19	0.65	0.09	0.02	3.71	0.01	6.35	40767	40765	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Port Angel	NORTHWE	0.02	8.16	2.72	0.69	0.01	2.72	0.00	0.00	40843	40841	0	0	1	Gwye	Delta	Single Phas	0.25
3	-400 Baseli	0	Kitsap 230	NORTHWE	0.03	8.15	4.41	1.08	0.02	6.14	0.01	3.48	40615	40612	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Vantage 5	NORTHWE	0.07	8.14	6.24	7.32	0.08	9.25	0.03	6.54	41113	41111	0	0	2	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Cabinet Go	NORTHWE	0.03	8.11	2.70	0.76	0.01	2.70	0.00	0.00	48059	48063	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Jefferson 1	PACE	0.02	8.10	1.97	0.38	0.00	1.42	0.00	1.28	65850	65851	0	0	2	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Alvey 230/	NORTHWE	0.03	8.07	1.85	0.97	0.00	1.03	0.00	1.71	40049	40047	0	0	3	Gwye	Gwye	Single Phas	0.51
3	-400 Baseli	0	Bethel (PG	NORTHWE	0.03	8.04	4.86	1.36	0.03	7.03	0.01	4.35	43039	43037	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Snoqualmi	NORTHWE	0.02	8.04	2.68	0.38	0.01	2.68	0.00	0.00	42335	42336	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Castle 115,	NORTHWE	0.02	8.01	2.67	0.37	0.01	2.67	0.00	0.00	47406	47407	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	La Grande	NORTHWE	0.02	7.96	2.65	0.38	0.01	2.65	0.00	0.00	46734	46732	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Grand Cou	NORTHWE	0.03	7.95	2.65	0.76	0.01	2.65	0.00	0.00	40280	40278	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Talbot 230	NORTHWE	0.03	7.95	1.56	0.45	0.01	1.18	0.01	2.62	42500	42511	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Krain Corn	NORTHWE	0.02	7.90	2.63	0.37	0.01	2.63	0.00	0.00	42509	42510	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Danskin W	IDAHO	0.03	7.89	3.83	0.52	0.03	7.28	0.02	6.70	60394	60390	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Gorge (SCL	NORTHWE	0.03	7.83	2.61	1.32	0.01	2.61	0.00	0.00	46431	46430	0	0	4	Gwye	Delta	Single Phas	0.51
3	-400 Baseli	0	Cedar Falls	NORTHWE	0.02	7.81	2.60	0.37	0.01	2.60	0.00	0.00	42125	42126	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Centralia S	NORTHWE	0.07	7.80	2.60	3.09	0.02	2.60	0.00	0.00	47741	47740	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Little Goos	NORTHWE	0.07	7.78	2.59	3.08	0.02	2.59	0.00	0.00	44217	44213	44214	44216	1	Gwye	Delta	Single Phas	1.10
3	-400 Baseli	0	Kettle Falls	NORTHWE	0.02	7.76	2.59	0.37	0.01	2.59	0.00	0.00	48175	48173	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Martin Cre	NORTHWE	0.03	7.76	2.74	0.65	0.01	2.90	0.00	0.32	40705	40703	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Pamona He	NORTHWE	0.03	7.76	2.88	0.79	0.01	3.17	0.00	0.61	45245	45243	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	March Poir	NORTHWE	0.03	7.74	2.95	0.85	0.01	3.31	0.00	1.02	42104	42107	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	O'Brien 23	NORTHWE	0.03	7.72	1.91	0.55	0.01	1.80	0.00	2.23	42503	42514	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Sherwood	NORTHWE	0.03	7.69	1.54	0.44	0.01	3.10	0.01	4.80	43527	43525	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Cornelius 1	NORTHWE	0.02	7.62	2.49	0.35	0.01	2.46	0.00	0.30	43109	43107	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Lolo 230/1	NORTHWE	0.03	7.62	2.01	0.56	0.01	1.62	0.00	1.45	48197	48195	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	LaGrande 2	NORTHWE	0.03	7.61	2.54	0.71	0.01	2.54	0.00	0.00	40621	40620	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Mossyrock	NORTHWE	0.03	7.59	2.53	1.35	0.01	2.53	0.00	0.00	46629	46628	0	0	1	Gwye	Delta	Single Phas	0.51
3	-400 Baseli	0	Cushman 2	NORTHWE	0.02	7.57	2.52	0.36	0.01	2.52	0.00	0.00	46682	46791	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Isthmus 23	NORTHWE	0.03	7.56	2.52	0.72	0.01	2.52	0.00	0.00	45153	45151	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Hot Spring	NORTHWE	0.07	7.54	1.16	1.37	0.00	0.00	0.01	2.51	40553	40551	0	0	1	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Hanna 230	NORTHWE	0.03	7.53	2.18	0.63	0.01	1.96	0.00	1.04	44995	44994	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Napavine 5	NORTHWE	0.07	7.53	2.51	2.78	0.02	2.51	0.00	0.00	40774	47583	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Napavine 5	NORTHWE	0.07	7.53	2.51	2.78	0.02	2.51	0.00	0.00	40774	47582	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Mountain	IDAHO	0.02	7.52	2.42	0.76	0.01	2.19	0.00	1.08	60250	61805	0	0	1	Unknown	Unknown	Single Phas	0.30
3	-400 Baseli	0	Canby 2 23	NORTHWE	0.03	7.52	2.51	0.72	0.01	2.51	0.00	0.00	40169	40167	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Phalen Gul	NORTHWE	0.03	7.51	2.52	0.70	0.01	2.52	0.00	0.02	42987	42988	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Cabinet Go	NORTHWE	0.03	7.51	2.81	0.79	0.01	3.41	0.00	2.01	48059	48057	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Mossyrock	NORTHWE	0.03	7.50	2.50	1.33	0.01	2.50	0.00	0.00	46629	46627	0	0	1	Gwye	Delta	Single Phas	0.51
3	-400 Baseli	0	Troutdale 2	NORTHWE	0.03	7.47	0.75	0.21	0.00	0.00	0.00	2.49	45301	45297	0	0	1	Delta	Gwye	Unknown	0.28
3	-400 Baseli	0	Paul 500/1	NORTHWE	0.07	7.45	4.41	5.17	0.04	4.98	0.01	2.50	40821	42806	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Diablo 230	NORTHWE	0.03	7.38	2.46	1.25	0.01	2.46	0.00	0.00	46421	46420	0	0	2	Gwye	Delta	Single Phas	0.51
3	-400 Baseli	0	Diablo 230	NORTHWE	0.03	7.38	2.46	1.25	0.01	2.46	0.00	0.00	46421	46419	0	0	1	Gwye	Delta	Single Phas	0.51
3	-400 Baseli	0	Cushman 2	NORTHWE	0.02	7.28	2.43	0.35	0.01	2.43	0.00	0.00	46681	46791	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Horse Hea	NORTHWE	0.03	7.23	2.41	0.58	0.01	2.41	0.00	0.00	40549	40547	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Scenic 115	NORTHWE	0.01	7.22	2.41	0.34	0.01	2.41	0.00	0.00	45478	45477	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Del Norte 1	NORTHWE	0.01	7.20	2.40	0.33	0.01	2.40	0.00	0.00	45085	45385	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Del Norte 1	NORTHWE	0.01	7.20	2.40	0.33	0.01	2.40	0.00	0.00	45085	45386	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Monroe 50	NORTHWE	0.06	7.19	5.40	6.41	0.08	9.43	0.04	9.29	40749	40747	0	0	1	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Grand Cou	NORTHWE	0.03	7.15	2.38	0.69	0.01	2.38	0.00	0.00	41752	41726	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Keeler 230	NORTHWE	0.03	7.15	2.06	0.49	0.01	1.96	0.00	1.42	40599	40597	0	0	2	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Lost River 2	PACE	0.03	7.10	2.37	0.64	0.01	2.37	0.00	0.00	65910	65911	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	C.J. Strike 1	IDAHO	0.02	7.10	2.37	0.55	0.01	2.37	0.00	0.00	60320	60322	0	0	1	Gwye	Delta	Three Phas	0.23
3	-400 Baseli	0	C.J. Strike 1	IDAHO	0.02	7.09	2.36	0.55	0.01	2.36	0.00	0.00	60320	60321	0	0	1	Gwye	Delta	Three Phas	0.23
3	-400 Baseli	0	C.J. Strike 1	IDAHO	0.02	7.09	2.36	0.55	0.01	2.36	0.00	0.00	60320	60323	0	0	1	Gwye	Delta	Three Phas	0.23
3	-400 Baseli	0	Goshen 34	PACE	0.04	7.04	7.42	3.11	0.08	12.64	0.03	11.25	65665	65670	65685	98535	2	Unknown	Unknown	Unknown	0.41
3	-400 Baseli	0	Goshen 34	PACE	0.04	7.04	7.42	3.11	0.08	12.64	0.03	11.25	65665	65670	65680	98534	1	Unknown	Unknown	Unknown	0.41
3	-400 Baseli	0	Rivergate 2	NORTHWE	0.03	7.02	2.34	0.66	0.01	3.31	0.01	3.34	43459	43461	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Linden 230	NORTHWE	0.03	6.97	2.32	0.67	0.01	2.32	0.00	0.00	47381	47382	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Cascade 23	NORTHWE	0.03	6.96	2.32	0.66	0.01	2.32	0.00	0.00	42312	42315	42313	42314	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Roza 115/3	NORTHWE	0.01	6.95	2.32	0.33	0.01	2.32	0.00	0.00	41286	41285	40756	41284	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	St. Marys 2	NORTHWE	0.03	6.93	2.05	0.59	0.01	2.05	0.00	1.55	43541	43553	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Cabinet Go	NORTHWE	0.03	6.86	2.29	0.65	0.01	2.29	0.00	0.00	48059	48061	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Dry Gulch 2	NORTHWE	0.03	6.78	1.27	0.36	0.01	2.06	0.01	3.48	48512	48510	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Pamona He	NORTHWE	0.03	6.77	2.51	0.69	0.01	2.77	0.00	0.53	45245	45243	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	White Rive	NORTHWE	0.03	6.74	3.62	1.43	0.02	5.41	0.01	4.10	42700	42701	0	0	1	Gwye	Gwye	Three Phas	0.38
3	-400 Baseli	0	COB Energ	NORTHWE	0.06	6.73	2.24	2.69	0.02	2.24	0.00	0.00	45262	45452	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	McNary 11	NORTHWE	0.01	6.70	1.34	0.16	0.00	0.00	0.00	2.23	40717	40715	0	0	1	Delta	Gwye	Core, Thre	0.12
3	-400 Baseli	0	Tacoma 23	NORTHWE	0.03	6.68	2.23	0.64	0.01	2.23	0.00	0.00	41049	41262	0	0	4	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Jackson Hy	NORTHWE	0.01	6.66	2.22	0.15	0.00	2.22	0.00	0.00	45685	45689	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Jackson Hy	NORTHWE	0.01	6.66	2.22	0.15	0.00	2.22	0.00	0.00	45685	45687	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Tacoma 23	NORTHWE	0.03	6.63	2.21	0.63	0.01	2.21	0.00	0.00	41049	41261	0	0	3	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Big Eddy 5	NORTHWE	0.06	6.60	9.42	11.22	0.14	15.57	0.05	13.37	40111	41343	0	0	5	Gwye	Gwye	Single Phas	1.10
3	-400 Baseli	0	Boulder Pa	NORTHWE	0.03	6.58	0.74	0.21	0.01	1.95	0.01	3.86	48524	48520	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Monpac 1	NORTHWE	0.01	6.57	2.19	0.30	0.00	2.19	0.00	0.00	45354	45355	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Grand Cou	NORTHWE	0.03	6.48	2.16	0.62	0.01	2.16	0.00	0.00	41751	41723	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rathdrum	NORTHWE	0.01	6.46	2.15	0.30	0.00	2.15	0.00	0.00	48353	48361	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Noxon Rap	NORTHWE	0.03	6.45	2.15	0.61	0.01	2.15	0.00	0.00	48281	48285	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	The Saddle	NORTHWE	0.03	6.42	2.14	0.60	0.01	2.14	0.00	0.00	47851	47852	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Benewah 2	NORTHWE	0.03	6.41	2.04	0.58	0.01	2.02	0.00	0.69	48037	48035	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Sumas Cog	NORTHWE	0.01	6.41	2.14	0.30	0.00	2.14	0.00	0.00	42020	42021	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Sumas Cog	NORTHWE	0.01	6.41	2.14	0.30	0.00	2.14	0.00	0.00	42020	42022	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Troutdale 2	NORTHWE	0.03	6.40	2.13	0.61	0.01	2.13	0.00	0.00	45303	45299	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Jacksonvill	NORTHWE	0.01	6.39	2.13	0.30	0.00	2.13	0.00	0.00	45252	45250	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Parish Gap	NORTHWE	0.03	6.38	1.66	0.46	0.01	1.55	0.00	1.20	45588	45589	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Grand Ron	NORTHWE	0.01	6.38	2.18	0.31	0.00	2.24	0.00	0.47	43223	43221	0	0	1	Gwye	Gwye	Unknown	0.14

6	+550 Basel	0	Box Canyo	NORTHWE	0.05	25.87	8.62	1.22	0.01	2.65	0.01	6.86	47126	47009	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Port Angel	NORTHWE	0.04	10.30	5.22	1.21	0.03	7.21	0.01	4.49	40845	40843	0	0	3	Unknown	Unknown	Core, Thre	0.23
6	+550 Basel	0	Happy Vall	NORTHWE	0.07	17.41	4.25	1.20	0.01	3.12	0.01	3.84	40505	47561	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Lone Pine 2	NORTHWE	0.04	8.73	4.12	1.19	0.02	5.36	0.01	2.64	45183	45181	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Wendson 2	NORTHWE	0.04	9.72	3.00	1.19	0.01	3.03	0.00	1.81	41141	41139	0	0	1	Gwye	Gwye	Three Phas	0.38
6	+550 Basel	0	Sedro Woo	NORTHWE	0.06	15.40	4.10	1.18	0.02	6.08	0.02	7.73	42100	42119	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Mountain	IDAHO	0.03	11.17	3.74	1.17	0.01	3.83	0.00	1.15	60250	61805	0	0	1	Unknown	Unknown	Single Phas	0.30
6	+550 Basel	0	Alcoa 230/	NORTHWE	0.08	20.80	4.96	1.17	0.01	3.16	0.01	4.28	40033	40031	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Toledo 230	NORTHWE	0.05	12.09	4.03	1.15	0.02	4.03	0.00	0.00	41083	41081	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Hungry Ho	NORTHWE	0.05	12.50	4.17	1.14	0.02	4.17	0.00	0.00	40557	40555	0	0	12	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Hungry Ho	NORTHWE	0.05	12.50	4.17	1.14	0.02	4.17	0.00	0.00	40557	40556	0	0	34	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bothell 230	NORTHWE	0.03	6.17	3.95	1.13	0.03	7.25	0.01	7.13	46403	46401	0	0	4	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Bothell 230	NORTHWE	0.03	6.19	3.94	1.13	0.03	7.23	0.01	7.12	46403	46401	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Lopez Islar	NORTHWE	0.03	13.06	4.35	1.13	0.01	4.35	0.00	0.00	41235	41234	0	0	4	Gwye	Delta	Single Phas	0.25
6	+550 Basel	0	Munro BPA	NORTHWE	0.03	8.59	3.97	1.12	0.02	5.08	0.01	2.28	48463	48461	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Fairmount	NORTHWE	0.07	17.29	4.74	1.11	0.02	3.72	0.00	2.09	40403	40401	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Dayton 11	NORTHWE	0.04	20.97	7.90	1.10	0.02	8.91	0.00	2.28	43139	43137	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Malin 230/	NORTHWE	0.05	12.27	4.09	1.10	0.02	4.09	0.00	0.00	45189	45187	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Lolo 230/1	NORTHWE	0.05	12.64	3.83	1.09	0.01	3.45	0.00	0.78	48197	48195	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Shawnee 2	NORTHWE	0.07	17.39	3.82	1.09	0.01	2.10	0.01	4.14	48385	48383	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Kitsap 230	NORTHWE	0.03	8.15	4.41	1.07	0.02	6.14	0.01	3.48	40615	40612	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Mont. 230	NORTHWE	0.04	11.00	3.67	1.05	0.02	3.67	0.00	0.00	47394	47395	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Hot Spring	IDAHO	0.09	22.82	7.61	1.04	0.03	7.61	0.00	0.00	60396	60397	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Drummon	PACE	0.05	18.88	6.23	1.01	0.02	6.08	0.00	0.56	66843	65470	0	0	1	Gwye	Gwye	Core, Thre	0.16
6	+550 Basel	0	Murryhill 2	NORTHWE	0.05	11.27	3.51	1.01	0.02	4.51	0.01	4.45	43348	43347	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	1.83	2.72	1.01	0.05	10.17	0.04	9.76	40285	41357	0	0	1	Unknown	Unknown	Unknown	0.36
6	+550 Basel	0	Alvey 230/	NORTHWE	0.06	15.80	4.18	0.99	0.01	3.13	0.01	2.28	40049	40047	0	0	4	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Chehalis 2	NORTHWE	0.04	9.62	3.48	0.99	0.01	3.60	0.00	0.40	40207	40203	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Sammamis	NORTHWE	0.05	13.46	3.44	0.98	0.02	5.97	0.02	8.06	42319	42323	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Pelton 230	NORTHWE	0.04	10.22	3.41	0.98	0.01	3.41	0.00	0.00	43409	43407	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Detroit 230	NORTHWE	0.02	5.64	1.88	0.97	0.01	1.88	0.00	0.00	40345	40344	0	0	1	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	Southwest	NORTHWE	0.03	8.52	3.38	0.97	0.02	3.93	0.00	1.25	46645	46643	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Alvey 230/	NORTHWE	0.03	8.07	1.85	0.97	0.00	1.03	0.00	1.71	40049	40047	0	0	3	Gwye	Gwye	Single Phas	0.51
6	+550 Basel	0	Detroit 230	NORTHWE	0.02	5.63	1.88	0.97	0.01	1.88	0.00	0.00	40345	40344	0	0	2	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	Lower Bak	NORTHWE	0.04	20.56	6.85	0.96	0.01	6.85	0.00	0.00	42108	42121	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Lane 230/1	NORTHWE	0.05	12.70	3.99	0.96	0.02	4.41	0.01	3.45	40627	40625	0	0	2	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Sunset 230	NORTHWE	0.05	11.73	3.26	0.94	0.02	5.71	0.02	7.33	43740	43739	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Windy Poir	NORTHWE	0.04	9.48	3.16	0.92	0.01	3.16	0.00	0.00	47823	47825	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Windy Poir	NORTHWE	0.04	9.46	3.15	0.91	0.01	3.15	0.00	0.00	47824	47826	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	White Bluf	NORTHWE	0.01	3.23	3.78	0.90	0.03	6.48	0.01	5.40	41149	41147	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	St. Johns 1	NORTHWE	0.02	9.91	3.49	0.89	0.01	3.78	0.00	0.84	41019	41017	0	0	1	Gwye	Gwye	Single Phas	0.25
6	+550 Basel	0	Sedro Woo	NORTHWE	0.01	2.26	3.09	0.89	0.03	6.20	0.01	6.33	42100	42120	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Ponderosa	NORTHWE	0.04	9.02	3.08	0.88	0.01	3.15	0.00	0.19	40838	45247	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Rathdrum	NORTHWE	0.04	9.30	3.15	0.88	0.01	3.27	0.00	1.02	48357	48356	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Massachus	NORTHWE	0.02	5.54	3.10	0.87	0.02	5.70	0.01	5.78	46435	46433	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Massachus	NORTHWE	0.02	5.52	3.10	0.87	0.02	5.71	0.01	5.79	46435	46433	0	0	3	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Sulphur 23	NORTHWE	0.04	9.40	3.13	0.87	0.01	3.13	0.00	0.00	41291	45497	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Union Gap	NORTHWE	0.04	10.82	3.16	0.87	0.01	2.72	0.00	0.89	45317	45315	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	March Poir	NORTHWE	0.03	7.74	2.95	0.85	0.01	3.31	0.00	1.02	42104	42107	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Warner 23	NORTHWE	0.04	10.02	3.49	0.84	0.02	4.86	0.01	4.59	41135	41136	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Bothell 230	NORTHWE	0.02	4.37	2.89	0.83	0.02	5.34	0.01	5.24	46403	46401	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Bothell 230	NORTHWE	0.02	4.37	2.89	0.83	0.02	5.34	0.01	5.24	46403	46401	0	0	3	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Bonneville	PACE	0.04	12.77	4.26	0.83	0.01	4.26	0.00	0.00	65195	65196	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Beaver 230	NORTHWE	0.04	8.96	2.99	0.82	0.01	2.99	0.00	0.00	43021	43019	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Sappho 11	NORTHWE	0.02	9.97	3.32	0.82	0.01	3.32	0.00	0.00	40945	40943	0	0	1	Gwye	Gwye	Single Phas	0.25
6	+550 Basel	0	Lexington 2	NORTHWE	0.04	8.78	3.44	0.82	0.02	4.05	0.00	1.42	40651	40649	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Juniper 230	NORTHWE	0.03	8.41	2.80	0.82	0.01	2.80	0.00	0.00	47386	47387	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Lolo 230/1	NORTHWE	0.04	9.48	2.87	0.82	0.01	2.59	0.00	0.58	48197	48195	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Sacheen 2	NORTHWE	0.00	0.18	2.10	0.81	0.02	4.18	0.01	4.15	40909	40907	0	0	1	Gwye	Gwye	Three Phas	0.38
6	+550 Basel	0	Ponderosa	NORTHWE	0.03	8.49	2.89	0.81	0.01	2.95	0.00	0.14	40836	45247	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bonneville	NORTHWE	0.04	10.20	3.40	0.81	0.01	3.40	0.00	0.00	44016	44006	44007	44012	1	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Bonneville	NORTHWE	0.04	10.20	3.40	0.81	0.01	3.40	0.00	0.00	44017	44008	44009	44013	1	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Mcloughlir	NORTHWE	0.02	5.03	2.82	0.81	0.02	4.40	0.01	3.59	43313	43311	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Union Gap	NORTHWE	0.04	10.04	2.93	0.80	0.01	2.53	0.00	0.83	45317	45315	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Dodge Jun	NORTHWE	0.03	8.55	2.87	0.80	0.01	2.87	0.00	0.02	42991	42992	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Chief Josep	NORTHWE	0.02	4.53	1.51	0.80	0.01	1.51	0.00	0.00	44165	44147	44148	44158	1	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	La Grande	NORTHWE	0.03	16.76	5.59	0.80	0.01	5.59	0.00	0.00	46734	46733	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Cabinet Go	NORTHWE	0.03	7.51	2.81	0.80	0.01	3.40	0.00	2.01	48059	48057	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Pamona He	NORTHWE	0.03	7.77	2.88	0.79	0.01	3.18	0.00	0.61	45245	45243	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Big Horn W	NORTHWE	0.03	8.57	2.86	0.79	0.01	2.86	0.00	0.00	47819	47821	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Big Horn W	NORTHWE	0.03	8.57	2.86	0.79	0.01	2.86	0.00	0.00	47819	47820	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Cabinet Go	NORTHWE	0.03	8.11	2.70	0.77	0.01	2.70	0.00	0.00	48059	48063	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.03	7.95	2.65	0.76	0.01	2.65	0.00	0.00	40280	40278	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Dry Gulch 2	NORTHWE	0.04	10.76	2.64	0.76	0.01	2.69	0.01	3.53	48512	48510	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Centralia S	NORTHWE	0.02	1.90	0.63	0.75	0.01	0.63	0.00	0.00	47731	47736	47737	47733	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Centralia S	NORTHWE	0.02	1.90	0.63	0.75	0.01	0.63	0.00	0.00	47731	47734	47735	47732	1	Unknown	Unknown	Unknown	1.10
6	+550 Basel	0	Chenoweth	NORTHWE	0.03	8.35	3.15	0.75	0.01	3.51	0.00	0.77	40219	40217	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Usk 230/11	NORTHWE	0.03	8.58	2.67	0.74	0.01	3.33	0.01	3.12	47091	47254	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bonneville	NORTHWE	0.02	4.30	1.43	0.74	0.01	1.43	0.00	0.00	44014	44002	0	0	1	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	Chief Josep	NORTHWE	0.02	4.19	1.40	0.74	0.01	1.40	0.00	0.00	44163	44143	44144	44156	1	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	Canyon Rd	NORTHWE	0.03	8.26	5.26	0.73	0.03	7.97	0.01	5.67	46633	46632	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Outlook 23	NORTHWE	0.04	10.94	2.63	0.73	0.01	1.63	0.00	2.04	45229	45227	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Carver 230	NORTHWE	0.04	9.40	2.53	0.73	0.02	4.16	0.01	5.36	43089	43087	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Carver 230	NORTHWE	0.02	5.89	2.53	0.73	0.01	3.09	0.00	1.14	43089	43088	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Chief Josep	NORTHWE	0.02	4.11	1.37	0.72	0.01	1.37	0.00	0.00	44162	44141	44142	44155	1	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	Bonneville	NORTHWE	0.02	4.18	1.39	0.72	0.01	1.39	0.00	0.00	44015	44004	0	0	1	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	Canby 2 23	NORTHWE	0.03	7.50	2.50	0.72	0.01	2.50	0.00	0.00	40169	40167	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Isthmus 23	NORTHWE	0.03	7.56	2.52	0.72	0.01	2.52	0.00	0.00	45153	45151	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	LaGrande 2	NORTHWE	0.03	7.72	2.57	0.71	0.01	2.57	0.00	0.00	40621	40620	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bonneville	NORTHWE	0.02	4.18	1.39	0.71	0.01	1.39	0.00	0.00	44015	44003	0	0	1	Gwye	Delta	Single Phas	0.51
6	+550 Basel	0	Whitehorn	NORTHWE	0.03	15.18	5.06	0.71	0.01	5.06	0.00	0.00	42040	42042	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Phalen Gul	NORTHWE	0.03	7.50	2.51	0.71	0.01	2.52	0.00	0.02	42987	42988	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Columbia F	NORTHWE	0.04	10.84	2.92	0.70	0.01	2.23	0.00	1.52	40249	40247	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Pamona He	NORTHWE	0.03	6.78	2.52	0.69	0.01	2.77	0.00	0.53	45245	45243	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Keeler 230	NORTHWE	0.02	4.57	2.91	0.69	0.02	4.52	0.01	3.41	40599	40597	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Whitehorn	NORTHWE	0.03	14.79	4.93	0.69	0.01	4.93	0.00	0.00	42040	42043	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Grand Cou	NORTHWE	0.03	7.15	2.38	0.69	0.01	2.38	0.00	0.00	41752	41726	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Port Angel	NORTHWE	0.02	8.16	2.72	0.69	0.01	2.72	0.00	0.00	40843	40841	0	0	1	Gwye	Delta	Single Phas	0.25
6	+550 Basel	0	Schnebly 2	NORTHWE	0.02	6.09	2.36	0.69	0.01	2.41	0.00	0.38	42374	42375	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Redmond 2	NORTHWE	0.02	6.13	2.41	0.68	0.01	2.85	0.00	1.05	40876	40873	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Linden 230	NORTHWE	0.03	6.96	2.32	0.67	0.01	2.32	0.00	0.00	47381	47382	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Custer 230	NORTHWE	0.04	9.05	2.32	0.66	0.02	4.67	0.01	6.35	40322	42001	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Cascade 23	NORTHWE	0.03	6.96	2.32	0.66	0.01	2.32	0.00	0.00	42312	42315	42313	42314	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Southwest	NORTHWE	0.05	13.44	4.76	0.66	0.02	5.05	0.00	1.04	46645	46643	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Rivergate 2	NORTHWE	0.03	7.02	2.34	0.66	0.01	3.31	0.01	3.34	43459	43461	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Martin Cre	NORTHWE	0.03	7.76	2.74	0.65	0.01	2.90	0.00	0.32	40705	40703	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Applegate	NORTHWE	0.03	14.31	4.77	0.65	0.01	4.77	0.00	0.00	45009	45374	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Lost River 2	PACE	0.03	7.10	2.37	0.65	0.01	2.37	0.00	0.00	65910	65911	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Cabinet Go	NORTHWE	0.03	6.86	2.29	0.65	0.01	2.29	0.00	0.00	48059	48061	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Danskin W	IDAHO	0.06	14.12	4.71	0.64	0.02	4.71	0.00	0.00	60394	60391	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Tacoma 23	NORTHWE	0.03	6.68	2.23	0.64	0.01	2.23	0.00	0.00	41049	41262	0	0	4	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Tacoma 23	NORTHWE	0.03	6.63	2.21	0.63	0.01	2.21	0.00	0.00	41049	41261	0	0	3	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Sno-king 2	NORTHWE	0.05	12.26	2.21	0.63	0.01	2.73	0.01	5.35	41004	41002	0	0	3	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Longview 2	NORTHWE	0.04	9.48	2.66	0.63	0.02	4.46	0.01	5.57	40671	40669	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Larson 230	NORTHWE	0.04	10.64	2.30	0.63	0.01	1.40	0.01	2.80	46151	46039	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Hanna 230	NORTHWE	0.03	7.53	2.18	0.63	0.01	1.96	0.00	1.04	44995	44994	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Copco 1 23	NORTHWE	0.01	3.25	2.18	0.63	0.01	3.45	0.01	2.70	45063	45061	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Copco 1 23	NORTHWE	0.01	3.25	2.18	0.63	0.01	3.45	0.01	2.70	45063	45061	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Bell 230/1	NORTHWE	0.03	6.20	2.63	0.62	0.02	4.28	0.01	4.17	40088	40087	0	0	1	Unknown	Unknown	Core, Thre	0.23
6	+550 Basel	0	Grand Cou	NORTHWE	0.03	6.48	2.16	0.62	0.01	2.16	0.00	0.00	41751	41723	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bellinghar	NORTHWE	0.02	3.85	2.56	0.61	0.02	3.89	0.01	2.68	40095	40093	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Noxon Rap	NORTHWE	0.03	6.45	2.15	0.61	0.01	2.15	0.00	0.00	48281	48285	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Troutdale 2	NORTHWE	0.03	6.40	2.13	0.61	0.01	2.13	0.00	0.00	45303	45299	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.03	6.31	2.10	0.61	0.01	2.10	0.00	0.00	41752	41729	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Pilot Butte	NORTHWE	0.03	6.33	2.11	0.60	0.01	2.11	0.00	0.00	45239	45441	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	McNary 23	NORTHWE	0.01	2.44	2.49	0.60	0.02	4.78	0.01	4.67	41353	40717	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Swan Valle	PACE	0.03	10.45	3.64	0.60	0.01	4.03	0.00	0.84	66465	66470	0	0	1	Gwye	Gwye	Core, Thre	0.16
6	+550 Basel	0	The Saddle	NORTHWE	0.03	6.41	2.14	0.60	0.01	2.14	0.00	0.00	47851	47852	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Monitor 2	NORTHWE	0.02	5.39	2.11	0.60	0.01	2.46	0.00	2.15	43329	43327	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	St. Marys 2	NORTHWE	0.03	6.93	2.05	0.59	0.01	2.05	0.00	1.55	43541	43553	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.02	6.05	2.02	0.58	0.01	2.02	0.00	0.00	41751	41722	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Sammamis	NORTHWE	0.02	5.95	2.03	0.58	0.02	3.88	0.01	4.66	42318	42322	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Green Vall	NORTHWE	0.02	6.10	2.03	0.58	0.01	2.03	0.00	0.00	40487	41209	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grants Pas	NORTHWE	0.02	4.05	2.02	0.58	0.01	3.26	0.01	2.97	45123	45121	0	0	3	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Mont. 230	NORTHWE	0.02	6.04	2.01	0.58	0.01	2.01	0.00	0.00	47398	47399	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Horse Hea	NORTHWE	0.03	7.22	2.41	0.58	0.01	2.41	0.00	0.00	40549	40547	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Chiloquin 2	NORTHWE	0.04	9.24	2.02	0.57	0.01	1.26	0.01	2.39	45047	45045	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Juniper 230	NORTHWE	0.02	6.01	2.00	0.57	0.01	2.00	0.00	0.00	47390	47391	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Pilot Butte	NORTHWE	0.02	5.98	1.99	0.57	0.01	1.99	0.00	0.00	45239	45441	0	0	3	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Pilot Butte	NORTHWE	0.02	5.98	1.99	0.57	0.01	1.99	0.00	0.00	45239	45441	0	0	2	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Wild Horse	NORTHWE	0.02	5.77	1.92	0.56	0.01	1.92	0.00	0.00	42363	42365	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Rocky Ford	NORTHWE	0.04	8.71	2.03	0.56	0.01	2.35	0.01	3.37	46156	46155	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Klondike W	NORTHWE	0.02	5.72	1.91	0.56	0.01	1.91	0.00	0.00	47830	47834	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Wild Horse	NORTHWE	0.02	5.73	1.91	0.56	0.01	1.91	0.00	0.00	42363	42370	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Benewah 2	NORTHWE	0.03	6.20	1.96	0.56	0.01	1.92	0.00	0.69	48037	48035	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	C.J. Strike 1	IDAHO	0.02	7.18	2.39	0.55	0.01	2.39	0.00	0.00	60320	60323	0	0	1	Gwye	Delta	Three Phas	0.23
6	+550 Basel	0	C.J. Strike 1	IDAHO	0.02	7.18	2.39	0.55	0.01	2.39	0.00	0.00	60320	60321	0	0	1	Gwye	Delta	Three Phas	0.23
6	+550 Basel	0	C.J. Strike 1	IDAHO	0.02	7.19	2.40	0.55	0.01	2.40	0.00	0.00	60320	60322	0	0	1	Gwye	Delta	Three Phas	0.23
6	+550 Basel	0	Ashe 230/2	NORTHWE	0.02	5.81	1.94	0.55	0.01	1.94	0.00	0.00	40059	40060	0	0	1	Unknown	Unknown	Unknown	0.28

0	Wild Horse	NORTHWE	0.023	5.757	1.919	0.555	0.008	1.919	0.000	0.000	42363	42365	0	0	1	Gwye	Delta	Unknown	0.28
0	Wild Horse	NORTHWE	0.023	5.723	1.908	0.551	0.008	1.908	0.000	0.000	42363	42370	0	0	1	Gwye	Delta	Unknown	0.28
0	Klondike W	NORTHWE	0.023	5.722	1.907	0.562	0.008	1.907	0.000	0.000	47830	47834	0	0	1	Unknown	Unknown	Unknown	0.28
0	Mountain I	IDAHO	0.022	9.348	3.078	0.968	0.007	3.011	0.002	1.112	60250	61805	0	0	1	Unknown	Unknown	Single Pha	0.30
0	Boundary 2	NORTHWE	0.022	5.643	1.881	0.522	0.007	1.881	0.000	0.000	46484	46472	0	0	5	Gwye	Delta	Unknown	0.28
0	Boundary 2	NORTHWE	0.022	5.643	1.881	0.522	0.007	1.881	0.000	0.000	46486	46474	0	0	6	Gwye	Delta	Unknown	0.28
0	Detroit 230	NORTHWE	0.022	5.642	1.881	0.976	0.007	1.881	0.000	0.000	40345	40344	0	0	1	Gwye	Delta	Single Pha	0.51
0	Sand Dune	NORTHWE	0.022	5.642	1.836	0.508	0.007	1.829	0.001	0.529	46089	46087	0	0	1	Unknown	Unknown	Unknown	0.28
0	Detroit 230	NORTHWE	0.022	5.626	1.875	0.973	0.007	1.875	0.000	0.000	40345	40344	0	0	2	Gwye	Delta	Single Pha	0.51
0	Wild Horse	NORTHWE	0.022	5.623	1.874	0.542	0.007	1.874	0.000	0.000	42363	42364	0	0	1	Gwye	Delta	Unknown	0.28
0	Talbot 230,	NORTHWE	0.022	5.604	1.815	0.526	0.010	2.523	0.005	2.544	42501	42512	0	0	1	Gwye	Gwye	Unknown	0.28
0	Longview 2	NORTHWE	0.022	5.589	1.863	0.532	0.007	1.863	0.000	0.000	40671	41228	0	0	1	Unknown	Unknown	Unknown	0.28
0	Noxon Rap	NORTHWE	0.022	5.542	1.847	0.487	0.007	1.847	0.000	0.000	40787	48287	0	0	1	Unknown	Unknown	Unknown	0.28
0	Massachus	NORTHWE	0.022	5.538	3.097	0.873	0.023	5.704	0.012	5.782	46435	46433	0	0	2	Gwye	Gwye	Unknown	0.28
0	Massachus	NORTHWE	0.022	5.519	3.099	0.874	0.023	5.710	0.012	5.786	46435	46433	0	0	3	Gwye	Gwye	Unknown	0.28
0	Beaver 230	NORTHWE	0.022	5.477	1.826	0.526	0.007	1.826	0.000	0.000	43021	43018	0	0	1	Gwye	Delta	Unknown	0.28
0	Cove 230/6	NORTHWE	0.022	5.404	1.801	0.513	0.007	1.801	0.000	0.000	45128	45130	0	0	2	Gwye	Delta	Unknown	0.28
0	Covington	NORTHWE	0.022	2.552	4.899	5.831	0.082	9.513	0.041	10.184	40306	40304	0	0	5	Gwye	Gwye	Single Pha	1.10
0	Mile Hi 115	NORTHWE	0.021	10.331	3.444	0.441	0.007	3.444	0.000	0.000	45203	45348	0	0	1	Gwye	Gwye	Unknown	0.14
0	Monitor 23	NORTHWE	0.021	5.392	2.109	0.596	0.010	2.456	0.002	2.149	43329	43327	0	0	1	Gwye	Gwye	Unknown	0.28
0	Lone Pine 2	NORTHWE	0.021	5.361	1.914	0.541	0.008	1.968	0.000	0.189	45183	45179	45308	45310	1	Gwye	Gwye	Unknown	0.28
0	O'Brien 230	NORTHWE	0.021	5.319	1.274	0.367	0.005	1.247	0.003	1.692	42503	42513	0	0	1	Gwye	Gwye	Unknown	0.28
0	La Pine 230	NORTHWE	0.021	5.311	0.990	0.236	0.003	0.635	0.004	1.789	40635	40633	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Grand Cou	NORTHWE	0.021	5.286	0.249	0.072	0.009	2.261	0.008	4.023	41356	40281	0	0	1	Unknown	Unknown	Unknown	0.28
0	Marengo V	NORTHWE	0.021	5.265	1.755	0.490	0.007	1.755	0.000	0.000	44911	45332	0	0	1	Gwye	Gwye	Unknown	0.28
0	Olympia 30	NORTHWE	0.021	4.102	3.403	2.341	0.053	10.174	0.035	8.905	40795	40793	0	0	1	Gwye	Gwye	Single Pha	0.66
0	Sappho 115	NORTHWE	0.020	9.972	3.324	0.818	0.007	3.324	0.000	0.000	40945	40943	0	0	1	Gwye	Gwye	Single Pha	0.25
0	St. Johns 1	NORTHWE	0.020	9.906	3.491	0.894	0.008	3.778	0.001	0.838	41019	41017	0	0	1	Gwye	Gwye	Single Pha	0.25
0	Lancaster 2	NORTHWE	0.020	5.131	1.710	0.474	0.007	1.710	0.000	0.000	40624	47568	0	0	1	Unknown	Unknown	Unknown	0.28
0	Rathdrum	NORTHWE	0.020	5.116	1.732	0.486	0.007	1.793	0.001	0.530	48357	48355	0	0	1	Gwye	Gwye	Unknown	0.28
0	Gresham 2	NORTHWE	0.020	5.089	1.572	0.449	0.007	1.775	0.003	1.470	43215	43219	0	0	1	Gwye	Gwye	Unknown	0.28
0	Maupin 23	NORTHWE	0.020	5.027	1.595	0.458	0.006	1.560	0.000	0.129	40709	40707	0	0	1	Unknown	Unknown	Unknown	0.28
0	Mcloughlin	NORTHWE	0.020	5.025	2.816	0.810	0.018	4.397	0.007	3.587	43313	43311	0	0	1	Gwye	Gwye	Unknown	0.28
0	Fry 230/11	NORTHWE	0.020	4.939	1.389	0.386	0.006	1.477	0.003	1.462	45111	45109	0	0	1	Gwye	Gwye	Unknown	0.28
0	Troutdale 2	NORTHWE	0.020	4.937	0.494	0.139	0.000	0.000	0.002	1.646	45303	45297	0	0	1	Delta	Gwye	Unknown	0.28
0	Miller 230/	NORTHWE	0.020	4.932	1.644	0.479	0.007	1.644	0.000	0.000	47857	47966	0	0	1	Unknown	Unknown	Unknown	0.28
0	Dworshak	NORTHWE	0.019	9.590	3.197	0.371	0.006	3.197	0.000	0.000	40367	40361	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Moscow 11	NORTHWE	0.019	9.589	3.196	0.449	0.003	1.593	0.004	1.823	48251	48247	0	0	1	Unknown	Unknown	Unknown	0.14
0	Green Spri	NORTHWE	0.019	9.435	3.145	0.455	0.006	3.145	0.000	0.000	45125	45213	0	0	1	Gwye	Gwye	Unknown	0.14
0	Amps 230/	PACE	0.019	4.845	1.615	0.441	0.006	1.615	0.000	0.000	65025	65026	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.019	4.817	1.606	0.462	0.006	1.606	0.000	0.000	40280	40279	0	0	1	Unknown	Unknown	Unknown	0.28
0	Cold Spring	NORTHWE	0.019	4.701	0.470	0.135	0.000	0.000	0.002	1.567	45051	45050	0	0	1	Delta	Gwye	Unknown	0.28
0	Gresham 2	NORTHWE	0.019	4.684	1.098	0.314	0.014	3.566	0.010	5.046	43215	43217	0	0	1	Gwye	Gwye	Unknown	0.28
0	Redmond 2	NORTHWE	0.019	4.671	1.861	0.519	0.009	2.208	0.002	0.811	40875	40873	0	0	2	Unknown	Unknown	Unknown	0.28
0	Dran 230/1	IDAHO	0.019	4.652	1.402	0.190	0.005	1.316	0.002	0.859	60130	61223	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Hanly Road	NORTHWE	0.018	8.852	2.951	0.420	0.006	2.953	0.000	0.002	47165	47166	0	0	1	Unknown	Unknown	Unknown	0.14
0	Rocky Read	NORTHWE	0.018	4.629	0.195	0.027	0.006	1.515	0.006	3.040	46831	46821	0	0	2	Gwye	Gwye	3-Legged C	0.13
0	Redmond 2	NORTHWE	0.018	4.607	1.861	0.528	0.009	2.233	0.002	0.866	40875	40874	0	0	1	Unknown	Unknown	Unknown	0.28
0	Keeler 230	NORTHWE	0.018	4.569	2.907	0.692	0.018	4.517	0.007	3.405	40599	40597	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Chief Josep	NORTHWE	0.018	4.531	1.510	0.798	0.006	1.510	0.000	0.000	44165	44147	44148	44158	1	Gwye	Delta	Single Pha	0.51
0	Dran 230/1	IDAHO	0.018	4.519	1.471	0.199	0.006	1.568	0.002	0.895	60130	61223	0	0	2	Gwye	Gwye	3-Legged C	0.13
0	Intalco 230	NORTHWE	0.018	4.490	1.497	0.426	0.006	1.497	0.000	0.000	40573	41216	0	0	3	Unknown	Unknown	Unknown	0.28
0	Libby - USC	NORTHWE	0.018	4.473	1.739	0.416	0.014	3.521	0.008	4.135	40657	40655	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Port Of Wa	NORTHWE	0.018	4.454	1.485	0.422	0.006	1.485	0.000	0.000	43909	43905	0	0	1	Gwye	Delta	Unknown	0.28
0	Oak Grove	NORTHWE	0.017	8.306	2.769	0.390	0.006	2.769	0.000	0.000	43372	43373	0	0	1	Gwye	Delta	Unknown	0.14
0	C.J. Strike 1	IDAHO	0.017	7.141	2.380	0.550	0.006	2.380	0.000	0.000	60320	60322	0	0	1	Gwye	Delta	Three Pha	0.23
0	C.J. Strike 1	IDAHO	0.017	7.135	2.378	0.549	0.006	2.378	0.000	0.000	60320	60323	0	0	1	Gwye	Delta	Three Pha	0.23
0	C.J. Strike 1	IDAHO	0.017	7.135	2.378	0.549	0.006	2.378	0.000	0.000	60320	60321	0	0	1	Gwye	Delta	Three Pha	0.23
0	Bothell 230	NORTHWE	0.017	4.373	2.893	0.827	0.021	5.337	0.010	5.244	46403	46401	0	0	3	Gwye	Gwye	Unknown	0.28
0	Bothell 230	NORTHWE	0.017	4.373	2.893	0.827	0.021	5.337	0.010	5.244	46403	46401	0	0	2	Gwye	Gwye	Unknown	0.28
0	Round Butt	NORTHWE	0.017	4.357	1.452	0.416	0.006	1.452	0.000	0.000	43483	43488	0	0	1	Gwye	Delta	Unknown	0.28
0	Round Butt	NORTHWE	0.017	4.357	1.452	0.416	0.006	1.452	0.000	0.000	43483	43490	0	0	1	Gwye	Delta	Unknown	0.28
0	Round Butt	NORTHWE	0.017	4.344	1.448	0.415	0.006	1.448	0.000	0.000	43482	43486	0	0	1	Gwye	Delta	Unknown	0.28
0	Stateline W	NORTHWE	0.017	4.324	1.441	0.402	0.006	1.441	0.000	0.000	47572	47571	0	0	1	Unknown	Unknown	Unknown	0.28
0	Bonneville	NORTHWE	0.017	4.295	1.432	0.735	0.006	1.432	0.000	0.000	44014	44002	0	0	1	Gwye	Delta	Single Pha	0.51
0	Klondike W	NORTHWE	0.017	4.283	1.428	0.420	0.006	1.428	0.000	0.000	47830	47835	0	0	1	Unknown	Unknown	Unknown	0.28
0	Klondike W	NORTHWE	0.017	4.283	1.428	0.420	0.006	1.428	0.000	0.000	47830	47833	0	0	1	Unknown	Unknown	Unknown	0.28
0	Chief Josep	NORTHWE	0.017	4.189	1.396	0.738	0.006	1.396	0.000	0.000	44163	44143	44144	44156	1	Gwye	Delta	Single Pha	0.51
0	Intalco 230	NORTHWE	0.017	4.186	1.395	0.398	0.006	1.395	0.000	0.000	40573	41219	0	0	6	Unknown	Unknown	Unknown	0.28
0	Bonneville	NORTHWE	0.017	4.182	1.394	0.721	0.006	1.394	0.000	0.000	44015	44004	0	0	1	Gwye	Delta	Single Pha	0.51
0	Bonneville	NORTHWE	0.017	4.182	1.394	0.712	0.006	1.394	0.000	0.000	44015	44003	0	0	1	Gwye	Delta	Single Pha	0.51
0	Olympia 23	NORTHWE	0.017	4.182	1.205	0.289	0.007	1.855	0.004	2.248	40792	40790	0	0	2	Gwye	Gwye	Core, Thre	0.23
0	Port Angel	NORTHWE	0.016	8.156	2.719	0.687	0.005	2.719	0.000	0.000	40843	40841	0	0	1	Gwye	Delta	Single Pha	0.25
0	Snoqualmi	NORTHWE	0.016	8.037	2.679	0.377	0.005	2.679	0.000	0.000	42335	42336	0	0	1	Gwye	Delta	Unknown	0.14
0	Castle 115/	NORTHWE	0.016	8.014	2.671	0.373	0.005	2.671	0.000	0.000	47406	47407	0	0	1	Gwye	Gwye	Unknown	0.14
0	La Grande	NORTHWE	0.016	7.962	2.654	0.378	0.005	2.654	0.000	0.000	46734	46732	0	0	1	Gwye	Delta	Unknown	0.14
0	Krain Corn	NORTHWE	0.016	7.894	2.631	0.366	0.005	2.631	0.000	0.000	42509	42510	0	0	1	Gwye	Delta	Unknown	0.14
0	Cedar Falls	NORTHWE	0.016	7.808	2.603	0.365	0.005	2.603	0.000	0.000	42125	42126	0	0	1	Gwye	Delta	Unknown	0.14
0	Wolverine	PACE	0.016	5.723	1.908	0.380	0.005	1.908	0.000	0.000	67512	67513	0	0	1	Unknown	Unknown	Unknown	0.19
0	Addy 230/1	NORTHWE	0.016	4.122	1.647	0.390	0.009	2.140	0.003	1.424	40021	40017	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Chief Josep	NORTHWE	0.016	4.108	1.369	0.724	0.005	1.369	0.000	0.000	44162	44141	44142	44155	1	Gwye	Delta	Single Pha	0.51
0	Sno-king 2	NORTHWE	0.016	4.087	0.768	0.106	0.004	1.048	0.004	1.885	41008	41014	0	0	2	Gwye	Gwye	3-Legged C	0.13
0	St. Marys 2	NORTHWE	0.016	4.065	1.485	0.424	0.007	1.669	0.001	0.688	43541	43737	0	0	1	Gwye	Gwye	Unknown	0.28
0	Intalco 230	NORTHWE	0.016	4.061	1.354	0.386	0.005	1.354	0.000	0.000	40573	41217	0	0	4	Unknown	Unknown	Unknown	0.28
0	Intalco 230	NORTHWE	0.016	4.061	1.354	0.386	0.005	1.354	0.000	0.000	40573	41218	0	0	5	Unknown	Unknown	Unknown	0.28
0	Grants Pas	NORTHWE	0.016	4.048	2.017	0.579	0.013	3.262	0.006	2.965	45123	45121	0	0	3	Gwye	Gwye	Unknown	0.28
0	Fredonia (F	NORTHWE	0.016	3.917	1.306	0.359	0.005	1.306	0.000	0.000	42113	42112	0	0	1	Unknown	Unknown	Unknown	0.28
0	Fredonia (F	NORTHWE	0.016	3.906	1.302	0.356	0.005	1.302	0.000	0.000	42113	42111	0	0	1	Gwye	Delta	Unknown	0.28
0	Centralia S	NORTHWE	0.016	1.901	0.634	0.753	0.005	0.634	0.000	0.000	47731	47736	47737	47733	1	Unknown	Unknown	Unknown	1.10
0	Centralia S	NORTHWE	0.016	1.901	0.634	0.753	0.005	0.634	0.000	0.000	47731	47734	47735	47732	1	Unknown	Unknown	Unknown	1.10
0	Kettle Falls	NORTHWE	0.015	7.764	2.588	0.366	0.005	2.588	0.000	0.000	48175	48173	0	0	1	Unknown	Unknown	Unknown	0.14
0	Cornelius 1	NORTHWE	0.015	7.621	2.490	0.349	0.005	2.463	0.000	0.303	43109	43107	0	0	1	Gwye	Gwye	Unknown	0.14
0	Cushman 2	NORTHWE	0.015	7.566	2.522	0.362	0.005	2.522	0.000	0.000	46682	46791	0	0	1	Gwye	Delta	Unknown	0.14
0	Cushman 2	NORTHWE	0.015	7.281	2.427	0.348	0.005	2.427	0.000	0.000	46681	46791	0	0	1	Gwye	Delta	Unknown	0.14
0	Linneman 2	NORTHWE	0.015	3.877	0.521	0.149	0.008	1.919	0.006	3.099	43291	43289	0	0	1	Gwye	Gwye	Unknown	0.28
0	Grants Pas	NORTHWE	0.015	3.854	1.920	0.551	0.012	3.106	0.006	2.823	45123	45121	0	0	1	Gwye	Gwye	Unknown	0.28
0	Bellingham	NORTHWE	0.015	3.849	2.560	0.611	0.015	3.888	0.005	2.683	40095	40093	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Intalco 230	NORTHWE	0.015	3.840	1.280	0.365	0.005	1.280	0.000	0.000	40573	41220	0	0	7	Unknown	Unknown	Unknown	0.28
0	Hermiston	NORTHWE	0.015	3.806	1.269	0.350	0.005	1.269	0.000	0.000	45137	45456	0	0	1	Unknown	Unknown	Unknown	0.28
0	Hermiston	NORTHWE	0.015	3.806	1.269	0.350	0.005	1.269	0.000	0.000	45137	45454	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grants Pas	NORTHWE	0.015	3.772	1.879	0.539	0.012	3.040	0.006	2.763	45123	45121	0	0	2	Gwye	Gwye	Unknown	0.28
0	Frenchmar	NORTHWE	0.015	3.749	0.925	0.257	0.008	2.003	0.006	2.784	46164	46168	0	0	1	Unknown	Unknown	Unknown	0.28
0	Intalco 230	NORTHWE	0.015	3.734	1.245	0.355	0.005	1.245	0.000	0.000	40573	41214	0	0	1	Unknown	Unknown	Unknown	0.28
0	Ancient Lal	NORTHWE	0.015	3.701	1.000	0.284	0.007	1.654	0.004	2.143	46005	46003	0	0	1	Unknown	Unknown	Unknown	0.28
0	Intalco 230	NORTHWE	0.015	3.661	1.220	0.348	0.005	1.220	0.000	0.000	40573	41215	0	0	2	Unknown	Unknown	Unknown	0.28
0	Scenic 115,	NORTHWE	0.014	7.215	2.405	0.339	0.005	2.405	0.000	0.000	45478	45477	0	0	1	Gwye	Gwye	Unknown	0.14
0	Del Norte 1	NORTHWE	0.014	7.199	2.400	0.328	0.005	2.400	0.000	0.000	45085	45385	0	0	1	Gwye	Gwye	Unknown	0.14
0	Del Norte 1	NORTHWE	0.014	7.199	2.400	0.328	0.005	2.400	0.000	0.000	45085	45386	0	0	1	Gwye	Gwye	Unknown	0.14
0	Roza 115/3	NORTHWE	0.014	6.954	2.318	0.325	0.005	2.318	0.000	0.000	41286	41285	40756	41284	1	Unknown	Unknown	Unknown	0.14
0	Stateline W	NORTHWE	0.014	3.554	1.185	0.327	0.005	1.185	0.000	0.000	44856	44855	0	0	1	Gwye	Gwye	Unknown	0.28
0	Columbia F	NORTHWE	0.014	3.512	1.066	0.254	0.004	0.961	0.001	0.314	40249	40247	0	0	2	Gwye	Gwye	Core, Thre	0.23
0	Dixonville 2	NORTHWE	0.014	3.505	1.433	0.414	0.007	1.812	0.002	1.064	45093	45091	0	0	1	Gwye	Gwye	Unknown	0.28
0	Dixonville 2	NORTHWE	0.014	3.505	1.433	0.414	0.007	1.812	0.002	1.064	45093	45091	0	0	2	Gwye	Gwye	Unknown	0.28
0	Tacoma 23	NORTHWE	0.014	3.472	0.332	0.095	0.005	1.284	0.005	2.350	41049	46631	0	0	2	Gwye	Gwye	Unknown	0.28
0	Locust 230	IDAHO	0.014	3.437	0.544	0.073	0.005	1.270	0.005	2.174	60207	61254	0	0	2	Gwye	Gwye	3-Legged C	0.13
0	Boundary 2	NORTHWE	0.014	3.430	1.143	0.326	0.005	1.143	0.000	0.000	46482	46470	0	0	4	Gwye	Delta	Unknown	0.28
0	Big Eddy 2	NORTHWE	0.014	3.407	0.676	0.267	0.010	2.457	0.007	3.593	41341	40107	0	0	1	Gwye	Gwye	Three Pha	0.38
0	Wauna 230	NORTHWE	0.014	3.406	1.135	0.321	0.005	1.135	0.000	0.000	47260	47290	0	0	1	Unknown	Unknown	Unknown	0.28
0	McNary 11	NORTHWE	0.013	6.685	1.337	0.154	0.000	0.000	0.003	2.228	40717	40715	0	0	1	Delta	Gwye	Core, Thre	0.12
0	Jackson Hy	NORTHWE	0.013	6.656	2.219	0.148	0.004	2.219	0.000	0.000	45685	45687	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Jackson Hy	NORTHWE	0.013	6.656	2.219	0.148	0.004	2.219	0.000	0.000	45685	45689	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Monpac 11	NORTHWE	0.013	6.566	2.189	0.298	0.004	2.189	0.000	0.000	45354	45355	0	0	1	Gwye	Gwye	Unknown	0.14
0	Rathdrum	NORTHWE	0.013	6.456	2.152	0.298	0.004	2.152	0.000	0.000	48353	48361	0	0	1	Unknown	Unknown	Unknown	0.14
0	Sumas Cog	NORTHWE	0.013	6.406	2.135	0.295	0.004	2.135	0.000	0.000	42020	42022	0	0	1	Gwye	Delta	Unknown	0.14
0	Sumas Cog	NORTHWE	0.013	6.406	2.135	0.295	0.004	2.135	0.000	0.000	42020	42021	0	0	1	Gwye	Delta	Unknown	0.14
0	Jacksonvill	NORTHWE	0.013	6.391	2.130	0.297	0.004	2.130	0.000	0.000	45252	45250	0	0	1	Gwye	Gwye	Unknown	0.14
0	Grand Ron	NORTHWE	0.013	6.379	2.176	0.307	0.004	2.242	0.000	0.465	43223	43221	0	0	1	Gwye	Gwye	Unknown	0.14
0	Rathdrum	NORTHWE	0.013	6.316	2.105	0.292	0.004	2.105	0.000	0.000	48351	48359	0	0	1	Unknown	Unknown	Unknown	0.14
0	Cougar 115	NORTHWE	0.013	6.301	2.100	0.251	0.004	2.100	0.000	0.000	46211	41304	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Swan Falls	IDAHO	0.013	5.503	1.834	0.150	0.004	1.834	0.000	0.000	60332	60331	0	0	1	Gwye	Delta	3-Legged C	0.08
0	Lucky Peak	IDAHO	0.013	5.314	1.771	0.305	0.004	1.771	0.000	0.000	60215	61816	0	0	1	Gwye	Delta	Unknown	0.17
0	Lucky Peak	IDAHO	0.013	5.314	1.771	0.305	0.004	1.771	0.000	0.000	60215	61817	0	0	1	Gwye	Delta	Unknown	0.17
0	Tacoma 23	NORTHWE	0.013	3.387	0.324	0.093	0.005	1.253	0.005	2.292	41049	46631	0	0	3	Gwye	Gwye	Unknown	0.28
0	Boundary 2	NORTHWE	0.013	3.356	1.119	0.319	0.004	1.119	0.000	0.000	46478	46466	0	0	2	Gwye	Delta	Unknown	0.28
0	Boundary 2	NORTHWE	0.013	3.336	1.112	0.317	0.004	1.112	0.000	0.000	46480	46468	0	0	3	Gwye	Delta	Unknown	0.28
0	Boundary 2	NORTHWE	0.013	3.271	1.090	0.311	0.004	1.090	0.000	0.000	46476	46464	0	0	1	Gwye	Delta	Unknown	0.28
0	Golden Hill	NORTHWE	0.013	3.270	1.090	0.318	0.004	1.090	0.000	0.000	47486	47490	0	0	1	Unknown	Unknown	Unknown	0.28
0	Golden Hill	NORTHWE	0.013	3.270	1.090	0.318	0.004	1.090	0.000	0.000	47486	47487	0	0	1	Unknown	Unknown	Unknown	0.28
0	Rivergate 2	NORTHWE	0.013	3.258	1.086	0.306	0.004	1.086	0.000	0.000	43459	43463	0	0	1	Gwye	Gwye	Unknown	0.28
0	Copco 1 23	NORTHWE	0.013	3.254	2.175	0.625	0.014	3.448	0.005	2.699	45063	45061	0	0	2	Gwye	Gwye	Unknown	0.28
0	Copco 1 23	NORTHWE	0.013	3.254	2.175	0.625	0.014	3.448	0.005	2.699	45063	45061	0	0	1	Gwye	Gwye	Unknown	0.28
0	White Bluf	NORTHWE	0.013	3.241	3.778	0.894	0.026	6.476	0.011	5.396	41149	41147	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Mayfield 2	NORTHWE	0.013	3.221	1.074	0.311	0.004	1.074	0.000	0.000	46625	46624	0	0	1	Gwye	Delta	Unknown	0.28
0	Noxon Rap	NORTHWE	0.013	3.193	1.064	0.302	0.004	1.064	0.000	0.000	48281	48283	0	0	1	Unknown	Unknown	Unknown	0.28
0	Kendall 11	NORTHWE	0.012	6.231	2.077	0.286	0.004	2.077	0.000	0.000	42008	42009	0	0	1	Gwye	Delta	Unknown	0.14
0	Hills Creek	NORTHWE	0.012	6.195	2.065	0.245	0.004	2.065	0.000	0.000	41212	41213	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Yreka 115/	NORTHWE	0.012	6.073	2.024	0.296	0.004	2.025	0.000	0.000	45538	45537	0	0	1	Gwye	Gwye	Unknown	0.14
0	Condon W	NORTHWE	0.012	5.821	1.946	0.281	0.004	1.948	0.000	0.007	41365	41363	0	0	1	Unknown	Unknown	Unknown	0.14
0	Orenco 11	NORTHWE	0.012	5.777	1.906	0.273	0.004	1.900	0.000	0.153	43381	43379	0	0	1	Gwye	Gwye	Unknown	0.14

45123	45121	0	0	1	0.55
42503	42514	0	0	2	0.55
42363	42364	0	0	1	0.55
65155	65156	0	0	1	0.54
45183	45179	45308	45310	1	0.54
45123	45121	0	0	2	0.54
40671	41228	0	0	1	0.53
40875	40874	0	0	1	0.53
42501	42512	0	0	1	0.53
43021	43018	0	0	1	0.53
43527	43523	0	0	1	0.53
60394	60390	0	0	1	0.52
48316	48315	0	0	1	0.52
46486	46474	0	0	6	0.52
46484	46472	0	0	5	0.52
40875	40873	0	0	2	0.52
44911	45332	0	0	1	0.52
45128	45130	0	0	2	0.51
46089	46087	0	0	1	0.51
41131	41129	0	0	1	0.50
45111	45109	0	0	2	0.50
41328	40992	0	0	3	0.49
46860	46862	0	0	1	0.49
60110	60105	0	0	1	0.49
40599	40597	0	0	2	0.49
46613	46790	0	0	1	0.49
46613	46789	0	0	1	0.49
40787	48287	0	0	1	0.49
48357	48355	0	0	1	0.49
46293	46292	0	0	1	0.49
40043	40041	0	0	3	0.48
47857	47966	0	0	1	0.48
41184	41185	0	0	1	0.48
44200	44191	44192	44197	1	0.48
40624	47568	0	0	1	0.47
47100	47104	0	0	T1	0.47
46435	46433	0	0	1	0.47
47100	47105	0	0	T2	0.47
47102	47106	0	0	T3	0.47
47102	47107	0	0	T4	0.47
44201	44193	44194	44198	2	0.47
47102	47108	0	0	T5	0.47
44164	44145	44146	44157	1	0.47
40280	40279	0	0	1	0.46
45588	45589	0	0	1	0.46
48251	48247	0	0	1	0.46
40709	40707	0	0	1	0.46
45125	45213	0	0	1	0.46
42500	42511	0	0	2	0.45
61829	60255	0	0	1	0.45
43215	43219	0	0	1	0.45
65025	65026	0	0	1	0.45
43527	43525	0	0	1	0.44
45203	45348	0	0	1	0.44
40485	40484	0	0	1	0.44
40573	41216	0	0	3	0.43
43541	43737	0	0	1	0.42
43909	43905	0	0	1	0.42
40805	40803	0	0	1	0.42
40899	40897	0	0	2	0.42
47165	47166	0	0	1	0.42
47830	47835	0	0	1	0.42
47830	47833	0	0	1	0.42
43483	43490	0	0	1	0.42
43483	43488	0	0	1	0.42
40657	40655	0	0	1	0.42
44122	44101	44102	44115	1	0.42
43482	43486	0	0	1	0.42
45093	45091	0	0	2	0.41
45093	45091	0	0	1	0.41
44123	44103	44104	44116	1	0.41
43541	43555	0	0	1	0.41
43193	43191	0	0	1	0.40
40573	41219	0	0	6	0.40
40021	40017	0	0	1	0.39
43372	43373	0	0	1	0.39
40095	40093	0	0	2	0.39
45111	45109	0	0	1	0.39
40573	41217	0	0	4	0.39
40573	41218	0	0	5	0.39
44126	44107	44108	44118	1	0.38
44124	44105	44106	44117	1	0.38
44059	44047	0	0	1	0.38
67512	67513	0	0	1	0.38
46734	46732	0	0	1	0.38
42335	42336	0	0	1	0.38
40939	45475	0	0	1	0.38
43123	43111	43119	43115	1	0.38
40367	40361	0	0	1	0.37
47406	47407	0	0	1	0.37
65850	65851	0	0	2	0.37
42503	42513	0	0	1	0.37
48175	48173	0	0	1	0.37
47572	47571	0	0	1	0.37
40573	41220	0	0	7	0.37
42509	42510	0	0	1	0.37
42125	42126	0	0	1	0.36
46682	46791	0	0	1	0.36
42113	42112	0	0	1	0.36
42113	42111	0	0	1	0.36
40573	41214	0	0	1	0.36
43109	43107	0	0	1	0.35
45137	45454	0	0	1	0.35
45137	45456	0	0	1	0.35
46681	46791	0	0	1	0.35
40573	41215	0	0	2	0.35
45478	45477	0	0	1	0.34
40261	40259	0	0	2	0.33
45085	45386	0	0	1	0.33
45085	45385	0	0	1	0.33
43519	43517	0	0	1	0.33
44127	44109	44110	44119	1	0.33
46482	46470	0	0	4	0.33
41286	41285	40756	41284	1	0.33
44127	44111	44112	44120	1	0.32
47260	47290	0	0	1	0.32
46478	46466	0	0	2	0.32
46480	46468	0	0	3	0.32
47486	47490	0	0	1	0.32
47486	47487	0	0	1	0.32
43215	43217	0	0	1	0.31
60215	61816	0	0	1	0.31
60215	61817	0	0	1	0.31
46476	46464	0	0	1	0.31
46625	46624	0	0	1	0.31
43223	43221	0	0	1	0.31
43459	43463	0	0	1	0.31
48281	48283	0	0	1	0.30
47827	47813	0	0	1	0.30
48353	48361	0	0	1	0.30
45354	45355	0	0	1	0.30
44856	44855	0	0	1	0.30
42507	42508	0	0	1	0.30
45252	45250	0	0	1	0.30
45538	45537	0	0	1	0.30
42020	42022	0	0	1	0.30
42020	42021	0	0	1	0.30
43909	43907	0	0	1	0.29
41751	41721	0	0	1	0.29
48351	48359	0	0	1	0.29
41401	41402	0	0	1	0.29
45167	45165	0	0	1	0.29
44057	44043	0	0	1	0.29
40792	40790	0	0	2	0.29
47827	47902	0	0	1	0.29
47827	47903	0	0	2	0.29
48317	48315	0	0	2	0.29
42008	42009	0	0	1	0.29
47822	47829	0	0	1	0.28

3	-400 Baseli	0	Fry 230/11	NORTHWE	0.03	6.35	1.79	0.50	0.01	1.90	0.00	1.88	45111	45109	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Pilot Butte	NORTHWE	0.03	6.33	2.11	0.60	0.01	2.11	0.00	0.00	45239	45441	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Rathdrum	NORTHWE	0.01	6.32	2.11	0.29	0.00	2.11	0.00	0.00	48351	48359	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Grand Cou	NORTHWE	0.03	6.31	2.10	0.61	0.01	2.10	0.00	0.00	41752	41729	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Cougar 115	NORTHWE	0.01	6.30	2.10	0.25	0.00	2.10	0.00	0.00	46211	41304	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Kendall 11	NORTHWE	0.01	6.23	2.08	0.29	0.00	2.08	0.00	0.00	42008	42009	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Boulder Pa	NORTHWE	0.03	6.21	0.71	0.20	0.01	1.84	0.01	3.64	48524	48522	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Big Eddy 5	NORTHWE	0.05	6.21	12.83	15.29	0.19	22.00	0.08	19.94	40111	41341	0	0	2	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Bell 230/11	NORTHWE	0.03	6.20	2.63	0.62	0.02	4.28	0.01	4.16	40088	40087	0	0	1	Unknown	Unknown	Core, Thre	0.23
3	-400 Baseli	0	Hills Creek	NORTHWE	0.01	6.20	2.07	0.25	0.00	2.07	0.00	0.00	41212	41213	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Bothell 230	NORTHWE	0.03	6.19	3.94	1.13	0.03	7.23	0.01	7.12	46403	46401	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Bothell 230	NORTHWE	0.03	6.17	3.95	1.13	0.03	7.25	0.01	7.13	46403	46401	0	0	4	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Redmond 2	NORTHWE	0.02	6.13	2.41	0.69	0.01	2.85	0.00	1.05	40876	40873	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	St. Marys 2	NORTHWE	0.02	6.13	1.41	0.41	0.02	4.23	0.01	6.04	43541	43555	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Schnebly 2	NORTHWE	0.02	6.12	2.37	0.67	0.01	2.42	0.00	0.39	42374	42375	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Green Vall	NORTHWE	0.02	6.10	2.03	0.58	0.01	2.03	0.00	0.00	40487	41209	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Yreka 115/	NORTHWE	0.01	6.07	2.02	0.30	0.00	2.03	0.00	0.00	45538	45537	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Grand Cou	NORTHWE	0.02	6.05	2.02	0.58	0.01	2.02	0.00	0.00	41751	41722	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Vantage 50	NORTHWE	0.05	6.04	3.42	4.02	0.04	4.62	0.01	2.61	41113	41112	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Mont. 230,	NORTHWE	0.02	6.04	2.01	0.58	0.01	2.01	0.00	0.00	47398	47399	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Juniper 23	NORTHWE	0.02	5.99	2.00	0.58	0.01	2.00	0.00	0.00	47390	47391	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Pilot Butte	NORTHWE	0.02	5.98	1.99	0.57	0.01	1.99	0.00	0.00	45239	45441	0	0	3	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Pilot Butte	NORTHWE	0.02	5.98	1.99	0.57	0.01	1.99	0.00	0.00	45239	45441	0	0	2	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Libby - PAC	NORTHWE	0.02	5.98	1.99	0.48	0.01	1.99	0.00	0.00	44200	44191	44192	44197	1	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Sammamis	NORTHWE	0.02	5.95	2.03	0.58	0.02	3.88	0.01	4.66	42318	42322	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Carver 230	NORTHWE	0.02	5.89	2.53	0.73	0.01	3.09	0.00	1.14	43089	43088	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Rocky Read	NORTHWE	0.02	5.86	0.51	0.07	0.00	0.99	0.01	2.92	46831	46821	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Libby - PAC	NORTHWE	0.02	5.86	1.95	0.47	0.01	1.95	0.00	0.00	44201	44193	44194	44198	2	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Ashe 230/2	NORTHWE	0.02	5.82	1.94	0.55	0.01	1.94	0.00	0.00	40059	40060	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Condon W	NORTHWE	0.01	5.82	1.95	0.28	0.00	1.95	0.00	0.01	41365	41363	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Massachus	NORTHWE	0.02	5.80	1.66	0.47	0.01	2.50	0.01	2.95	46435	46433	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Orenco 11	NORTHWE	0.01	5.78	1.91	0.27	0.00	1.90	0.00	0.15	43381	43379	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Wild Horse	NORTHWE	0.02	5.75	1.92	0.55	0.01	1.92	0.00	0.00	42363	42365	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Twin Falls	NORTHWE	0.01	5.74	1.91	0.27	0.00	1.91	0.00	0.00	42340	42341	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Wolverine	PACE	0.02	5.72	1.91	0.38	0.01	1.91	0.00	0.00	67512	67513	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Klondike W	NORTHWE	0.02	5.72	1.91	0.56	0.01	1.91	0.00	0.00	47830	47834	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Wild Horse	NORTHWE	0.02	5.71	1.90	0.54	0.01	1.90	0.00	0.00	42363	42370	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Texaco 115	NORTHWE	0.01	5.69	1.90	0.26	0.00	1.90	0.00	0.00	42130	42132	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Texaco 115	NORTHWE	0.01	5.69	1.90	0.26	0.00	1.90	0.00	0.00	42130	42131	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Weed Junc	NORTHWE	0.01	5.67	1.89	0.27	0.00	1.89	0.00	0.00	44961	45525	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	COB Energ	NORTHWE	0.05	5.65	1.88	2.25	0.02	1.88	0.00	0.00	45262	45450	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	COB Energ	NORTHWE	0.05	5.65	1.88	2.25	0.02	1.88	0.00	0.00	45262	45451	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Sand Dune	NORTHWE	0.02	5.64	1.84	0.51	0.01	1.83	0.00	0.53	46089	46087	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Detroit 230	NORTHWE	0.02	5.64	1.88	0.98	0.01	1.88	0.00	0.00	40345	40344	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Boundary 2	NORTHWE	0.02	5.64	1.88	0.52	0.01	1.88	0.00	0.00	46484	46472	0	0	5	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Boundary 2	NORTHWE	0.02	5.64	1.88	0.52	0.01	1.88	0.00	0.00	46486	46474	0	0	6	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Terrell Cre	NORTHWE	0.01	5.63	1.88	0.27	0.00	1.88	0.00	0.00	42030	42032	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Detroit 230	NORTHWE	0.02	5.63	1.88	0.98	0.01	1.88	0.00	0.00	40345	40344	0	0	2	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Wild Horse	NORTHWE	0.02	5.61	1.87	0.54	0.01	1.87	0.00	0.00	42363	42364	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Talbot 230	NORTHWE	0.02	5.60	1.81	0.53	0.01	2.52	0.01	2.54	42501	42512	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Longview 2	NORTHWE	0.02	5.59	1.86	0.53	0.01	1.86	0.00	0.00	40671	41228	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Northeast	NORTHWE	0.01	5.57	1.86	0.26	0.00	1.86	0.00	0.00	48277	48275	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Cushman 1	NORTHWE	0.01	5.56	1.85	0.49	0.00	1.85	0.00	0.00	46613	46790	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Cushman 1	NORTHWE	0.01	5.56	1.85	0.49	0.00	1.85	0.00	0.00	46613	46789	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Terrell Cre	NORTHWE	0.01	5.55	1.85	0.26	0.00	1.85	0.00	0.00	42030	42031	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Noxon Rap	NORTHWE	0.02	5.54	1.85	0.49	0.01	1.85	0.00	0.00	40787	48287	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Massachus	NORTHWE	0.02	5.54	3.10	0.87	0.02	5.70	0.01	5.78	46435	46433	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Terrell Cre	NORTHWE	0.01	5.52	1.84	0.26	0.00	1.84	0.00	0.00	42030	42033	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Massachus	NORTHWE	0.02	5.52	3.10	0.87	0.02	5.71	0.01	5.79	46435	46433	0	0	3	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Swan Falls	IDAHO	0.01	5.51	1.84	0.15	0.00	1.84	0.00	0.00	60332	60331	0	0	1	Gwye	Delta	3-Legged C	0.08
3	-400 Baseli	0	Beaver 230	NORTHWE	0.02	5.48	1.83	0.53	0.01	1.83	0.00	0.00	43021	43018	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Cove 230/6	NORTHWE	0.02	5.40	1.80	0.51	0.01	1.80	0.00	0.00	45128	45130	0	0	2	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Monitor 23	NORTHWE	0.02	5.39	2.11	0.60	0.01	2.46	0.00	2.15	43329	43327	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Lone Pine 2	NORTHWE	0.02	5.36	1.91	0.54	0.01	1.97	0.00	0.19	45183	45179	45308	45310	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Ice Harbor	NORTHWE	0.01	5.33	1.78	0.20	0.00	1.78	0.00	0.00	40565	40560	0	0	2	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	O'Brien 23	NORTHWE	0.02	5.32	1.27	0.37	0.01	1.25	0.00	1.69	42503	42513	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Texaco 115	NORTHWE	0.01	5.31	1.77	0.24	0.00	1.77	0.00	0.00	42130	42133	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	La Pine 230	NORTHWE	0.02	5.31	0.99	0.24	0.00	0.64	0.00	1.79	40635	40633	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Foster 115	NORTHWE	0.01	5.31	1.77	0.20	0.00	1.77	0.00	0.00	40435	44031	44032	44033	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Grand Cou	NORTHWE	0.02	5.29	0.25	0.07	0.01	2.26	0.01	4.02	41356	40281	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Ice Harbor	NORTHWE	0.01	5.24	1.75	0.20	0.00	1.75	0.00	0.00	40565	40559	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Lucky Peak	IDAHO	0.01	5.19	1.73	0.30	0.00	1.73	0.00	0.00	60215	61816	0	0	1	Gwye	Delta	Unknown	0.17
3	-400 Baseli	0	Lucky Peak	IDAHO	0.01	5.19	1.73	0.30	0.00	1.73	0.00	0.00	60215	61817	0	0	1	Gwye	Delta	Unknown	0.17
3	-400 Baseli	0	Fredericks	NORTHWE	0.01	5.14	1.72	0.23	0.00	1.72	0.00	0.00	42720	42722	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Fredericks	NORTHWE	0.01	5.14	1.72	0.23	0.00	1.72	0.00	0.00	42720	42721	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Lancaster 2	NORTHWE	0.02	5.13	1.71	0.47	0.01	1.71	0.00	0.00	40624	47568	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rathdrum	NORTHWE	0.02	5.12	1.73	0.49	0.01	1.79	0.00	0.53	48357	48355	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Gresham 2	NORTHWE	0.02	5.09	1.57	0.45	0.01	1.78	0.00	1.47	43215	43219	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Ice Harbor	NORTHWE	0.01	5.09	1.70	0.19	0.00	1.70	0.00	0.00	40569	40564	0	0	6	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Greenwoo	NORTHWE	0.01	5.09	1.70	0.24	0.00	1.70	0.00	0.00	48143	48229	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Ice Harbor	NORTHWE	0.01	5.03	1.68	0.19	0.00	1.68	0.00	0.00	40569	40563	0	0	5	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Maupin 23	NORTHWE	0.02	5.03	1.60	0.46	0.01	1.56	0.00	0.13	40709	40707	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Naches 11	NORTHWE	0.01	5.03	1.68	0.23	0.00	1.68	0.00	0.00	45211	45361	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Mcloughlin	NORTHWE	0.02	5.03	2.82	0.81	0.02	4.40	0.01	3.59	43313	43311	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Fredonia (I	NORTHWE	0.01	5.02	1.67	0.23	0.00	1.67	0.00	0.00	42110	42115	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Fredonia (I	NORTHWE	0.01	4.99	1.66	0.23	0.00	1.66	0.00	0.00	42110	42114	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Marengo V	NORTHWE	0.02	4.97	1.66	0.46	0.01	1.66	0.00	0.00	44911	45332	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Faraday 11	NORTHWE	0.01	4.95	2.81	0.40	0.01	4.06	0.00	2.48	43193	43191	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Fry 230/11	NORTHWE	0.02	4.94	1.39	0.39	0.01	1.48	0.00	1.46	45111	45109	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Troutdale 2	NORTHWE	0.02	4.94	0.49	0.14	0.00	0.00	0.00	1.65	45303	45297	0	0	1	Delta	Gwye	Unknown	0.28
3	-400 Baseli	0	Miller 230/	NORTHWE	0.02	4.93	1.64	0.48	0.01	1.64	0.00	0.00	47857	47966	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Oregon Cit	NORTHWE	0.01	4.91	1.64	0.42	0.00	1.64	0.00	0.00	40805	40803	0	0	1	Gwye	Gwye	Single Pha	0.25
3	-400 Baseli	0	Post Falls 1	NORTHWE	0.01	4.90	1.63	0.23	0.00	1.63	0.00	0.00	48329	48331	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Amps 230/	PACE	0.02	4.85	1.62	0.44	0.01	1.62	0.00	0.00	65025	65026	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.02	4.82	1.61	0.46	0.01	1.61	0.00	0.00	40280	40279	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Dran 230/1	IDAHO	0.02	4.71	1.42	0.19	0.01	1.32	0.00	0.85	60130	61223	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Cold Spring	NORTHWE	0.02	4.71	0.47	0.14	0.00	0.00	0.00	1.57	45051	45050	0	0	1	Delta	Gwye	Unknown	0.28
3	-400 Baseli	0	Stateline W	NORTHWE	0.02	4.71	1.57	0.44	0.01	1.57	0.00	0.00	47572	47571	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Headwork	NORTHWE	0.01	4.69	1.56	0.24	0.00	1.56	0.00	0.00	48149	46619	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Gresham 2	NORTHWE	0.02	4.68	1.10	0.31	0.01	3.57	0.01	5.05	43215	43217	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Redmond 2	NORTHWE	0.02	4.67	1.86	0.52	0.01	2.21	0.00	0.81	40875	40873	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Carmen Sn	NORTHWE	0.01	4.65	1.55	0.11	0.00	1.55	0.00	0.00	46209	46210	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Rocky Read	NORTHWE	0.02	4.63	0.20	0.03	0.01	1.52	0.01	3.04	46831	46821	0	0	2	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Redmond 2	NORTHWE	0.02	4.61	1.86	0.53	0.01	2.23	0.00	0.87	40875	40874	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Dran 230/1	IDAHO	0.02	4.58	1.49	0.20	0.01	1.57	0.00	0.88	60130	61223	0	0	2	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Keeler 230	NORTHWE	0.02	4.57	2.91	0.69	0.02	4.52	0.01	3.41	40599	40597	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Chief Josep	NORTHWE	0.02	4.53	1.51	0.80	0.01	1.51	0.00	0.00	44165	44147	44148	44158	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Intalco 230	NORTHWE	0.02	4.49	1.50	0.43	0.01	1.50	0.00	0.00	40573	41216	0	0	3	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Libby - USC	NORTHWE	0.02	4.47	1.74	0.42	0.01	3.52	0.01	4.14	40657	40655	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Port Of Wa	NORTHWE	0.02	4.45	1.49	0.42	0.01	1.49	0.00	0.00	43909	43905	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Coyote Spr	NORTHWE	0.04	4.44	1.48	1.76	0.01	1.48	0.00	0.00	43123	48516	48518	48519	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Snoqualmi	NORTHWE	0.01	4.43	1.48	0.21	0.00	1.48	0.00	0.00	42330	42331	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Hanford G	NORTHWE	0.01	4.40	1.47	0.21	0.00	1.47	0.00	0.00	40502	40504	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Bothell 230	NORTHWE	0.02	4.37	2.89	0.83	0.02	5.34	0.01	5.24	46403	46401	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Bothell 230	NORTHWE	0.02	4.37	2.89	0.83	0.02	5.34	0.01	5.24	46403	46401	0	0	3	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Round But	NORTHWE	0.02	4.36	1.45	0.42	0.01	1.45	0.00	0.00	43483	43490	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Round But	NORTHWE	0.02	4.36	1.45	0.42	0.01	1.45	0.00	0.00	43483	43488	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Parker 115	NORTHWE	0.01	4.35	1.45	0.20	0.00	1.45	0.00	0.00	40815	41254	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Parker 115	NORTHWE	0.01	4.35	1.45	0.20	0.00	1.45	0.00	0.00	40815	41246	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Round But	NORTHWE	0.02	4.34	1.45	0.42	0.01	1.45	0.00	0.00	43482	43486	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Chief Josep	NORTHWE	0.04	4.31	1.44	1.71	0.01	1.44	0.00	0.00	44166	44149	44150	44159	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Bonneville	NORTHWE	0.02	4.30	1.43	0.73	0.01	1.43	0.00	0.00	44014	44002	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Klondike W	NORTHWE	0.02	4.28	1.43	0.42	0.01	1.43	0.00	0.00	47830	47833	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Klondike W	NORTHWE	0.02	4.28	1.43	0.42	0.01	1.43	0.00	0.00	47830	47835	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Chief Josep	NORTHWE	0.04	4.20	1.40	1.66	0.01	1.40	0.00	0.00	44167	44151	44152	44160	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Chief Josep	NORTHWE	0.02	4.19	1.40	0.74	0.01	1.40	0.00	0.00	44163	44143	44144	44156	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Intalco 230	NORTHWE	0.02	4.19	1.40	0.40	0.01	1.40	0.00	0.00	40573	41219	0	0	6	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Bonneville	NORTHWE	0.02	4.18	1.39	0.71	0.01	1.39	0.00	0.00	44015	44003	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Bonneville	NORTHWE	0.02	4.18	1.39	0.72	0.01	1.39	0.00	0.00	44015	44004	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Olympia 23	NORTHWE	0.02	4.18	1.21	0.29	0.01	1.86	0.00	2.25	40792	40790	0	0	2	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Craig View	NORTHWE	0.01	4.15	1.83	0.25	0.01	2.49	0.00	1.11	45069	45134	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Stateline W	NORTHWE	0.01	4.13	1.55	0.22	0.00	1.62	0.00	0.24	47574	47573	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Addy 230/	NORTHWE	0.02	4.12	1.65	0.39	0.01	2.14	0.00	1.43	40021	40017	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Chief Josep	NORTHWE	0.02	4.11	1.37	0.72	0.01	1.37	0.00	0.00	44162	44141	44142	44155	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Olympia 30	NORTHWE	0.02	4.10	3.40	2.34	0.05	10.17	0.04	8.91	40795	40793	0	0	1	Gwye	Gwye	Single Pha	0.66
3	-400 Baseli	0	I.E. Paper 1	NORTHWE	0.01	4.10	1.37	0.19	0.00	1.37	0.00	0.00	48163	48166	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	I.E. Paper 1	NORTHWE	0.01	4.10	1.37	0.19	0.00	1.37	0.00	0.00	48163	48168	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Sno-king 2	NORTHWE	0.02	4.09	0.77	0.11	0.00	1.05	0.00	1.89	41008	41014	0	0	2	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	St. Marys 2	NORTHWE	0.02	4.07	1.49	0.42	0.01	1.67	0.00	0.69	43541	43737	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Intalco 230	NORTHWE	0.02	4.06	1.35	0.39	0.01	1.35	0.00	0.00	40573	41218	0	0	5	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Intalco 230	NORTHWE	0.02	4.06	1.35	0.39	0.01	1.35	0.00	0.00	40573	41217	0	0	4	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hilltop 345	SIERRA	0.02	4.05	4.60	0.00	0.07	11.93	0.05	11.19	64058	40537	0	0	1	Unknown	Unknown	Unknown	0.41
3	-400 Baseli	0	Chief Josep	NORTHWE	0.04	4.05	1.35	1.60	0.01	1.35	0.00	0.00	44167	44153	44154	44161	1	Gwye	Delta	Single Pha	1.10
3	-400 Baseli	0	Grants Pas	NORTHWE	0.02	4.05	2.02	0.58	0.01	3.26	0.01	2.97	45123	45121	0	0	3	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Fredonia (I	NORTHWE	0.01	3.99	1.33	0.19	0.00	1.33	0.00	0.00	42116	42117	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Fredonia (I	NORTHWE	0.02	3.92	1.31	0.36	0.01	1.31	0.00	0.00	42113	42112	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Wincheste	NORTHWE	0.01	3.91	1.30	0.18	0.00	1.30	0.00	0.00	45533	45534	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Fredonia (I	NORTHWE	0.02	3.91	1.30	0.35	0.01	1.30	0.00	0.00	42113	42111	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Wolverine	PACE	0.01	3.90	1.30	0.26	0.00	1.30	0.00	0.00	69513	69515	0	0	1	Unknown	Unknown	Unknown	0.19

6	+550 Basel	0	Grants Pas	NORTHWE	0.02	3.85	1.92	0.55	0.01	3.11	0.01	2.82	45123	45121	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	O'Brien 23	NORTHWE	0.03	7.72	1.91	0.55	0.01	1.80	0.00	2.23	42503	42514	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Wild Horse	NORTHWE	0.02	5.63	1.88	0.55	0.01	1.88	0.00	0.00	42363	42364	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Big Grassy	PACE	0.03	9.45	3.15	0.54	0.01	3.15	0.00	0.00	65155	65156	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Lone Pine 2	NORTHWE	0.02	5.36	1.91	0.54	0.01	1.97	0.00	0.19	45183	45179	45308	45310	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Grants Pas	NORTHWE	0.02	3.77	1.88	0.54	0.01	3.04	0.01	2.76	45123	45121	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Longview 2	NORTHWE	0.02	5.59	1.86	0.53	0.01	1.86	0.00	0.00	40671	41228	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Redmond 2	NORTHWE	0.02	4.61	1.86	0.53	0.01	2.23	0.00	0.87	40875	40874	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Talbot 230	NORTHWE	0.02	5.60	1.82	0.53	0.01	2.52	0.01	2.54	42501	42512	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Beaver 230	NORTHWE	0.02	5.48	1.83	0.53	0.01	1.83	0.00	0.00	43021	43018	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Sherwood	NORTHWE	0.05	13.40	1.84	0.53	0.01	1.47	0.01	5.54	43527	43523	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Danskin W	IDAHO	0.04	8.94	3.83	0.52	0.03	6.31	0.01	5.20	60394	60390	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Pine Creek	NORTHWE	0.02	11.82	3.94	0.52	0.00	1.77	0.01	5.15	48316	48315	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Boundary 2	NORTHWE	0.02	5.65	1.88	0.52	0.01	1.88	0.00	0.00	46486	46474	0	0	6	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Boundary 2	NORTHWE	0.02	5.65	1.88	0.52	0.01	1.88	0.00	0.00	46484	46472	0	0	5	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Redmond 2	NORTHWE	0.02	4.67	1.86	0.52	0.01	2.21	0.00	0.81	40875	40873	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Marengo V	NORTHWE	0.02	5.56	1.85	0.52	0.01	1.85	0.00	0.00	44911	45332	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Cove 230/6	NORTHWE	0.02	5.40	1.80	0.51	0.01	1.80	0.00	0.00	45128	45130	0	0	2	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Sand Dune	NORTHWE	0.02	5.64	1.84	0.51	0.01	1.83	0.00	0.53	46089	46087	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Walla Wall	NORTHWE	0.03	12.64	4.21	0.50	0.01	4.21	0.00	0.00	41131	41129	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Fry 230/11	NORTHWE	0.03	6.35	1.79	0.50	0.01	1.90	0.00	1.88	45111	45109	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Snohomish	NORTHWE	0.01	2.94	0.94	0.49	0.01	2.77	0.01	3.73	41328	40992	0	0	3	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Andrew Yo	NORTHWE	0.08	18.78	3.57	0.49	0.01	1.76	0.01	5.74	46860	46862	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Caldwell 2	IDAHO	0.05	11.39	3.66	0.49	0.01	3.45	0.00	0.36	60110	60105	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Keeler 230	NORTHWE	0.03	7.15	2.06	0.49	0.01	1.96	0.00	1.42	40599	40597	0	0	2	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Cushman 1	NORTHWE	0.01	5.56	1.85	0.49	0.00	1.85	0.00	0.00	46613	46790	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Cushman 1	NORTHWE	0.01	5.56	1.85	0.49	0.00	1.85	0.00	0.00	46613	46789	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Noxon Rap	NORTHWE	0.02	5.54	1.85	0.49	0.01	1.85	0.00	0.00	40787	48287	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rathdrum	NORTHWE	0.02	5.12	1.73	0.49	0.01	1.79	0.00	0.53	48357	48355	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	McKenzie 2	NORTHWE	0.01	2.06	3.49	0.49	0.03	6.33	0.01	5.67	46293	46292	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Allston 230	NORTHWE	0.01	2.67	2.03	0.48	0.02	4.04	0.01	4.20	40043	40041	0	0	3	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Miller 230/	NORTHWE	0.02	4.93	1.64	0.48	0.01	1.64	0.00	0.00	47857	47966	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Bald Moun	NORTHWE	0.03	12.42	4.14	0.48	0.01	4.14	0.00	0.00	41184	41185	0	0	1	Unknown	Unknown	Core, Thre	0.12
6	+550 Basel	0	Libby - PAC	NORTHWE	0.02	5.98	1.99	0.48	0.01	1.99	0.00	0.00	44200	44191	44192	44197	1	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Lancaster 2	NORTHWE	0.02	5.13	1.71	0.47	0.01	1.71	0.00	0.00	40624	47568	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Wells (DOF	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47100	47104	0	0	T1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Massachus	NORTHWE	0.02	5.80	1.66	0.47	0.01	2.50	0.01	2.95	46435	46433	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Wells (DOF	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47100	47105	0	0	T2	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Wells (DOF	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47102	47106	0	0	T3	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Wells (DOF	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47102	47107	0	0	T4	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Libby - PAC	NORTHWE	0.02	5.86	1.95	0.47	0.01	1.95	0.00	0.00	44201	44193	44194	44198	2	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Wells (DOF	NORTHWE	0.04	10.11	3.37	0.47	0.01	3.37	0.00	0.00	47102	47108	0	0	T5	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Chief Josep	NORTHWE	0.01	2.64	0.88	0.47	0.00	0.88	0.00	0.00	44164	44145	44146	44157	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Grand Cou	NORTHWE	0.02	4.82	1.61	0.46	0.01	1.61	0.00	0.00	40280	40279	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Parish Gap	NORTHWE	0.03	6.38	1.66	0.46	0.01	1.55	0.00	1.20	45588	45589	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Moscow 11	NORTHWE	0.02	9.75	3.25	0.46	0.00	1.58	0.00	1.83	48251	48247	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Maupin 23	NORTHWE	0.02	5.03	1.60	0.46	0.01	1.56	0.00	0.13	40709	40707	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Green Spri	NORTHWE	0.02	9.44	3.15	0.46	0.01	3.15	0.00	0.00	45125	45213	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Talbot 230	NORTHWE	0.03	7.95	1.56	0.45	0.01	1.18	0.01	2.62	42500	42511	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Amalgama	IDAHO	0.03	8.61	3.37	0.45	0.02	4.11	0.00	1.25	61829	60255	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Gresham 2	NORTHWE	0.02	5.09	1.57	0.45	0.01	1.78	0.00	1.47	43215	43219	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Amps 230/	PACE	0.02	4.85	1.62	0.45	0.01	1.62	0.00	0.00	65025	65026	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Sherwood	NORTHWE	0.03	7.69	1.54	0.44	0.01	3.10	0.01	4.80	43527	43525	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Mile Hi 115	NORTHWE	0.02	10.33	3.44	0.44	0.01	3.44	0.00	0.00	45203	45348	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Green Pete	NORTHWE	0.02	11.39	3.80	0.44	0.01	3.80	0.00	0.00	40485	40484	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Intalco 230	NORTHWE	0.02	4.49	1.50	0.43	0.01	1.50	0.00	0.00	40573	41216	0	0	3	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	St. Marys 2	NORTHWE	0.02	4.07	1.49	0.42	0.01	1.67	0.00	0.69	43541	43737	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Port Of Wa	NORTHWE	0.02	4.45	1.49	0.42	0.01	1.49	0.00	0.00	43909	43905	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Oregon Cit	NORTHWE	0.01	4.91	1.64	0.42	0.00	1.64	0.00	0.00	40805	40803	0	0	1	Gwye	Gwye	Single Pha	0.25
6	+550 Basel	0	J.D. Ross 2	NORTHWE	0.01	2.40	1.80	0.42	0.01	2.97	0.01	2.42	40899	40897	0	0	2	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Hanly Road	NORTHWE	0.02	8.85	2.95	0.42	0.01	2.95	0.00	0.00	47165	47166	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Klondike W	NORTHWE	0.02	4.28	1.43	0.42	0.01	1.43	0.00	0.00	47830	47835	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Klondike W	NORTHWE	0.02	4.28	1.43	0.42	0.01	1.43	0.00	0.00	47830	47833	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Round But	NORTHWE	0.02	4.36	1.45	0.42	0.01	1.45	0.00	0.00	43483	43490	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Round But	NORTHWE	0.02	4.36	1.45	0.42	0.01	1.45	0.00	0.00	43483	43488	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Libby - USC	NORTHWE	0.02	4.47	1.74	0.42	0.01	3.52	0.01	4.14	40657	40655	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	McNary 23	NORTHWE	0.01	2.34	0.78	0.42	0.00	0.78	0.00	0.00	44122	44101	44102	44115	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Round But	NORTHWE	0.02	4.34	1.45	0.42	0.01	1.45	0.00	0.00	43482	43486	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Dixonville 2	NORTHWE	0.01	3.51	1.43	0.41	0.01	1.81	0.00	1.06	45093	45091	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Dixonville 2	NORTHWE	0.01	3.51	1.43	0.41	0.01	1.81	0.00	1.06	45093	45091	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	McNary 23	NORTHWE	0.01	2.31	0.77	0.41	0.00	0.77	0.00	0.00	44123	44103	44104	44116	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	St. Marys 2	NORTHWE	0.02	6.13	1.41	0.41	0.02	4.23	0.01	6.04	43541	43555	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Faraday 11	NORTHWE	0.01	4.95	2.81	0.40	0.01	4.06	0.00	2.48	43193	43191	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Intalco 230	NORTHWE	0.02	4.19	1.40	0.40	0.01	1.40	0.00	0.00	40573	41219	0	0	6	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Addy 230/	NORTHWE	0.02	4.12	1.65	0.39	0.01	2.14	0.00	1.42	40021	40017	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Oak Grove	NORTHWE	0.02	8.31	2.77	0.39	0.01	2.77	0.00	0.00	43372	43373	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Bellingham	NORTHWE	0.01	3.04	1.35	0.39	0.01	1.73	0.00	0.82	40095	40093	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Fry 230/11	NORTHWE	0.02	4.94	1.39	0.39	0.01	1.48	0.00	1.46	45111	45109	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Intalco 230	NORTHWE	0.02	4.06	1.35	0.39	0.01	1.35	0.00	0.00	40573	41217	0	0	4	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Intalco 230	NORTHWE	0.02	4.06	1.35	0.39	0.01	1.35	0.00	0.00	40573	41218	0	0	5	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	McNary 23	NORTHWE	0.01	2.15	0.72	0.38	0.00	0.72	0.00	0.00	44126	44107	44108	44118	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	McNary 23	NORTHWE	0.01	2.14	0.71	0.38	0.00	0.71	0.00	0.00	44124	44105	44106	44117	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	The Dalles	NORTHWE	0.01	2.16	0.72	0.38	0.00	0.72	0.00	0.00	44059	44047	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Wolverine	PACE	0.02	5.72	1.91	0.38	0.01	1.91	0.00	0.00	67512	67513	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	La Grande	NORTHWE	0.02	7.96	2.65	0.38	0.01	2.65	0.00	0.00	46734	46732	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Snoqualmi	NORTHWE	0.02	8.04	2.68	0.38	0.01	2.68	0.00	0.00	42335	42336	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Santiam 23	NORTHWE	0.01	1.33	1.33	0.38	0.01	2.05	0.00	2.44	40939	45475	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Coyote Spr	NORTHWE	0.01	0.95	0.32	0.38	0.00	0.32	0.00	0.00	43123	43111	43119	43115	1	Gwye	Delta	Unknown	1.10
6	+550 Basel	0	Dworshak	NORTHWE	0.02	9.66	3.22	0.37	0.01	3.22	0.00	0.00	40367	40361	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Castle 115,	NORTHWE	0.02	8.01	2.67	0.37	0.01	2.67	0.00	0.00	47406	47407	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Jefferson 1	PACE	0.02	8.10	1.97	0.37	0.00	1.42	0.00	1.28	65850	65851	0	0	2	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	O'Brien 23	NORTHWE	0.02	5.32	1.27	0.37	0.01	1.25	0.00	1.69	42503	42513	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Kettle Falls	NORTHWE	0.02	7.76	2.59	0.37	0.01	2.59	0.00	0.00	48175	48173	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Stateline V	NORTHWE	0.02	3.94	1.31	0.37	0.01	1.31	0.00	0.00	47572	47571	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Intalco 230	NORTHWE	0.02	3.84	1.28	0.37	0.01	1.28	0.00	0.00	40573	41220	0	0	7	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Krain Corn	NORTHWE	0.02	7.89	2.63	0.37	0.01	2.63	0.00	0.00	42509	42510	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Cedar Falls	NORTHWE	0.02	7.81	2.60	0.36	0.01	2.60	0.00	0.00	42125	42126	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Cushman 2	NORTHWE	0.02	7.57	2.52	0.36	0.01	2.52	0.00	0.00	46682	46791	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Fredonia (I	NORTHWE	0.02	3.92	1.31	0.36	0.01	1.31	0.00	0.00	42113	42112	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Fredonia (I	NORTHWE	0.02	3.91	1.30	0.36	0.01	1.30	0.00	0.00	42113	42111	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Intalco 230	NORTHWE	0.02	3.73	1.25	0.36	0.01	1.25	0.00	0.00	40573	41214	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Cornelius 1	NORTHWE	0.02	7.62	2.49	0.35	0.01	2.46	0.00	0.30	43109	43107	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Hermiston	NORTHWE	0.02	3.80	1.27	0.35	0.01	1.27	0.00	0.00	45137	45454	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Hermiston	NORTHWE	0.02	3.80	1.27	0.35	0.01	1.27	0.00	0.00	45137	45456	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Cushman 2	NORTHWE	0.02	7.28	2.43	0.35	0.01	2.43	0.00	0.00	46681	46791	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Intalco 230	NORTHWE	0.02	3.66	1.22	0.35	0.01	1.22	0.00	0.00	40573	41215	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Scenic 115	NORTHWE	0.01	7.22	2.41	0.34	0.01	2.41	0.00	0.00	45478	45477	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Columbia 2	NORTHWE	0.00	1.03	0.63	0.33	0.01	1.58	0.00	1.90	40261	40259	0	0	2	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Del Norte 1	NORTHWE	0.01	7.20	2.40	0.33	0.01	2.40	0.00	0.00	45085	45386	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Del Norte 1	NORTHWE	0.01	7.20	2.40	0.33	0.01	2.40	0.00	0.00	45085	45385	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Sellwood 1	NORTHWE	0.01	3.38	2.32	0.33	0.01	3.69	0.00	2.68	43519	43517	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	McNary 23	NORTHWE	0.01	1.83	0.61	0.33	0.00	0.61	0.00	0.00	44127	44109	44110	44119	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Boundary 2	NORTHWE	0.01	3.43	1.14	0.33	0.01	1.14	0.00	0.00	46482	46470	0	0	4	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Roza 115/3	NORTHWE	0.01	6.96	2.32	0.33	0.01	2.32	0.00	0.00	41286	41285	40756	41284	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	McNary 23	NORTHWE	0.01	1.82	0.61	0.32	0.00	0.61	0.00	0.00	44127	44111	44112	44120	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Wauna 230	NORTHWE	0.01	3.41	1.14	0.32	0.01	1.14	0.00	0.00	47260	47290	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Boundary 2	NORTHWE	0.01	3.36	1.12	0.32	0.00	1.12	0.00	0.00	46478	46466	0	0	2	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Boundary 2	NORTHWE	0.01	3.34	1.11	0.32	0.00	1.11	0.00	0.00	46480	46468	0	0	3	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Golden Hil	NORTHWE	0.01	3.27	1.09	0.32	0.00	1.09	0.00	0.00	47486	47490	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Golden Hil	NORTHWE	0.01	3.27	1.09	0.32	0.00	1.09	0.00	0.00	47486	47487	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Gresham 2	NORTHWE	0.02	4.68	1.10	0.31	0.01	3.57	0.01	5.05	43215	43217	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Lucky Peak	IDAHO	0.01	5.44	1.81	0.31	0.00	1.81	0.00	0.00	60215	61816	0	0	1	Gwye	Delta	Unknown	0.17
6	+550 Basel	0	Lucky Peak	IDAHO	0.01	5.44	1.81	0.31	0.00	1.81	0.00	0.00	60215	61817	0	0	1	Gwye	Delta	Unknown	0.17
6	+550 Basel	0	Boundary 2	NORTHWE	0.01	3.27	1.09	0.31	0.00	1.09	0.00	0.00	46476	46464	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Mayfield 2	NORTHWE	0.01	3.22	1.07	0.31	0.00	1.07	0.00	0.00	46625	46624	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Grand Ron	NORTHWE	0.01	6.38	2.18	0.31	0.00	2.24	0.00	0.47	43223	43221	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Rivergate 2	NORTHWE	0.01	3.26	1.09	0.31	0.00	1.09	0.00	0.00	43459	43463	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Noxon Rap	NORTHWE	0.01	3.19	1.06	0.30	0.00	1.06	0.00	0.00	48281	48283	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	White Cree	NORTHWE	0.00	0.24	1.05	0.30	0.01	2.02	0.00	1.94	47827	47813	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rathdrum	NORTHWE	0.01	6.46	2.15	0.30	0.00	2.15	0.00	0.00	48353	48361	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Monpac 11	NORTHWE	0.01	6.57	2.19	0.30	0.00	2.19	0.00	0.00	45354	45355	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Stateline V	NORTHWE	0.01	3.24	1.08	0.30	0.00	1.08	0.00	0.00	44856	44855	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Berrydale 2	NORTHWE	0.04	9.09	1.03	0.30	0.01	3.43	0.01	6.15	42507	42508	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Jacksonvill	NORTHWE	0.01	6.39	2.13	0.30	0.00	2.13	0.00	0.00	45252	45250	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Yreka 115/	NORTHWE	0.01	6.07	2.02	0.30	0.00	2.03	0.00	0.00	45538	45537	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Sumas Cog	NORTHWE	0.01	6.41	2.14	0.30	0.00	2.14	0.00	0.00	42020	42022	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Sumas Cog	NORTHWE	0.01	6.41	2.14	0.30	0.00	2.14	0.00	0.00	42020	42021	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Port Of Wa	NORTHWE	0.01	3.09	1.03	0.29	0.00	1.03	0.00	0.00	43909	43907	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	3.04	1.01	0.29	0.00	1.01	0.00	0.00	41751	41721	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rathdrum	NORTHWE	0.01	6.32	2.11	0.29	0.00	2.11	0.00	0.00	48351	48359	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Rock Creek	NORTHWE	0.08	9.16	0.25	0.29	0.02	2.17	0.02	5.22	41401	41402	0	0	1	Gwye	Gwye	Single Pha	1.10
6	+550 Basel	0	Knott 115/	NORTHWE	0.01	3.11	2.04	0.29	0.01	3.29	0.00	2.53	45167	45165	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.65	0.55	0.29	0.00	0.55	0.00	0.00	44057	44043	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Olympia 23	NORTHWE	0.02	4.18	1.21	0.29	0.01	1.86	0.00	2.25	40792	40790	0	0	2	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	White Cree	NORTHWE	0.01	2.97	0.99	0.29	0.00	0.99	0.00	0.00	47827	47902	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	White Cree	NORTHWE	0.01	2.97	0.99	0.29	0.00	0.99	0.00	0.00	47827	47903	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Pine Creek	NORTHWE	0.00	0.64	1.02	0.29	0.01	2.22	0.01	2.40	48317	48315	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Kendall 11	NORTHWE	0.01	6.23	2.08	0.29	0.00	2.08	0.00	0.00	42008	42009	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Goodnoe 2	NORTHWE	0.01	2.94	0.98	0.28	0.00	0.98	0.00	0.00	47822	47829	0	0	1	Unknown	Unknown	Unknown	0.28

0	Port Of Wa	NORTHWE	0.012	3.089	1.030	0.292	0.004	1.030	0.000	0.000	43909	43907	0	0	1	Gwye	Delta	Unknown	0.28
0	Grand Cou	NORTHWE	0.012	3.038	1.013	0.292	0.004	1.013	0.000	0.000	41751	41721	0	0	1	Unknown	Unknown	Unknown	0.28
0	Bellingham	NORTHWE	0.012	3.035	1.350	0.386	0.007	1.728	0.002	0.818	40095	40093	0	0	2	Gwye	Gwye	Unknown	0.28
0	White Cree	NORTHWE	0.012	2.973	0.991	0.289	0.004	0.991	0.000	0.000	47827	47902	0	0	1	Unknown	Unknown	Unknown	0.28
0	White Cree	NORTHWE	0.012	2.973	0.991	0.289	0.004	0.991	0.000	0.000	47827	47903	0	0	2	Unknown	Unknown	Unknown	0.28
0	Snohomish	NORTHWE	0.012	2.939	0.941	0.493	0.011	2.771	0.007	3.730	41328	40992	0	0	3	Gwye	Gwye	Single Pha	0.51
0	Goodnoe 2	NORTHWE	0.012	2.937	0.979	0.284	0.004	0.979	0.000	0.000	47822	47829	0	0	1	Unknown	Unknown	Unknown	0.28
0	Goodnoe H	NORTHWE	0.012	2.926	0.975	0.281	0.004	0.975	0.000	0.000	47329	47687	0	0	1	Unknown	Unknown	Unknown	0.28
0	Twin Falls I	NORTHWE	0.011	5.735	1.912	0.266	0.004	1.912	0.000	0.000	42340	42341	0	0	1	Unknown	Unknown	Unknown	0.14
0	Texaco 115	NORTHWE	0.011	5.692	1.897	0.255	0.004	1.897	0.000	0.000	42130	42131	0	0	1	Gwye	Gwye	Unknown	0.14
0	Texaco 115	NORTHWE	0.011	5.692	1.897	0.255	0.004	1.897	0.000	0.000	42130	42132	0	0	1	Gwye	Gwye	Unknown	0.14
0	Weed Junc	NORTHWE	0.011	5.665	1.888	0.270	0.004	1.888	0.000	0.000	44961	45525	0	0	1	Gwye	Gwye	Unknown	0.14
0	Terrell Cre	NORTHWE	0.011	5.632	1.877	0.264	0.004	1.877	0.000	0.000	42030	42032	0	0	1	Unknown	Unknown	Unknown	0.14
0	Northeast (	NORTHWE	0.011	5.570	1.857	0.255	0.004	1.857	0.000	0.000	48277	48275	0	0	1	Unknown	Unknown	Unknown	0.14
0	Cushman 1	NORTHWE	0.011	5.555	1.852	0.488	0.004	1.852	0.000	0.000	46613	46789	0	0	1	Gwye	Delta	Single Pha	0.25
0	Cushman 1	NORTHWE	0.011	5.555	1.852	0.488	0.004	1.852	0.000	0.000	46613	46790	0	0	1	Gwye	Delta	Single Pha	0.25
0	Terrell Cre	NORTHWE	0.011	5.551	1.850	0.266	0.004	1.850	0.000	0.000	42030	42031	0	0	1	Unknown	Unknown	Unknown	0.14
0	Terrell Cre	NORTHWE	0.011	5.524	1.841	0.263	0.004	1.841	0.000	0.000	42030	42033	0	0	1	Unknown	Unknown	Unknown	0.14
0	Ice Harbor	NORTHWE	0.011	5.323	1.774	0.198	0.004	1.774	0.000	0.000	40565	40560	0	0	2	Gwye	Delta	Core, Thre	0.12
0	Texaco 115	NORTHWE	0.011	5.311	1.770	0.240	0.004	1.770	0.000	0.000	42130	42133	0	0	1	Gwye	Gwye	Unknown	0.14
0	Foster 115,	NORTHWE	0.011	5.309	1.770	0.204	0.004	1.770	0.000	0.000	40435	44031	44032	44033	1	Gwye	Delta	Core, Thre	0.12
0	Wolverine	PACE	0.011	3.897	1.299	0.259	0.004	1.299	0.000	0.000	69513	69515	0	0	1	Unknown	Unknown	Unknown	0.19
0	Wolverine	PACE	0.011	3.849	1.283	0.256	0.004	1.283	0.000	0.000	69513	69514	0	0	1	Unknown	Unknown	Unknown	0.19
0	Klondike W	NORTHWE	0.011	2.723	0.908	0.267	0.004	0.908	0.000	0.000	47831	47970	0	0	1	Unknown	Unknown	Unknown	0.28
0	Sno-king 2	NORTHWE	0.011	2.719	0.639	0.152	0.004	1.107	0.003	1.567	41006	41012	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Antelope 2	PACE	0.011	2.703	0.154	0.042	0.006	1.620	0.007	2.521	65075	65080	0	0	1	Unknown	Unknown	Unknown	0.28
0	Allston 230	NORTHWE	0.011	2.674	2.031	0.484	0.016	4.035	0.008	4.196	40043	40041	0	0	3	Gwye	Gwye	Core, Thre	0.23
0	Chief Josep	NORTHWE	0.011	2.644	0.881	0.466	0.004	0.881	0.000	0.000	44164	44145	44146	44157	1	Gwye	Delta	Single Pha	0.51
0	Ice Harbor	NORTHWE	0.010	5.228	1.743	0.194	0.003	1.743	0.000	0.000	40565	40559	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Fredericks	NORTHWE	0.010	5.144	1.715	0.230	0.003	1.715	0.000	0.000	42720	42722	0	0	1	Gwye	Delta	Unknown	0.14
0	Fredericks	NORTHWE	0.010	5.144	1.715	0.230	0.003	1.715	0.000	0.000	42720	42721	0	0	1	Gwye	Delta	Unknown	0.14
0	Greenwoo	NORTHWE	0.010	5.087	1.696	0.236	0.003	1.696	0.000	0.000	48143	48229	0	0	1	Unknown	Unknown	Unknown	0.14
0	Ice Harbor	NORTHWE	0.010	5.077	1.692	0.188	0.003	1.692	0.000	0.000	40569	40564	0	0	6	Gwye	Delta	Core, Thre	0.12
0	Naches 115	NORTHWE	0.010	5.027	1.676	0.232	0.003	1.676	0.000	0.000	45211	45361	0	0	1	Gwye	Delta	Unknown	0.14
0	Fredonia (F	NORTHWE	0.010	5.021	1.674	0.227	0.003	1.674	0.000	0.000	42110	42115	0	0	1	Gwye	Delta	Unknown	0.14
0	Ice Harbor	NORTHWE	0.010	5.017	1.672	0.185	0.003	1.672	0.000	0.000	40569	40563	0	0	5	Gwye	Delta	Core, Thre	0.12
0	Fredonia (F	NORTHWE	0.010	4.993	1.664	0.226	0.003	1.664	0.000	0.000	42110	42114	0	0	1	Gwye	Delta	Unknown	0.14
0	Faraday 11	NORTHWE	0.010	4.947	2.808	0.402	0.008	4.063	0.003	2.475	43193	43191	0	0	1	Gwye	Gwye	Unknown	0.14
0	Oregon Cit	NORTHWE	0.010	4.911	1.637	0.422	0.003	1.637	0.000	0.000	40805	40803	0	0	1	Gwye	Gwye	Single Pha	0.25
0	Post Falls 1	NORTHWE	0.010	4.904	1.635	0.225	0.003	1.635	0.000	0.000	48329	48331	0	0	1	Unknown	Unknown	Unknown	0.14
0	Rigby 161/	PACE	0.010	3.701	1.234	0.234	0.003	1.234	0.000	0.000	66295	66296	0	0	3	Unknown	Unknown	Unknown	0.19
0	Klondike W	NORTHWE	0.010	2.550	0.850	0.251	0.003	0.850	0.000	0.000	47855	47971	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.010	2.503	0.834	0.241	0.003	0.834	0.000	0.000	41754	41736	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.010	2.503	0.834	0.241	0.003	0.834	0.000	0.000	41754	41737	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.010	2.503	0.834	0.241	0.003	0.834	0.000	0.000	41754	41738	0	0	1	Unknown	Unknown	Unknown	0.28
0	Windy Poir	NORTHWE	0.010	2.501	0.834	0.242	0.003	0.834	0.000	0.000	47465	47493	0	0	1	Unknown	Unknown	Unknown	0.28
0	Windy Poir	NORTHWE	0.010	2.501	0.834	0.242	0.003	0.834	0.000	0.000	47465	47496	0	0	1	Unknown	Unknown	Unknown	0.28
0	McNary 23	NORTHWE	0.010	2.454	2.493	0.603	0.019	4.780	0.009	4.665	41353	40717	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Douglas 23	NORTHWE	0.010	2.449	0.064	0.015	0.003	0.695	0.003	1.511	47031	47029	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	J.D. Ross 2	NORTHWE	0.010	2.397	1.799	0.422	0.012	2.974	0.005	2.422	40899	40897	0	0	2	Gwye	Gwye	Core, Thre	0.23
0	Headwork	NORTHWE	0.009	4.690	1.563	0.239	0.003	1.563	0.000	0.000	48149	46619	0	0	1	Unknown	Unknown	Unknown	0.14
0	Carmen Sm	NORTHWE	0.009	4.645	1.548	0.108	0.003	1.548	0.000	0.000	46209	46210	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Snoqualmi	NORTHWE	0.009	4.425	1.475	0.207	0.003	1.475	0.000	0.000	42330	42331	0	0	1	Gwye	Delta	Unknown	0.14
0	Hanford G	NORTHWE	0.009	4.403	1.468	0.206	0.003	1.468	0.000	0.000	40502	40504	0	0	1	Unknown	Unknown	Unknown	0.14
0	Parker 115	NORTHWE	0.009	4.349	1.450	0.203	0.003	1.450	0.000	0.000	40815	41254	0	0	1	Unknown	Unknown	Unknown	0.14
0	Parker 115	NORTHWE	0.009	4.349	1.450	0.203	0.003	1.450	0.000	0.000	40815	41246	0	0	1	Unknown	Unknown	Unknown	0.14
0	Scoville 13	PACE	0.009	3.713	1.238	0.199	0.003	1.238	0.000	0.000	65010	65050	0	0	1	Unknown	Unknown	Unknown	0.17
0	Danskin W	IDAHO	0.009	3.606	1.202	0.100	0.003	1.202	0.000	0.000	60390	60393	0	0	1	Gwye	Delta	3-Legged C	0.08
0	Danskin W	IDAHO	0.009	3.602	1.201	0.100	0.003	1.201	0.000	0.000	60390	60392	0	0	1	Gwye	Delta	3-Legged C	0.08
0	Rigby 161/	PACE	0.009	3.364	1.121	0.213	0.003	1.121	0.000	0.000	66295	66296	0	0	2	Unknown	Unknown	Unknown	0.19
0	Sugermill 1	PACE	0.009	3.089	1.030	0.198	0.003	1.030	0.000	0.000	66430	66440	0	0	1	Unknown	Unknown	Unknown	0.19
0	Goodnoe H	NORTHWE	0.009	2.352	0.784	0.226	0.003	0.784	0.000	0.000	47329	47688	0	0	1	Unknown	Unknown	Unknown	0.28
0	McNary 23	NORTHWE	0.009	2.348	0.783	0.416	0.003	0.783	0.000	0.000	44122	44101	44102	44115	1	Gwye	Delta	Single Pha	0.51
0	Lancaster 2	NORTHWE	0.009	2.341	0.780	0.216	0.003	0.780	0.000	0.000	40624	47569	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.009	2.321	0.774	0.223	0.003	0.774	0.000	0.000	41753	41730	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.009	2.321	0.774	0.223	0.003	0.774	0.000	0.000	41753	41732	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.009	2.321	0.774	0.223	0.003	0.774	0.000	0.000	41753	41731	0	0	1	Unknown	Unknown	Unknown	0.28
0	Olympia 23	NORTHWE	0.009	2.318	0.429	0.226	0.001	0.335	0.002	0.829	40792	40791	0	0	1	Gwye	Gwye	Single Pha	0.51
0	McNary 23	NORTHWE	0.009	2.314	0.771	0.410	0.003	0.771	0.000	0.000	44123	44103	44104	44116	1	Gwye	Delta	Single Pha	0.51
0	J.D. Ross 2	NORTHWE	0.009	2.295	0.818	0.192	0.004	0.973	0.001	0.630	40899	40897	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Sedro Woo	NORTHWE	0.009	2.259	3.091	0.886	0.025	6.202	0.013	6.327	42100	42120	0	0	2	Gwye	Gwye	Unknown	0.28
0	Grand Cou	NORTHWE	0.009	2.192	0.731	0.211	0.003	0.731	0.000	0.000	41751	41724	0	0	1	Unknown	Unknown	Unknown	0.28
0	Wanapum	NORTHWE	0.009	2.189	0.730	0.210	0.003	0.730	0.000	0.000	46169	46182	46183	46196	1	Unknown	Unknown	Unknown	0.28
0	Wanapum	NORTHWE	0.009	2.189	0.730	0.210	0.003	0.730	0.000	0.000	46169	46180	46181	46195	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.009	2.186	0.729	0.210	0.003	0.729	0.000	0.000	41751	41725	0	0	1	Unknown	Unknown	Unknown	0.28
0	McNary 23	NORTHWE	0.009	2.160	0.720	0.383	0.003	0.720	0.000	0.000	44126	44107	44108	44118	1	Gwye	Delta	Single Pha	0.51
0	The Dalles	NORTHWE	0.009	2.158	0.719	0.380	0.003	0.719	0.000	0.000	44059	44047	0	0	1	Gwye	Delta	Single Pha	0.51
0	Rattlesnak	NORTHWE	0.009	2.153	0.906	0.000	0.009	2.375	0.007	2.422	40867	62009	0	0	1	Unknown	Unknown	Unknown	0.28
0	McNary 23	NORTHWE	0.009	2.147	0.716	0.381	0.003	0.716	0.000	0.000	44124	44105	44106	44117	1	Gwye	Delta	Single Pha	0.51
0	Priest Rapi	NORTHWE	0.009	2.136	0.712	0.202	0.003	0.712	0.000	0.000	46065	46178	46179	46194	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.009	1.828	2.724	1.007	0.053	10.174	0.039	9.764	40285	41357	0	0	1	Unknown	Unknown	Unknown	0.36
0	Dixonville 5	NORTHWE	0.009	1.086	0.166	0.195	0.000	0.000	0.001	0.362	45095	44900	0	0	1	Gwye	Gwye	Unknown	1.10
0	Craig View	NORTHWE	0.008	4.146	1.826	0.250	0.005	2.492	0.001	1.110	45069	45134	0	0	1	Gwye	Gwye	Unknown	0.14
0	I.E. Paper 1	NORTHWE	0.008	4.097	1.366	0.189	0.003	1.366	0.000	0.000	48163	48168	0	0	1	Unknown	Unknown	Unknown	0.14
0	I.E. Paper 1	NORTHWE	0.008	4.097	1.366	0.189	0.003	1.366	0.000	0.000	48163	48166	0	0	1	Unknown	Unknown	Unknown	0.14
0	Stateline W	NORTHWE	0.008	4.086	1.528	0.216	0.003	1.600	0.000	0.238	47574	47573	0	0	1	Unknown	Unknown	Unknown	0.14
0	Fredonia (F	NORTHWE	0.008	3.987	1.329	0.185	0.003	1.329	0.000	0.000	42116	42117	0	0	1	Unknown	Unknown	Unknown	0.14
0	Wincheste	NORTHWE	0.008	3.909	1.303	0.178	0.003	1.303	0.000	0.000	45533	45534	0	0	1	Gwye	Gwye	Unknown	0.14
0	Carmen Sm	NORTHWE	0.008	3.871	1.290	0.090	0.003	1.290	0.000	0.000	46209	46210	0	0	2	Gwye	Delta	3-Legged C	0.07
0	Sugermill 1	PACE	0.008	2.948	1.110	0.214	0.003	1.158	0.000	0.175	66430	66435	0	0	1	Unknown	Unknown	Unknown	0.19
0	Rigby 161/	PACE	0.008	2.741	0.914	0.173	0.003	0.914	0.000	0.000	66295	66296	0	0	1	Unknown	Unknown	Unknown	0.19
0	Antelope R	NORTHWE	0.008	2.061	0.687	0.192	0.003	0.687	0.000	0.000	44280	44281	0	0	1	Unknown	Unknown	Unknown	0.28
0	McKenzie 2	NORTHWE	0.008	2.055	3.491	0.485	0.025	6.328	0.011	5.673	46293	46292	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Shepherds	NORTHWE	0.008	2.051	0.684	0.199	0.003	0.684	0.000	0.000	47860	47453	0	0	1	Unknown	Unknown	Unknown	0.28
0	Shepherds	NORTHWE	0.008	2.051	0.684	0.199	0.003	0.684	0.000	0.000	47860	47450	0	0	1	Unknown	Unknown	Unknown	0.28
0	Boise Benc	IDAHO	0.008	2.020	1.652	0.224	0.014	3.478	0.008	3.138	60045	60040	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Longview 2	NORTHWE	0.008	2.018	0.673	0.183	0.003	0.673	0.000	0.000	40672	41226	0	0	1	Unknown	Unknown	Unknown	0.28
0	Longview 2	NORTHWE	0.008	2.018	0.673	0.183	0.003	0.673	0.000	0.000	40672	41225	0	0	1	Unknown	Unknown	Unknown	0.28
0	Boise Benc	IDAHO	0.008	2.016	0.711	0.096	0.004	0.995	0.002	0.815	60045	60040	60051	60058	4	Gwye	Gwye	3-Legged C	0.13
0	Longview 2	NORTHWE	0.008	1.993	0.664	0.181	0.003	0.664	0.000	0.000	40672	41224	0	0	1	Unknown	Unknown	Unknown	0.28
0	Wallula 23	NORTHWE	0.008	1.944	0.648	0.181	0.003	0.648	0.000	0.000	45331	45329	0	0	1	Gwye	Delta	Unknown	0.28
0	Biglow Can	NORTHWE	0.008	1.894	0.631	0.184	0.003	0.631	0.000	0.000	47844	47841	0	0	1	Gwye	Gwye	Unknown	0.28
0	Coyote Spr	NORTHWE	0.008	0.954	0.318	0.378	0.003	0.318	0.000	0.000	43123	43111	43119	43115	1	Gwye	Delta	Unknown	1.10
0	Smith Falls	NORTHWE	0.007	3.727	1.242	0.173	0.002	1.242	0.000	0.000	41299	41298	0	0	1	Unknown	Unknown	Unknown	0.14
0	Hopkins Ri	NORTHWE	0.007	3.709	1.236	0.174	0.002	1.236	0.000	0.000	47800	47802	0	0	2	Gwye	Delta	Unknown	0.14
0	Cave Junct	NORTHWE	0.007	3.605	1.202	0.170	0.002	1.202	0.000	0.000	45037	45381	0	0	1	Gwye	Gwye	Unknown	0.14
0	Thurston 1	NORTHWE	0.007	3.597	1.339	0.090	0.003	1.529	0.000	0.330	46255	46256	0	0	1	Gwye	Gwye	3-Legged C	0.07
0	Dry Creek-	PACE	0.007	3.544	1.558	0.223	0.004	2.145	0.001	1.041	66813	66814	0	0	1	Unknown	Unknown	Unknown	0.14
0	Hopkins Ri	NORTHWE	0.007	3.531	1.177	0.165	0.002	1.177	0.000	0.000	47800	47801	0	0	1	Gwye	Delta	Unknown	0.14
0	Summer Fa	NORTHWE	0.007	3.511	1.170	0.166	0.002	1.170	0.000	0.000	46447	46653	0	0	1	Unknown	Unknown	Unknown	0.14
0	Summer Fa	NORTHWE	0.007	3.511	1.170	0.166	0.002	1.170	0.000	0.000	46447	46655	0	0	1	Unknown	Unknown	Unknown	0.14
0	Fossil 115/	NORTHWE	0.007	3.425	1.193	0.170	0.003	1.269	0.000	0.130	40434	40433	0	0	1	Unknown	Unknown	Unknown	0.14
0	Hood River	NORTHWE	0.007	3.406	1.135	0.150	0.002	1.135	0.000	0.000	40541	45307	0	0	1	Gwye	Delta	Unknown	0.14
0	Sellwood 1	NORTHWE	0.007	3.382	2.316	0.327	0.007	3.690	0.003	2.683	43519	43517	0	0	1	Gwye	Gwye	Unknown	0.14
0	Alder 115/	NORTHWE	0.007	3.345	1.115	0.159	0.002	1.115	0.000	0.000	46670	46671	0	0	1	Gwye	Delta	Unknown	0.14
0	Alder 115/	NORTHWE	0.007	3.345	1.115	0.159	0.002	1.115	0.000	0.000	46670	46672	0	0	1	Gwye	Delta	Unknown	0.14
0	River Road	NORTHWE	0.007	3.321	1.107	0.280	0.002	1.107	0.000	0.000	47215	47216	0	0	1	Gwye	Delta	Single Pha	0.25
0	Hazelwood	NORTHWE	0.007	3.293	1.098	0.155	0.002	1.098	0.000	0.000	45131	45226	0	0	3	Gwye	Gwye	Unknown	0.14
0	Cinder 161	PACE	0.007	2.611	0.870	0.170	0.002	0.870	0.000	0.000	67672	67671	0	0	1	Unknown	Unknown	Unknown	0.19
0	Biglow Can	NORTHWE	0.007	1.867	0.622	0.181	0.002	0.622	0.000	0.000	47844	47842	0	0	1	Gwye	Gwye	Unknown	0.28
0	McNary 23	NORTHWE	0.007	1.839	0.613	0.327	0.002	0.613	0.000	0.000	44127	44109	44110	44119	1	Gwye	Delta	Single Pha	0.51
0	McNary 23	NORTHWE	0.007	1.828	0.609	0.325	0.002	0.609	0.000	0.000	44127	44111	44112	44120	1	Gwye	Delta	Single Pha	0.51
0	Diamond H	NORTHWE	0.007	1.799	0.621	0.176	0.003	0.629	0.000	0.038	45089	45388	0	0	1	Gwye	Gwye	Unknown	0.28
0	Grand Cou	NORTHWE	0.007	1.776	0.592	0.171	0.002	0.592	0.000	0.000	41752	41727	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.007	1.776	0.592	0.171	0.002	0.592	0.000	0.000	41752	41728	0	0	1	Unknown	Unknown	Unknown	0.28
0	Hermiston	NORTHWE	0.007	1.757	0.586	0.162	0.002	0.586	0.000	0.000	45137	45455	0	0	1	Unknown	Unknown	Unknown	0.28
0	Hermiston	NORTHWE	0.007	1.757	0.586	0.162	0.002	0.586	0.000	0.000	45137	45457	0	0	1	Unknown	Unknown	Unknown	0.28
0	Goodnoe H	NORTHWE	0.007	1.743	0.737	0.208	0.004	0.923	0.001	0.452	47329	40380	0	0	1	Unknown	Unknown	Unknown	0.28
0	White Cree	NORTHWE	0.007	1.719	0.573	0.167	0.002	0.573	0.000	0.000	47858	47979	0	0	1	Unknown	Unknown	Unknown	0.28
0	The Dalles	NORTHWE	0.007	1.648	0.549	0.290	0.002	0.549	0.000	0.000	44057	44043	0	0	1	Gwye	Delta	Single Pha	0.51
0	Boise Benc	IDAHO	0.007	1.641	0.907	0.123	0.007	1.681	0.003	1.425	60045	60040	60050	60056	2	Gwye	Gwye	3-Legged C	0.13
0	Hood River	NORTHWE	0.006	3.216	1.072	0.149	0.002	1.072	0.000	0.000	40541	45309	0	0	1	Gwye	Delta	Unknown	0.14
0	Residual (L	PACE	0.006	3.194	0.760	0.108	0.001	0.632	0.001	1.040	65535	66815	0	0	1	Unknown	Unknown	Unknown	0.14
0	Knott 115/	NORTHWE	0.006	3.110	2.044	0.290	0.007	3.290	0.003	2.533	45167	45165	0	0	1	Gwye	Gwye	Unknown	0.14
0	Post Street	NORTHWE	0.006	3.063	1.021	0.144	0.002	1.021	0.000	0.000	48339	48337	0	0	1	Unknown	Unknown	Unknown	0.14
0	Willow Cre	NORTHWE	0.006	3.013	1.099	0.155	0.002	1.140	0.000	0.135	47848	47993	0	0	1	Unknown	Unknown	Unknown	0.14
0	Post Street	NORTHWE	0.006	2.979	0.993	0.140	0.002	0.993	0.000	0.000	48339	48337	0	0	2	Unknown	Unknown	Unknown	0.14
0	Goshen 16	PACE	0.006	2.088	0.696	0.138	0.002	0.696	0.000	0.000	65670	65672	0	0	1	Unknown	Unknown	Unknown	0.19
0	Jefferson 1	PACE	0.006	2.043	0.681	0.125	0.017	6.205	0.017	6.164	65860	65850	0	0	1	Unknown	Unknown	Unknown	0.19
0	Goshen 16	PACE	0.006	2.024	0.199	0.033	0.004	1.486	0.004	2.113	65670	65675	0	0	2	Unknown	Unknown	Core, Thre	0.16
0	Goshen 16	PACE	0.006	2.024	0.199	0.033	0.004	1.486	0.004	2.113	65670	65675	0	0	1	Unknown	Unknown	Core, Thre	0.16
0	Wallula 23	NORTHWE	0.006	1.588	0.529	0.148	0.002	0.529	0.000	0.000	45331	45329	0	0	2	Gwye	Delta	Unknown	0.28
0	Boise Benc	IDAHO	0.006	1.574	1.051	0.142	0.008	2.089	0.004	1.835	60045	60040	0	0	3	Gwye	Gwye	3-Legged C	0.13
0	Rocky Reac	NORTHWE	0.006	1.529	0.510	0.070	0.002	0.510	0.000	0.000	46856	46851	0	0	1	Gwye	Delta	3-Legged C	0.13
0	The Dalles	NORTHWE	0.006	1.518	0.506	0.267	0.002	0.506	0.000	0.000	44057	44044	0	0	1	Gwye	Delta	Single Pha	0.51
0	Rocky Reac	NORTHWE	0.006	1.513	0.504	0.070	0.002	0.504	0.000	0.000	46856	46850	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Calapooya	NORTHWE	0.006	1.491	0.481	0.137	0.002	0.476	0.000	0.038	45031	45380	0	0	1	Gwye	Gwye	Unknown	0.28
0	Rocky Reac	NORTHWE	0.006	1.471	0.490	0.068	0.002	0.490	0.000	0.000	46855	46848	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Rocky Reac	NORTHWE	0.006	1.439	0.480	0.066	0.002	0.480	0.000	0.000	46854	46845	0	0	1	Gwye	Delta	3-Legged C	0.13

46005	46003	0	0	1	0.28
47329	47687	0	0	1	0.28
41365	41363	0	0	1	0.28
47215	47216	0	0	1	0.28
43381	43379	0	0	1	0.27
44961	45525	0	0	1	0.27
48317	48316	0	0	1	0.27
42030	42031	0	0	1	0.27
41341	40107	0	0	1	0.27
45327	45325	0	0	2	0.27
44057	44044	0	0	1	0.27
42030	42033	0	0	1	0.27
42340	42341	0	0	1	0.27
47831	47970	0	0	1	0.27
47082	47080	0	0	1	0.26
42030	42032	0	0	1	0.26
69513	69515	0	0	1	0.26
46164	46168	0	0	1	0.26
69513	69514	0	0	1	0.26
48277	48275	0	0	1	0.26
42130	42131	0	0	1	0.26
42130	42132	0	0	1	0.26
40249	40247	0	0	2	0.25
46625	46623	0	0	1	0.25
44058	44046	0	0	1	0.25
46211	41304	0	0	1	0.25
45327	45325	0	0	1	0.25
45069	45134	0	0	1	0.25
47855	47971	0	0	1	0.25
44058	44045	0	0	1	0.25
41212	41213	0	0	1	0.25
48249	48251	0	0	1	0.24
47465	47496	0	0	1	0.24
47465	47493	0	0	1	0.24
41754	41738	0	0	1	0.24
41754	41737	0	0	1	0.24
41754	41736	0	0	1	0.24
42130	42133	0	0	1	0.24
48149	46619	0	0	1	0.24
40635	40633	0	0	1	0.24
40671	47423	0	0	1	0.24
48143	48229	0	0	1	0.24
66295	66296	0	0	3	0.23
60064	60065	0	0	1	0.23
45211	45361	0	0	1	0.23
42720	42722	0	0	1	0.23
42720	42721	0	0	1	0.23
42110	42115	0	0	1	0.23
40792	40791	0	0	1	0.23
47329	47688	0	0	1	0.23
42110	42114	0	0	1	0.23
48329	48331	0	0	1	0.23
41329	40988	0	0	2	0.23
41753	41732	0	0	1	0.22
41753	41731	0	0	1	0.22
41753	41730	0	0	1	0.22
66813	66814	0	0	1	0.22
60045	60040	0	0	1	0.22
47049	47047	0	0	1	0.22
40624	47569	0	0	1	0.22
45301	45297	0	0	1	0.21
47574	47573	0	0	1	0.21
66430	66435	0	0	1	0.21
66295	66296	0	0	2	0.21
41751	41724	0	0	1	0.21
46169	46182	46183	46196	1	0.21
41751	41725	0	0	1	0.21
46169	46180	46181	46195	1	0.21
43253	43251	0	0	1	0.21
45259	45446	0	0	1	0.21
47329	40380	0	0	1	0.21
42330	42331	0	0	1	0.21
43083	43081	0	0	2	0.21
48524	48520	0	0	1	0.21
40502	40504	0	0	1	0.21
40435	44031	44032	44033	1	0.20
40815	41246	0	0	1	0.20
40815	41254	0	0	1	0.20
45331	45329	0	0	1	0.20
46065	46178	46179	46194	1	0.20
65010	65050	0	0	1	0.20
44087	44073	44074	44082	1	0.20
44088	44075	44076	44083	1	0.20
44086	44071	44072	44081	1	0.20
44089	44077	44078	44084	1	0.20
40565	40560	0	0	2	0.20
47860	47450	0	0	1	0.20
47860	47453	0	0	1	0.20
66430	66440	0	0	1	0.20
60130	61223	0	0	2	0.20
48524	48522	0	0	2	0.20
45095	44900	0	0	1	0.20
40565	40559	0	0	1	0.19
44055	44041	0	0	1	0.19
48075	48481	0	0	2	0.19
48075	48481	0	0	1	0.19
44280	44281	0	0	1	0.19
40899	40897	0	0	1	0.19
48163	48166	0	0	1	0.19
48163	48168	0	0	1	0.19
60130	61223	0	0	1	0.19
40569	40564	0	0	6	0.19
60207	61254	0	0	1	0.19
42116	42117	0	0	1	0.19
40569	40563	0	0	5	0.19
40672	41225	0	0	1	0.18
40672	41226	0	0	1	0.18
47844	47841	0	0	1	0.18
43037	43035	0	0	1	0.18
40672	41224	0	0	1	0.18
47844	47842	0	0	1	0.18
45533	45534	0	0	1	0.18
47830	47327	0	0	1	0.18
45089	45388	0	0	1	0.18
47800	47802	0	0	2	0.18
40981	40979	0	0	1	0.18
41299	41298	0	0	1	0.17
40983	40979	0	0	1	0.17
66295	66296	0	0	1	0.17
41752	41728	0	0	1	0.17
67672	67671	0	0	1	0.17
41752	41727	0	0	1	0.17
45037	45381	0	0	1	0.17
40434	40433	0	0	1	0.17
43083	43081	0	0	1	0.17
47800	47801	0	0	1	0.17
47858	47979	0	0	1	0.17
46447	46655	0	0	1	0.17
46447	46653	0	0	1	0.17
45065	45126	0	0	1	0.17
45331	45329	0	0	2	0.17
44128	44113	44114	44121	1	0.16
45137	45455	0	0	1	0.16
45137	45457	0	0	1	0.16
46670	46672	0	0	1	0.16
46670	46671	0	0	1	0.16
45131	45226	0	0	3	0.16
47848	47993	0	0	1	0.16
40139	44005	0	0	1	0.16
40717	40715	0	0	1	0.15
41006	41012	0	0	1	0.15
40139	44001	0	0	1	0.15
40541	45307	0	0	1	0.15
40541	45309	0	0	1	0.15
60332	60331	0	0	1	0.15
43291	43289	0	0	1	0.15
48029	48027	0	0	1	0.15
45685	45689	0	0	1	0.15
45685	45687	0	0	1	0.15

3	-400 Baseli	0	Linneman	NORTHWE	0.02	3.88	0.52	0.15	0.01	1.92	0.01	3.10	43291	43289	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Stateline V	NORTHWE	0.02	3.87	1.29	0.36	0.01	1.29	0.00	0.00	44856	44855	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Carmen Sn	NORTHWE	0.01	3.87	1.29	0.09	0.00	1.29	0.00	0.00	46209	46210	0	0	2	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Grants Pas	NORTHWE	0.02	3.85	1.92	0.55	0.01	3.11	0.01	2.82	45123	45121	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Wolverine	PACE	0.01	3.85	1.28	0.26	0.00	1.28	0.00	0.00	69513	69514	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Bellingham	NORTHWE	0.02	3.85	2.56	0.61	0.02	3.89	0.01	2.68	40095	40093	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Intalco 230	NORTHWE	0.02	3.84	1.28	0.36	0.01	1.28	0.00	0.00	40573	41220	0	0	7	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hermiston	NORTHWE	0.02	3.82	1.27	0.35	0.01	1.27	0.00	0.00	45137	45456	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hermiston	NORTHWE	0.02	3.82	1.27	0.35	0.01	1.27	0.00	0.00	45137	45454	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grants Pas	NORTHWE	0.02	3.77	1.88	0.54	0.01	3.04	0.01	2.76	45123	45121	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Frenchmar	NORTHWE	0.02	3.75	0.93	0.26	0.01	2.00	0.01	2.78	46164	46168	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Intalco 230	NORTHWE	0.02	3.73	1.25	0.35	0.01	1.25	0.00	0.00	40573	41214	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Smith Falls	NORTHWE	0.01	3.73	1.24	0.17	0.00	1.24	0.00	0.00	41299	41298	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Scoville 13	PACE	0.01	3.71	1.24	0.20	0.00	1.24	0.00	0.00	65010	65050	0	0	1	Unknown	Unknown	Unknown	0.17
3	-400 Baseli	0	Ancient La	NORTHWE	0.02	3.71	1.00	0.28	0.01	1.66	0.00	2.14	46005	46003	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rigby 161/	PACE	0.01	3.70	1.23	0.24	0.00	1.23	0.00	0.00	66295	66296	0	0	3	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Hopkins Ri	NORTHWE	0.01	3.67	1.22	0.17	0.00	1.22	0.00	0.00	47800	47802	0	0	2	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Intalco 230	NORTHWE	0.02	3.66	1.22	0.35	0.01	1.22	0.00	0.00	40573	41215	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Cave Junct	NORTHWE	0.01	3.61	1.20	0.17	0.00	1.20	0.00	0.00	45037	45381	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Thurston 1	NORTHWE	0.01	3.60	1.34	0.09	0.00	1.53	0.00	0.33	46255	46256	0	0	1	Gwye	Gwye	3-Legged C	0.07
3	-400 Baseli	0	Dry Creek-	PACE	0.01	3.54	1.56	0.22	0.00	2.15	0.00	1.04	66813	66814	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Columbia F	NORTHWE	0.01	3.51	1.07	0.25	0.00	0.96	0.00	0.31	40249	40247	0	0	2	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Summer Fa	NORTHWE	0.01	3.51	1.17	0.17	0.00	1.17	0.00	0.00	46447	46653	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Summer Fa	NORTHWE	0.01	3.51	1.17	0.17	0.00	1.17	0.00	0.00	46447	46655	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Dixonville	NORTHWE	0.01	3.51	1.43	0.41	0.01	1.81	0.00	1.06	45093	45091	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Dixonville	NORTHWE	0.01	3.51	1.43	0.41	0.01	1.81	0.00	1.06	45093	45091	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	COB Energ	NORTHWE	0.03	3.50	1.17	1.40	0.01	1.17	0.00	0.00	45262	47660	0	0	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Hopkins Ri	NORTHWE	0.01	3.50	1.17	0.16	0.00	1.17	0.00	0.00	47800	47801	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Tacoma 23	NORTHWE	0.01	3.47	0.33	0.10	0.01	1.28	0.01	2.35	41049	46631	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Locust 230	IDAHO	0.01	3.47	0.55	0.07	0.01	1.27	0.01	2.18	60207	61254	0	0	2	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Boundary	NORTHWE	0.01	3.43	1.14	0.33	0.01	1.14	0.00	0.00	46482	46470	0	0	4	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Fossil 115/	NORTHWE	0.01	3.43	1.19	0.17	0.00	1.27	0.00	0.13	40434	40433	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Big Eddy 2	NORTHWE	0.01	3.41	0.68	0.27	0.01	2.46	0.01	3.59	41341	40107	0	0	1	Gwye	Gwye	Three Pha	0.38
3	-400 Baseli	0	Wauna 230	NORTHWE	0.01	3.41	1.14	0.32	0.01	1.14	0.00	0.00	47260	47290	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hood River	NORTHWE	0.01	3.41	1.14	0.15	0.00	1.14	0.00	0.00	40541	45307	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Tacoma 23	NORTHWE	0.01	3.39	0.32	0.09	0.01	1.25	0.01	2.29	41049	46631	0	0	3	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Sellwood 1	NORTHWE	0.01	3.38	2.32	0.33	0.01	3.69	0.00	2.68	43519	43517	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Danskin W	IDAHO	0.01	3.38	1.13	0.09	0.00	1.13	0.00	0.00	60390	60393	0	0	1	Gwye	Delta	3-Legged C	0.08
3	-400 Baseli	0	Danskin W	IDAHO	0.01	3.38	1.13	0.09	0.00	1.13	0.00	0.00	60390	60392	0	0	1	Gwye	Delta	3-Legged C	0.08
3	-400 Baseli	0	Rigby 161/	PACE	0.01	3.36	1.12	0.21	0.00	1.12	0.00	0.00	66295	66296	0	0	2	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Boundary	NORTHWE	0.01	3.36	1.12	0.32	0.00	1.12	0.00	0.00	46478	46466	0	0	2	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Alder 115/	NORTHWE	0.01	3.35	1.12	0.16	0.00	1.12	0.00	0.00	46670	46671	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Alder 115/	NORTHWE	0.01	3.35	1.12	0.16	0.00	1.12	0.00	0.00	46670	46672	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Boundary	NORTHWE	0.01	3.34	1.11	0.32	0.00	1.11	0.00	0.00	46480	46468	0	0	3	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	River Road	NORTHWE	0.01	3.32	1.11	0.28	0.00	1.11	0.00	0.00	47215	47216	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Hazelwooc	NORTHWE	0.01	3.29	1.10	0.16	0.00	1.10	0.00	0.00	45131	45226	0	0	3	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Golden Hil	NORTHWE	0.01	3.27	1.09	0.32	0.00	1.09	0.00	0.00	47486	47487	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Golden Hil	NORTHWE	0.01	3.27	1.09	0.32	0.00	1.09	0.00	0.00	47486	47490	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Boundary	NORTHWE	0.01	3.27	1.09	0.31	0.00	1.09	0.00	0.00	46476	46464	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Rivergate	NORTHWE	0.01	3.26	1.09	0.31	0.00	1.09	0.00	0.00	43459	43463	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Copco 1 23	NORTHWE	0.01	3.25	2.18	0.63	0.01	3.45	0.01	2.70	45063	45061	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Copco 1 23	NORTHWE	0.01	3.25	2.18	0.63	0.01	3.45	0.01	2.70	45063	45061	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	White Bluf	NORTHWE	0.01	3.25	3.78	0.89	0.03	6.48	0.01	5.39	41149	41147	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Mayfield 2	NORTHWE	0.01	3.22	1.07	0.31	0.00	1.07	0.00	0.00	46625	46624	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Hood River	NORTHWE	0.01	3.22	1.07	0.15	0.00	1.07	0.00	0.00	40541	45309	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Noxon Rap	NORTHWE	0.01	3.19	1.07	0.30	0.00	1.07	0.00	0.00	48281	48283	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Residual (L	PACE	0.01	3.19	0.76	0.11	0.00	0.63	0.00	1.04	65535	66815	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Knott 115/	NORTHWE	0.01	3.11	2.05	0.29	0.01	3.29	0.00	2.53	45167	45165	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Port Of Wa	NORTHWE	0.01	3.09	1.03	0.29	0.00	1.03	0.00	0.00	43909	43907	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Sugermill 1	PACE	0.01	3.09	1.03	0.20	0.00	1.03	0.00	0.00	66430	66440	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Post Street	NORTHWE	0.01	3.06	1.02	0.14	0.00	1.02	0.00	0.00	48339	48337	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Olympia 5(	NORTHWE	0.03	3.05	14.35	17.09	0.23	26.30	0.10	26.23	40797	40794	0	0	1	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	3.04	1.01	0.29	0.00	1.01	0.00	0.00	41751	41721	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Bellingham	NORTHWE	0.01	3.04	1.35	0.39	0.01	1.73	0.00	0.82	40095	40093	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Willow Cre	NORTHWE	0.01	3.01	1.10	0.16	0.00	1.14	0.00	0.14	47848	47993	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Post Street	NORTHWE	0.01	2.98	0.99	0.14	0.00	0.99	0.00	0.00	48339	48337	0	0	2	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	White Cree	NORTHWE	0.01	2.97	0.99	0.29	0.00	0.99	0.00	0.00	47827	47903	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	White Cree	NORTHWE	0.01	2.97	0.99	0.29	0.00	0.99	0.00	0.00	47827	47902	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Covington	NORTHWE	0.03	2.97	4.45	2.41	0.08	8.68	0.04	9.39	40302	40303	0	0	4	Unknown	Unknown	Core, Thre	0.50
3	-400 Baseli	0	Sugermill 1	PACE	0.01	2.95	1.11	0.21	0.00	1.16	0.00	0.18	66430	66435	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Snohomish	NORTHWE	0.01	2.94	0.94	0.49	0.01	2.77	0.01	3.73	41328	40992	0	0	3	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	Goodnoe 2	NORTHWE	0.01	2.94	0.98	0.28	0.00	0.98	0.00	0.00	47822	47829	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Goodnoe H	NORTHWE	0.01	2.93	0.98	0.28	0.00	0.98	0.00	0.00	47329	47687	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Albeni Falls	NORTHWE	0.01	2.76	0.92	0.10	0.00	0.92	0.00	0.00	40029	40032	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Albeni Falls	NORTHWE	0.01	2.76	0.92	0.10	0.00	0.92	0.00	0.00	40029	40030	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Albeni Falls	NORTHWE	0.01	2.76	0.92	0.10	0.00	0.92	0.00	0.00	40029	40028	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Rigby 161/	PACE	0.01	2.74	0.91	0.18	0.00	0.91	0.00	0.00	66295	66296	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Klondike W	NORTHWE	0.01	2.72	0.91	0.27	0.00	0.91	0.00	0.00	47831	47970	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Sno-king 2	NORTHWE	0.01	2.72	0.64	0.15	0.00	1.11	0.00	1.57	41006	41012	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Antelope 2	PACE	0.01	2.70	0.15	0.04	0.01	1.62	0.01	2.52	65075	65080	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Allston 230	NORTHWE	0.01	2.67	2.03	0.48	0.02	4.04	0.01	4.20	40043	40041	0	0	3	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Chief Josep	NORTHWE	0.01	2.64	0.88	0.47	0.00	0.88	0.00	0.00	44164	44145	44146	44157	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	East Jackso	PACE	0.01	2.63	0.88	0.12	0.00	0.88	0.00	0.00	65480	66822	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Ice Harbor	NORTHWE	0.01	2.63	0.88	0.10	0.00	0.88	0.00	0.00	40567	40562	0	0	4	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Cinder 161	PACE	0.01	2.61	0.87	0.17	0.00	0.87	0.00	0.00	67672	67671	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Tolt 115/1	NORTHWE	0.01	2.59	0.86	0.12	0.00	0.86	0.00	0.00	42350	42351	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Boardman	NORTHWE	0.01	2.59	0.90	0.11	0.00	0.96	0.00	0.18	40127	40125	0	0	1	Gwye	Gwye	Core, Thre	0.12
3	-400 Baseli	0	Macks Inn	PACE	0.01	2.56	0.85	0.10	0.00	0.85	0.00	0.00	65915	65914	0	0	1	Unknown	Unknown	Core, Thre	0.12
3	-400 Baseli	0	Macks Inn	PACE	0.01	2.56	0.85	0.10	0.00	0.85	0.00	0.00	65915	65914	0	0	2	Unknown	Unknown	Core, Thre	0.12
3	-400 Baseli	0	Covington	NORTHWE	0.02	2.55	4.90	5.83	0.08	9.51	0.04	10.18	40306	40304	0	0	5	Gwye	Gwye	Single Pha	1.10
3	-400 Baseli	0	Klondike W	NORTHWE	0.01	2.55	0.85	0.25	0.00	0.85	0.00	0.00	47855	47971	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Ager 115/6	NORTHWE	0.01	2.54	0.85	0.12	0.00	0.85	0.00	0.00	45004	44978	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Roberts Cr	NORTHWE	0.01	2.51	0.84	0.12	0.00	0.84	0.00	0.00	45467	45468	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	41754	41737	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	41754	41738	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	41754	41736	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Windy Poir	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	47465	47493	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Windy Poir	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	47465	47496	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	McNary 23	NORTHWE	0.01	2.47	2.50	0.60	0.02	4.78	0.01	4.67	41353	40717	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Douglas 23	NORTHWE	0.01	2.45	0.06	0.02	0.00	0.70	0.00	1.51	47031	47029	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Morrow Pc	NORTHWE	0.01	2.40	0.80	0.11	0.00	0.80	0.00	0.00	47334	47658	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	J.D. Ross 2	NORTHWE	0.01	2.40	1.80	0.42	0.01	2.97	0.01	2.42	40899	40897	0	0	2	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Copco # 2	NORTHWE	0.01	2.38	1.16	0.17	0.00	1.78	0.00	1.10	45065	45126	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Port Angel	NORTHWE	0.01	2.38	0.48	0.06	0.00	0.00	0.00	0.79	40843	40841	0	0	2	Delta	Gwye	Core, Thre	0.12
3	-400 Baseli	0	McNary 23	NORTHWE	0.01	2.35	0.79	0.42	0.00	0.79	0.00	0.00	44122	44101	44102	44115	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Goodnoe H	NORTHWE	0.01	2.35	0.78	0.23	0.00	0.78	0.00	0.00	47329	47688	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Lancaster	NORTHWE	0.01	2.34	0.78	0.22	0.00	0.78	0.00	0.00	40624	47569	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Canemah 1	NORTHWE	0.01	2.34	1.48	0.21	0.01	2.26	0.00	1.50	43083	43081	0	0	2	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.32	0.77	0.22	0.00	0.77	0.00	0.00	41753	41732	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.32	0.77	0.22	0.00	0.77	0.00	0.00	41753	41730	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.32	0.77	0.22	0.00	0.77	0.00	0.00	41753	41731	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	McNary 23	NORTHWE	0.01	2.32	0.77	0.41	0.00	0.77	0.00	0.00	44123	44103	44104	44116	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Olympia 23	NORTHWE	0.01	2.32	0.43	0.23	0.00	0.34	0.00	0.83	40792	40791	0	0	1	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	J.D. Ross 2	NORTHWE	0.01	2.30	0.82	0.19	0.00	0.97	0.00	0.63	40899	40897	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Sedro Woo	NORTHWE	0.01	2.26	3.09	0.88	0.03	6.20	0.01	6.33	42100	42120	0	0	2	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Winston Ri	NORTHWE	0.00	2.24	0.75	0.11	0.00	0.75	0.00	0.00	44879	45464	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Ice Harbor	NORTHWE	0.00	2.23	0.75	0.09	0.00	0.75	0.00	0.00	40567	40561	0	0	3	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Texaco 115	NORTHWE	0.00	2.23	0.74	0.10	0.00	0.74	0.00	0.00	42130	42134	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Little Falls	NORTHWE	0.00	2.22	0.74	0.11	0.00	0.74	0.00	0.00	48193	48189	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Dexter 115	NORTHWE	0.00	2.21	0.74	0.09	0.00	0.74	0.00	0.00	40347	40346	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	The Dalles	NORTHWE	0.00	2.20	0.73	0.19	0.00	0.73	0.00	0.00	44055	44041	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	41751	41724	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Wanapum	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	46169	46180	46181	46195	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Wanapum	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	46169	46182	46183	46196	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	41751	41725	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Fishhole 1	NORTHWE	0.00	2.17	0.72	0.10	0.00	0.72	0.00	0.00	45105	45184	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Lookout Pc	NORTHWE	0.00	2.17	0.72	0.08	0.00	0.72	0.00	0.00	44274	44273	0	0	3	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Lookout Pc	NORTHWE	0.00	2.17	0.72	0.08	0.00	0.72	0.00	0.00	44274	44272	0	0	2	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	Lookout Pc	NORTHWE	0.00	2.17	0.72	0.08	0.00	0.72	0.00	0.00	44274	44271	0	0	1	Gwye	Delta	Core, Thre	0.12
3	-400 Baseli	0	McNary 23	NORTHWE	0.01	2.17	0.72	0.38	0.00	0.72	0.00	0.00	44126	44107	44108	44118	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	2.16	0.72	0.38	0.00	0.72	0.00	0.00	44059	44047	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Little Falls	NORTHWE	0.00	2.15	0.72	0.10	0.00	0.72	0.00	0.00	48193	48191	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	McNary 23	NORTHWE	0.01	2.15	0.72	0.38	0.00	0.72	0.00	0.00	44124	44105	44106	44117	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Rattlesnak	NORTHWE	0.01	2.15	0.91	0.00	0.01	2.38	0.01	2.42	40867	62009	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Oak Grove	NORTHWE	0.00	2.15	0.72	0.10	0.00	0.72	0.00	0.00	43371	43369	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Priest Rapi	NORTHWE	0.01	2.14	0.71	0.20	0.00	0.71	0.00	0.00	46065	46178	46179	46194	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Willow Cre	NORTHWE	0.00	2.09	0.78	0.11	0.00	0.82	0.00	0.12	47847	47990	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Goshen 16	PACE	0.01	2.09	0.70	0.14	0.00	0.70	0.00	0.00	65670	65672	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Plummel 1	NORTHWE	0.00	2.07	0.69	0.10	0.00	0.69	0.00	0.00	48323	48327	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Antelope R	NORTHWE	0.01	2.06	0.69	0.19	0.00	0.69	0.00	0.00	44280	44281	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	McKenzie	NORTHWE	0.01	2.06	3.49	0.49	0.03	6.33	0.01	5.67	46293	46292	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Shepherds	NORTHWE	0.01	2.05	0.69	0.20	0.00	0.69	0.00	0.00	47860	47450	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Shepherds	NORTHWE	0.01	2.05	0.69	0.20	0.00	0.69	0.00	0.00	47860	47453	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Jefferson 1	PACE	0.01	2.04	0.68	0.13	0.02	6.21	0.02	6.16	65860	65850	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Boise Benc	IDAHO	0.01	2.04	1.68	0.23	0.01	3.52	0.01	3.17	60045	60040	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Boise Benc	IDAHO	0.01	2.04	0.72	0.10	0.00	1.01	0.00	0.81	60045	60040	60051	60058	4	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Albina 115	NORTHWE	0.00	2.04	0.41	0.06	0.00	0.00	0.00	0.68	45001	45003	0	0	2	Delta	Gwye	Unknown	0.14
3	-400 Baseli	0	Goshen 16	PACE	0.01	2.02	0.20	0.03	0.00	1.49	0.00	2.11	65670	65675	0	0	2	Unknown	Unknown	Core, Thre	0.16
3	-400 Baseli	0	Goshen 16	PACE	0.01	2.02	0.20	0.03	0.00	1.49	0.00	2.11	65670	65675	0	0	1	Unknown	Unknown	Core, Thre	0.16

6	+550 Basel	0	Ancient La	NORTHWE	0.02	3.70	1.00	0.28	0.01	1.65	0.00	2.14	46005	46003	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Goodnoe H	NORTHWE	0.01	2.93	0.98	0.28	0.00	0.98	0.00	0.00	47329	47687	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Condon W	NORTHWE	0.01	5.82	1.95	0.28	0.00	1.95	0.00	0.01	41365	41363	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	River Road	NORTHWE	0.01	3.32	1.11	0.28	0.00	1.11	0.00	0.00	47215	47216	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Orenco 11	NORTHWE	0.01	5.78	1.91	0.27	0.00	1.90	0.00	0.15	43381	43379	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Weed Junc	NORTHWE	0.01	5.67	1.89	0.27	0.00	1.89	0.00	0.00	44961	45525	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Pine Creek	NORTHWE	0.00	0.21	0.96	0.27	0.01	1.84	0.00	1.77	48317	48316	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Terrell Cre	NORTHWE	0.01	5.55	1.85	0.27	0.00	1.85	0.00	0.00	42030	42031	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Big Eddy 2	NORTHWE	0.01	3.41	0.68	0.27	0.01	2.46	0.01	3.59	41341	40107	0	0	1	Gwye	Gwye	Three Pha	0.38
6	+550 Basel	0	Walla Wall	NORTHWE	0.01	2.90	0.97	0.27	0.00	0.97	0.00	0.00	45327	45325	0	0	2	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.52	0.51	0.27	0.00	0.51	0.00	0.00	44057	44044	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Terrell Cre	NORTHWE	0.01	5.52	1.84	0.27	0.00	1.84	0.00	0.00	42030	42033	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Twin Falls	NORTHWE	0.01	5.74	1.91	0.27	0.00	1.91	0.00	0.00	42340	42341	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Klondike W	NORTHWE	0.01	2.72	0.91	0.27	0.00	0.91	0.00	0.00	47831	47970	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Tap 230/1	NORTHWE	0.00	0.89	1.90	0.26	0.01	3.50	0.01	3.20	47082	47080	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Terrell Cre	NORTHWE	0.01	5.63	1.88	0.26	0.00	1.88	0.00	0.00	42030	42032	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Wolverine	PACE	0.01	3.90	1.30	0.26	0.00	1.30	0.00	0.00	69513	69515	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Frenchmar	NORTHWE	0.02	3.75	0.92	0.26	0.01	2.00	0.01	2.78	46164	46168	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Wolverine	PACE	0.01	3.85	1.28	0.26	0.00	1.28	0.00	0.00	69513	69514	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Northeast	NORTHWE	0.01	5.57	1.86	0.26	0.00	1.86	0.00	0.00	48277	48275	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Texaco 115	NORTHWE	0.01	5.69	1.90	0.26	0.00	1.90	0.00	0.00	42130	42131	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Texaco 115	NORTHWE	0.01	5.69	1.90	0.26	0.00	1.90	0.00	0.00	42130	42132	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Columbia F	NORTHWE	0.01	3.51	1.07	0.25	0.00	0.96	0.00	0.31	40249	40247	0	0	2	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Mayfield 2	NORTHWE	0.01	1.42	0.48	0.25	0.00	0.48	0.00	0.00	46625	46623	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.43	0.48	0.25	0.00	0.48	0.00	0.00	44058	44046	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Cougar 115	NORTHWE	0.01	6.30	2.10	0.25	0.00	2.10	0.00	0.00	46211	41304	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Walla Wall	NORTHWE	0.01	2.72	0.91	0.25	0.00	0.91	0.00	0.00	45327	45325	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Craig View	NORTHWE	0.01	4.15	1.83	0.25	0.01	2.49	0.00	1.11	45069	45134	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Klondike W	NORTHWE	0.01	2.55	0.85	0.25	0.00	0.85	0.00	0.00	47855	47971	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.39	0.46	0.25	0.00	0.46	0.00	0.00	44058	44045	0	0	1	Gwye	Delta	Single Pha	0.51
6	+550 Basel	0	Hills Creek	NORTHWE	0.01	6.20	2.07	0.25	0.00	2.07	0.00	0.00	41212	41213	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Moscow 2	NORTHWE	0.00	0.18	0.85	0.24	0.01	1.64	0.00	1.58	48249	48251	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Windy Poir	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	47465	47496	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Windy Poir	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	47465	47493	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	41754	41738	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	41754	41737	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.50	0.83	0.24	0.00	0.83	0.00	0.00	41754	41736	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Texaco 115	NORTHWE	0.01	5.31	1.77	0.24	0.00	1.77	0.00	0.00	42130	42133	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Headwork	NORTHWE	0.01	4.69	1.56	0.24	0.00	1.56	0.00	0.00	48149	46619	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	La Pine 230	NORTHWE	0.02	5.31	0.99	0.24	0.00	0.64	0.00	1.79	40635	40633	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Longview 2	NORTHWE	0.00	0.83	0.83	0.24	0.00	1.11	0.00	0.94	40671	47423	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Greenwoo	NORTHWE	0.01	5.09	1.70	0.24	0.00	1.70	0.00	0.00	48143	48229	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Rigby 161/	PACE	0.01	3.70	1.23	0.23	0.00	1.23	0.00	0.00	66295	66296	0	0	3	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Bowmont	IDAHO	0.04	9.91	1.73	0.23	0.00	0.63	0.01	3.93	60064	60065	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Naches 115	NORTHWE	0.01	5.03	1.68	0.23	0.00	1.68	0.00	0.00	45211	45361	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Fredericks	NORTHWE	0.01	5.14	1.72	0.23	0.00	1.72	0.00	0.00	42720	42722	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Fredericks	NORTHWE	0.01	5.14	1.72	0.23	0.00	1.72	0.00	0.00	42720	42721	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Fredonia (I	NORTHWE	0.01	5.02	1.67	0.23	0.00	1.67	0.00	0.00	42110	42115	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Olympia 23	NORTHWE	0.01	2.32	0.43	0.23	0.00	0.34	0.00	0.83	40792	40791	0	0	1	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Goodnoe H	NORTHWE	0.01	2.35	0.78	0.23	0.00	0.78	0.00	0.00	47329	47688	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Fredonia (I	NORTHWE	0.01	4.99	1.66	0.23	0.00	1.66	0.00	0.00	42110	42114	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Post Falls 1	NORTHWE	0.01	4.91	1.64	0.23	0.00	1.64	0.00	0.00	48329	48331	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Snohomish	NORTHWE	0.01	1.33	0.43	0.23	0.01	1.27	0.00	1.70	41329	40988	0	0	2	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.32	0.77	0.22	0.00	0.77	0.00	0.00	41753	41732	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.32	0.77	0.22	0.00	0.77	0.00	0.00	41753	41731	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.32	0.77	0.22	0.00	0.77	0.00	0.00	41753	41730	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Dry Creek-	PACE	0.01	3.54	1.56	0.22	0.00	2.15	0.00	1.04	66813	66814	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Boise Benc	IDAHO	0.01	2.00	1.63	0.22	0.01	3.43	0.01	3.11	60045	60040	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Glenoma 2	NORTHWE	0.00	0.13	0.77	0.22	0.00	1.08	0.00	1.03	47049	47047	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Lancaster	NORTHWE	0.01	2.34	0.78	0.22	0.00	0.78	0.00	0.00	40624	47569	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Troutdale	NORTHWE	0.03	7.47	0.75	0.21	0.00	0.00	0.00	2.49	45301	45297	0	0	1	Delta	Gwye	Unknown	0.28
6	+550 Basel	0	Stateline V	NORTHWE	0.01	4.04	1.51	0.21	0.00	1.58	0.00	0.24	47574	47573	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Sugermill 1	PACE	0.01	2.95	1.11	0.21	0.00	1.16	0.00	0.18	66430	66435	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Rigby 161/	PACE	0.01	3.36	1.12	0.21	0.00	1.12	0.00	0.00	66295	66296	0	0	2	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	41751	41724	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Wanapum	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	46169	46182	46183	46196	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	41751	41725	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Wanapum	NORTHWE	0.01	2.19	0.73	0.21	0.00	0.73	0.00	0.00	46169	46180	46181	46195	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Hogan 115	NORTHWE	0.00	0.71	1.46	0.21	0.01	2.92	0.00	2.83	43253	43251	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Prospect 1	NORTHWE	0.00	2.02	1.49	0.21	0.01	2.72	0.00	2.05	45259	45446	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Goodnoe H	NORTHWE	0.01	1.74	0.74	0.21	0.00	0.92	0.00	0.45	47329	40380	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Snoqualmi	NORTHWE	0.01	4.43	1.48	0.21	0.00	1.48	0.00	0.00	42330	42331	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Canemah	NORTHWE	0.01	2.34	1.48	0.21	0.01	2.26	0.00	1.50	43083	43081	0	0	2	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Boulder Pa	NORTHWE	0.03	6.58	0.73	0.21	0.01	1.93	0.01	3.85	48524	48520	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Hanford G	NORTHWE	0.01	4.41	1.47	0.21	0.00	1.47	0.00	0.00	40502	40504	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Foster 115	NORTHWE	0.01	5.31	1.77	0.20	0.00	1.77	0.00	0.00	40435	44031	44032	44033	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Parker 115	NORTHWE	0.01	4.35	1.45	0.20	0.00	1.45	0.00	0.00	40815	41246	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Parker 115	NORTHWE	0.01	4.35	1.45	0.20	0.00	1.45	0.00	0.00	40815	41254	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Wallula 23	NORTHWE	0.01	2.17	0.72	0.20	0.00	0.72	0.00	0.00	45331	45329	0	0	1	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	Priest Rapi	NORTHWE	0.01	2.13	0.71	0.20	0.00	0.71	0.00	0.00	46065	46178	46179	46194	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Scoville 13	PACE	0.01	3.71	1.24	0.20	0.00	1.24	0.00	0.00	65010	65050	0	0	1	Unknown	Unknown	Unknown	0.17
6	+550 Basel	0	John Day P	NORTHWE	0.00	0.51	0.17	0.20	0.00	0.17	0.00	0.00	44087	44073	44074	44082	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	John Day P	NORTHWE	0.00	0.51	0.17	0.20	0.00	0.17	0.00	0.00	44088	44075	44076	44083	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	John Day P	NORTHWE	0.00	0.51	0.17	0.20	0.00	0.17	0.00	0.00	44086	44071	44072	44081	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	John Day P	NORTHWE	0.00	0.50	0.17	0.20	0.00	0.17	0.00	0.00	44089	44077	44078	44084	1	Gwye	Delta	Single Pha	1.10
6	+550 Basel	0	Ice Harbor	NORTHWE	0.01	5.31	1.77	0.20	0.00	1.77	0.00	0.00	40565	40560	0	0	2	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Shepherds	NORTHWE	0.01	2.05	0.68	0.20	0.00	0.68	0.00	0.00	47860	47450	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Shepherds	NORTHWE	0.01	2.05	0.68	0.20	0.00	0.68	0.00	0.00	47860	47453	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Sugermill 1	PACE	0.01	3.09	1.03	0.20	0.00	1.03	0.00	0.00	66430	66440	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Dran 230/1	IDAHO	0.02	4.46	1.46	0.20	0.01	1.57	0.00	0.92	60130	61223	0	0	2	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Boulder Pa	NORTHWE	0.03	6.22	0.70	0.20	0.01	1.83	0.01	3.63	48524	48522	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Dixonville	NORTHWE	0.01	1.09	0.17	0.20	0.00	0.00	0.00	0.36	45095	44900	0	0	1	Gwye	Gwye	Unknown	1.10
6	+550 Basel	0	Ice Harbor	NORTHWE	0.01	5.22	1.74	0.19	0.00	1.74	0.00	0.00	40565	40559	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	The Dalles	NORTHWE	0.00	2.20	0.73	0.19	0.00	0.73	0.00	0.00	44055	44041	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Clearwater	NORTHWE	0.00	1.68	1.39	0.19	0.00	1.75	0.00	1.19	48075	48481	0	0	2	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Clearwater	NORTHWE	0.00	1.68	1.39	0.19	0.00	1.74	0.00	1.18	48075	48481	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Antelope R	NORTHWE	0.01	2.07	0.69	0.19	0.00	0.69	0.00	0.00	44280	44281	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	J.D. Ross 2	NORTHWE	0.01	2.30	0.82	0.19	0.00	0.97	0.00	0.63	40899	40897	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	I.E. Paper 1	NORTHWE	0.01	4.10	1.37	0.19	0.00	1.37	0.00	0.00	48163	48166	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	I.E. Paper 1	NORTHWE	0.01	4.10	1.37	0.19	0.00	1.37	0.00	0.00	48163	48168	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Dran 230/1	IDAHO	0.02	4.59	1.39	0.19	0.01	1.32	0.00	0.87	60130	61223	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Ice Harbor	NORTHWE	0.01	5.07	1.69	0.19	0.00	1.69	0.00	0.00	40569	40564	0	0	6	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Locust 230	IDAHO	0.04	8.75	1.40	0.19	0.01	2.16	0.01	4.60	60207	61254	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Fredonia (I	NORTHWE	0.01	3.99	1.33	0.19	0.00	1.33	0.00	0.00	42116	42117	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Ice Harbor	NORTHWE	0.01	5.01	1.67	0.19	0.00	1.67	0.00	0.00	40569	40563	0	0	5	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Longview 2	NORTHWE	0.01	2.02	0.67	0.18	0.00	0.67	0.00	0.00	40672	41225	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Longview 2	NORTHWE	0.01	2.02	0.67	0.18	0.00	0.67	0.00	0.00	40672	41226	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Biglow Car	NORTHWE	0.01	1.89	0.63	0.18	0.00	0.63	0.00	0.00	47844	47841	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Bethel (PG	NORTHWE	0.00	0.88	1.27	0.18	0.01	2.74	0.00	2.88	43037	43035	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Longview 2	NORTHWE	0.01	1.99	0.66	0.18	0.00	0.66	0.00	0.00	40672	41224	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Biglow Car	NORTHWE	0.01	1.87	0.62	0.18	0.00	0.62	0.00	0.00	47844	47842	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Wincheste	NORTHWE	0.01	3.91	1.30	0.18	0.00	1.30	0.00	0.00	45533	45534	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Klondike W	NORTHWE	0.01	1.24	0.60	0.18	0.00	0.79	0.00	0.37	47830	47327	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Diamond H	NORTHWE	0.01	1.80	0.62	0.18	0.00	0.63	0.00	0.04	45089	45388	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Hopkins Ri	NORTHWE	0.01	3.75	1.25	0.18	0.00	1.25	0.00	0.00	47800	47802	0	0	2	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Sifton 230/	NORTHWE	0.00	1.09	0.75	0.18	0.01	1.76	0.00	2.08	40981	40979	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Smith Falls	NORTHWE	0.01	3.73	1.24	0.17	0.00	1.24	0.00	0.00	41299	41298	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Sifton 230/	NORTHWE	0.00	1.10	0.75	0.17	0.01	1.76	0.00	2.08	40983	40979	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Rigby 161/	PACE	0.01	2.74	0.91	0.17	0.00	0.91	0.00	0.00	66295	66296	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	1.78	0.59	0.17	0.00	0.59	0.00	0.00	41752	41728	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Cinder 161	PACE	0.01	2.61	0.87	0.17	0.00	0.87	0.00	0.00	67672	67671	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Grand Cou	NORTHWE	0.01	1.78	0.59	0.17	0.00	0.59	0.00	0.00	41752	41727	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Cave Junct	NORTHWE	0.01	3.61	1.20	0.17	0.00	1.20	0.00	0.00	45037	45381	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Fossil 115/	NORTHWE	0.01	3.43	1.19	0.17	0.00	1.27	0.00	0.13	40434	40433	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Canemah 1	NORTHWE	0.00	1.90	1.21	0.17	0.00	1.84	0.00	1.22	43083	43081	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Hopkins Ri	NORTHWE	0.01	3.57	1.19	0.17	0.00	1.19	0.00	0.00	47800	47801	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	White Cree	NORTHWE	0.01	1.72	0.57	0.17	0.00	0.57	0.00	0.00	47858	47979	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Summer Fa	NORTHWE	0.01	3.51	1.17	0.17	0.00	1.17	0.00	0.00	46447	46655	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Summer Fa	NORTHWE	0.01	3.51	1.17	0.17	0.00	1.17	0.00	0.00	46447	46653	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Copco # 2	NORTHWE	0.01	2.38	1.16	0.17	0.00	1.78	0.00	1.10	45065	45126	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Wallula 23	NORTHWE	0.01	1.78	0.59	0.17	0.00	0.59	0.00	0.00	45331	45329	0	0	2	Gwye	Delta	Unknown	0.28
6	+550 Basel	0	McNary 11	NORTHWE	0.00	1.88	0.63	0.16	0.00	0.63	0.00	0.00	44128	44113	44114	44121	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Hermiston	NORTHWE	0.01	1.75	0.58	0.16	0.00	0.58	0.00	0.00	45137	45455	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Hermiston	NORTHWE	0.01	1.75	0.58	0.16	0.00	0.58	0.00	0.00	45137	45457	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Alder 115/	NORTHWE	0.01	3.35	1.12	0.16	0.00	1.12	0.00	0.00	46670	46672	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Alder 115/	NORTHWE	0.01	3.35	1.12	0.16	0.00	1.12	0.00	0.00	46670	46671	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Hazelwooc	NORTHWE	0.01	3.29	1.10	0.16	0.00	1.10	0.00	0.00	45131	45226	0	0	3	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Willow Cre	NORTHWE	0.01	3.01	1.10	0.16	0.00	1.14	0.00	0.14	47848	47993	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Bonneville	NORTHWE	0.00	1.79	0.60	0.16	0.00	0.60	0.00	0.00	40139	44005	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	McNary 11	NORTHWE	0.01	6.67	1.33	0.15	0.00	0.00	0.00	2.22	40717	40715	0	0	1	Delta	Gwye	Core, Thre	0.12
6	+550 Basel	0	Sno-king 2	NORTHWE	0.01	2.72	0.64	0.15	0.00	1.11	0.00	1.57	41006	41012	0	0	1	Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Bonneville	NORTHWE	0.00	1.79	0.60	0.15	0.00	0.60	0.00	0.00	40139	44001	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Hood River	NORTHWE	0.01	3.41	1.14	0.15	0.00	1.14	0.00	0.00	40541	45307	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Hood River	NORTHWE	0.01	3.22	1.07	0.15	0.00	1.07	0.00	0.00	40541	45309	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Swan Falls	IDAHO	0.01	5.50	1.83	0.15	0.00	1.83	0.00	0.00	60332	60331	0	0	1	Gwye	Delta	3-Legged C	0.08
6	+550 Basel	0	Linneman	NORTHWE	0.02	3.88	0.52	0.15	0.01	1.92	0.01	3.10	43291	43289	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Beacon (Sp	NORTHWE	0.00	0.58	1.06	0.15	0.00	1.18	0.00	0.98	48029	48027	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Jackson Hy	NORTHWE	0.01	6.66	2.22	0.15	0.00	2.22	0.00	0.00	45685	45689	0	0	1	Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Jackson Hy	NORTHWE	0.01	6.66	2.22	0.15	0.00	2.22	0.00	0.00	45685	45687	0	0	1	Gwye	Delta	3-Legged C	0.07

0	The Dalles	NORTHWE	0.006	1.429	0.476	0.252	0.002	0.476	0.000	0.000	44058	44046	0	0	1	Gwye	Delta	Single Pha	0.51
0	Mayfield 2	NORTHWE	0.006	1.424	0.475	0.252	0.002	0.475	0.000	0.000	46625	46623	0	0	1	Gwye	Delta	Single Pha	0.51
0	Rocky Reac	NORTHWE	0.006	1.416	0.472	0.065	0.002	0.472	0.000	0.000	46855	46849	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Rocky Reac	NORTHWE	0.006	1.412	0.471	0.065	0.002	0.471	0.000	0.000	46852	46841	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Rocky Reac	NORTHWE	0.006	1.405	0.468	0.065	0.002	0.468	0.000	0.000	46852	46842	0	0	1	Gwye	Delta	3-Legged C	0.13
0	The Dalles	NORTHWE	0.006	1.393	0.464	0.245	0.002	0.464	0.000	0.000	44058	44045	0	0	1	Gwye	Delta	Single Pha	0.51
0	Biglow Can	NORTHWE	0.006	1.386	0.462	0.135	0.002	0.462	0.000	0.000	47844	47840	0	0	1	Gwye	Gwye	Unknown	0.28
0	Albeni Falls	NORTHWE	0.005	2.761	0.920	0.102	0.002	0.920	0.000	0.000	40029	40032	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Albeni Falls	NORTHWE	0.005	2.761	0.920	0.101	0.002	0.920	0.000	0.000	40029	40030	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Albeni Falls	NORTHWE	0.005	2.761	0.920	0.101	0.002	0.920	0.000	0.000	40029	40028	0	0	1	Gwye	Delta	Core, Thre	0.12
0	East Jackso	PACE	0.005	2.632	0.877	0.123	0.002	0.878	0.000	0.000	65480	66822	0	0	1	Unknown	Unknown	Unknown	0.14
0	Ice Harbor	NORTHWE	0.005	2.628	0.876	0.099	0.002	0.876	0.000	0.000	40567	40562	0	0	4	Gwye	Delta	Core, Thre	0.12
0	Tolt 115/1	NORTHWE	0.005	2.589	0.863	0.120	0.002	0.863	0.000	0.000	42350	42351	0	0	1	Gwye	Delta	Unknown	0.14
0	Boardman	NORTHWE	0.005	2.586	0.901	0.105	0.002	0.959	0.000	0.176	40127	40125	0	0	1	Gwye	Gwye	Core, Thre	0.12
0	Macks Inn	PACE	0.005	2.558	0.853	0.102	0.002	0.853	0.000	0.000	65915	65914	0	0	1	Unknown	Unknown	Core, Thre	0.12
0	Macks Inn	PACE	0.005	2.558	0.853	0.102	0.002	0.853	0.000	0.000	65915	65914	0	0	2	Unknown	Unknown	Core, Thre	0.12
0	Ager 115/6	NORTHWE	0.005	2.544	0.848	0.115	0.002	0.848	0.000	0.000	45004	44978	0	0	1	Gwye	Gwye	Unknown	0.14
0	Roberts Cr	NORTHWE	0.005	2.505	0.835	0.115	0.002	0.835	0.000	0.000	45467	45468	0	0	1	Gwye	Gwye	Unknown	0.14
0	Morrow Pc	NORTHWE	0.005	2.402	0.801	0.112	0.002	0.801	0.000	0.000	47334	47658	0	0	1	Unknown	Unknown	Unknown	0.14
0	Copco # 2	NORTHWE	0.005	2.381	1.155	0.166	0.004	1.775	0.001	1.101	45065	45126	0	0	1	Gwye	Gwye	Unknown	0.14
0	Port Angel	NORTHWE	0.005	2.377	0.475	0.055	0.000	0.000	0.001	0.792	40843	40841	0	0	2	Delta	Gwye	Core, Thre	0.12
0	Canemah 1	NORTHWE	0.005	2.340	1.481	0.207	0.005	2.260	0.002	1.497	43083	43081	0	0	2	Gwye	Gwye	Unknown	0.14
0	Meadow C	PACE	0.005	1.734	0.578	0.116	0.002	0.578	0.000	0.000	69524	69525	0	0	1	Unknown	Unknown	Unknown	0.19
0	Snohomish	NORTHWE	0.005	1.377	0.181	0.095	0.003	0.760	0.002	1.205	41330	40984	0	0	1	Gwye	Gwye	Single Pha	0.51
0	Libby - PAC	NORTHWE	0.005	1.357	0.452	0.108	0.002	0.452	0.000	0.000	44201	44195	44196	44199	3	Gwye	Delta	Core, Thre	0.23
0	Rocky Reac	NORTHWE	0.005	1.350	0.450	0.062	0.002	0.450	0.000	0.000	46853	46843	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Rocky Reac	NORTHWE	0.005	1.341	0.447	0.062	0.002	0.447	0.000	0.000	46853	46844	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Rocky Reac	NORTHWE	0.005	1.337	0.446	0.062	0.002	0.446	0.000	0.000	46854	46846	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Santiam 23	NORTHWE	0.005	1.327	1.327	0.376	0.008	2.054	0.003	2.440	40939	45475	0	0	1	Gwye	Gwye	Unknown	0.28
0	Snohomish	NORTHWE	0.005	1.326	0.430	0.225	0.005	1.265	0.003	1.698	41329	40988	0	0	2	Gwye	Gwye	Single Pha	0.51
0	Priest Rapi	NORTHWE	0.005	1.315	0.438	0.125	0.002	0.438	0.000	0.000	46069	46174	46175	46192	1	Unknown	Unknown	Unknown	0.28
0	Priest Rapi	NORTHWE	0.005	1.315	0.438	0.125	0.002	0.438	0.000	0.000	46069	46176	46177	46193	1	Unknown	Unknown	Unknown	0.28
0	Shepherds	NORTHWE	0.005	1.308	0.436	0.127	0.002	0.436	0.000	0.000	47861	47459	0	0	1	Unknown	Unknown	Unknown	0.28
0	Shepherds	NORTHWE	0.005	1.308	0.436	0.127	0.002	0.436	0.000	0.000	47861	47456	0	0	1	Unknown	Unknown	Unknown	0.28
0	The Dalles	NORTHWE	0.005	1.307	0.436	0.105	0.002	0.436	0.000	0.000	44060	44049	0	0	1	Gwye	Delta	Core, Thre	0.23
0	The Dalles	NORTHWE	0.005	1.296	0.432	0.104	0.002	0.432	0.000	0.000	44060	44051	0	0	1	Gwye	Delta	Core, Thre	0.23
0	The Dalles	NORTHWE	0.005	1.286	0.429	0.103	0.002	0.429	0.000	0.000	44060	44050	0	0	1	Gwye	Delta	Core, Thre	0.23
0	Fredericks	NORTHWE	0.005	1.271	0.424	0.122	0.002	0.424	0.000	0.000	47578	47577	0	0	1	Unknown	Unknown	Unknown	0.28
0	McKenzie 2	NORTHWE	0.005	1.271	0.424	0.058	0.002	0.424	0.000	0.000	46809	46858	0	0	2	Gwye	Delta	3-Legged C	0.13
0	The Dalles	NORTHWE	0.005	1.263	0.421	0.101	0.002	0.421	0.000	0.000	44059	44048	0	0	1	Gwye	Delta	Core, Thre	0.23
0	McKenzie 2	NORTHWE	0.005	1.263	0.421	0.058	0.002	0.421	0.000	0.000	46809	46857	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Klondike W	NORTHWE	0.005	1.237	0.600	0.177	0.003	0.787	0.001	0.374	47830	47327	0	0	1	Unknown	Unknown	Unknown	0.28
0	Rocky Reac	NORTHWE	0.005	1.221	0.407	0.056	0.002	0.407	0.000	0.000	46855	46847	0	0	1	Gwye	Delta	3-Legged C	0.13
0	Jones Cany	NORTHWE	0.005	1.193	0.398	0.116	0.002	0.398	0.000	0.000	47814	47817	0	0	1	Unknown	Unknown	Unknown	0.28
0	Longview 2	NORTHWE	0.005	1.185	0.395	0.113	0.002	0.395	0.000	0.000	40671	41227	0	0	1	Unknown	Unknown	Unknown	0.28
0	Winston Ri	NORTHWE	0.004	2.239	0.746	0.107	0.001	0.746	0.000	0.000	44879	45464	0	0	1	Unknown	Unknown	Unknown	0.14
0	Ice Harbor	NORTHWE	0.004	2.234	0.745	0.088	0.001	0.745	0.000	0.000	40567	40561	0	0	3	Gwye	Delta	Core, Thre	0.12
0	Texaco 115	NORTHWE	0.004	2.230	0.743	0.100	0.001	0.743	0.000	0.000	42130	42134	0	0	1	Gwye	Gwye	Unknown	0.14
0	Little Falls (	NORTHWE	0.004	2.217	0.739	0.106	0.001	0.739	0.000	0.000	48193	48189	0	0	1	Unknown	Unknown	Unknown	0.14
0	Dexter 115	NORTHWE	0.004	2.210	0.737	0.085	0.001	0.737	0.000	0.000	40347	40346	0	0	1	Gwye	Delta	Core, Thre	0.12
0	The Dalles	NORTHWE	0.004	2.202	0.734	0.193	0.001	0.734	0.000	0.000	44055	44041	0	0	1	Gwye	Delta	Single Pha	0.25
0	Fishhole 11	NORTHWE	0.004	2.171	0.724	0.097	0.001	0.724	0.000	0.000	45105	45184	0	0	1	Gwye	Gwye	Unknown	0.14
0	Lookout Pc	NORTHWE	0.004	2.169	0.723	0.081	0.001	0.723	0.000	0.000	44274	44273	0	0	3	Gwye	Delta	Core, Thre	0.12
0	Lookout Pc	NORTHWE	0.004	2.169	0.723	0.081	0.001	0.723	0.000	0.000	44274	44272	0	0	2	Gwye	Delta	Core, Thre	0.12
0	Lookout Pc	NORTHWE	0.004	2.169	0.723	0.081	0.001	0.723	0.000	0.000	44274	44271	0	0	1	Gwye	Delta	Core, Thre	0.12
0	Little Falls (	NORTHWE	0.004	2.154	0.718	0.102	0.001	0.718	0.000	0.000	48193	48191	0	0	1	Unknown	Unknown	Unknown	0.14
0	Oak Grove	NORTHWE	0.004	2.150	0.717	0.104	0.001	0.717	0.000	0.000	43371	43369	0	0	1	Gwye	Delta	Unknown	0.14
0	Willow Cre	NORTHWE	0.004	2.095	0.785	0.111	0.002	0.822	0.000	0.123	47847	47990	0	0	1	Unknown	Unknown	Unknown	0.14
0	Plummel 1	NORTHWE	0.004	2.064	0.688	0.095	0.001	0.688	0.000	0.000	48323	48327	0	0	1	Unknown	Unknown	Unknown	0.14
0	Albina 115	NORTHWE	0.004	2.035	0.407	0.057	0.000	0.000	0.001	0.678	45001	45003	0	0	2	Delta	Gwye	Unknown	0.14
0	Prospect 1	NORTHWE	0.004	2.020	1.491	0.208	0.005	2.718	0.002	2.045	45259	45446	0	0	1	Gwye	Gwye	Unknown	0.14
0	Palisades (	PACE	0.004	1.965	0.655	0.088	0.001	0.655	0.000	0.000	66185	66160	0	0	1	Unknown	Unknown	Unknown	0.14
0	Palisades (	PACE	0.004	1.965	0.655	0.088	0.001	0.655	0.000	0.000	66185	66165	0	0	1	Unknown	Unknown	Unknown	0.14
0	Palisades (	PACE	0.004	1.965	0.655	0.087	0.001	0.655	0.000	0.000	66185	66170	0	0	1	Unknown	Unknown	Unknown	0.14
0	Palisades (	PACE	0.004	1.965	0.655	0.087	0.001	0.655	0.000	0.000	66185	66175	0	0	1	Unknown	Unknown	Unknown	0.14
0	White Rive	NORTHWE	0.004	1.932	0.644	0.090	0.001	0.644	0.000	0.000	42701	42702	0	0	1	Gwye	Delta	Unknown	0.14
0	Kelso 115/	NORTHWE	0.004	1.931	0.644	0.090	0.001	0.644	0.000	0.000	47035	47402	0	0	1	Gwye	Gwye	Unknown	0.14
0	Canemah 1	NORTHWE	0.004	1.904	1.205	0.168	0.004	1.839	0.001	1.219	43083	43081	0	0	1	Gwye	Gwye	Unknown	0.14
0	McNary 11	NORTHWE	0.004	1.896	0.632	0.162	0.001	0.632	0.000	0.000	44128	44113	44114	44121	1	Gwye	Delta	Single Pha	0.25
0	Dry Gulch	NORTHWE	0.004	1.831	0.610	0.086	0.001	0.610	0.000	0.000	48113	45097	0	0	1	Gwye	Delta	Unknown	0.14
0	Nine Canyo	NORTHWE	0.004	1.815	0.679	0.095	0.001	0.711	0.000	0.106	47314	47315	0	0	1	Unknown	Unknown	Unknown	0.14
0	Nine Canyo	NORTHWE	0.004	1.815	0.679	0.095	0.001	0.711	0.000	0.106	47314	47316	0	0	2	Unknown	Unknown	Unknown	0.14
0	Nine Canyo	NORTHWE	0.004	1.815	0.679	0.095	0.001	0.711	0.000	0.106	47314	47313	0	0	3	Unknown	Unknown	Unknown	0.14
0	Chiloquin 1	NORTHWE	0.004	1.812	0.604	0.086	0.001	0.604	0.000	0.000	45045	45094	0	0	1	Gwye	Gwye	Unknown	0.14
0	Bonneville	NORTHWE	0.004	1.794	0.598	0.150	0.001	0.598	0.000	0.000	40139	44005	0	0	1	Gwye	Delta	Single Pha	0.25
0	Bonneville	NORTHWE	0.004	1.794	0.598	0.149	0.001	0.598	0.000	0.000	40139	44001	0	0	1	Gwye	Delta	Single Pha	0.25
0	Addy 115/2	NORTHWE	0.004	1.772	0.591	0.083	0.001	0.591	0.000	0.000	40017	48007	0	0	1	Unknown	Unknown	Unknown	0.14
0	Rock Island	NORTHWE	0.004	1.763	0.588	0.040	0.001	0.588	0.000	0.000	46894	46893	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Rock Island	NORTHWE	0.004	1.760	0.587	0.041	0.001	0.587	0.000	0.000	46818	46812	46814	46828	3	Gwye	Delta	3-Legged C	0.07
0	Sifton 230/	NORTHWE	0.004	1.095	0.747	0.174	0.007	1.758	0.004	2.075	40983	40979	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Sifton 230/	NORTHWE	0.004	1.086	0.750	0.175	0.007	1.763	0.004	2.077	40981	40979	0	0	1	Gwye	Gwye	Core, Thre	0.23
0	Roundup 2	NORTHWE	0.004	1.085	0.385	0.104	0.002	0.395	0.000	0.033	40905	40903	0	0	1	Unknown	Unknown	Unknown	0.28
0	Jones Cany	NORTHWE	0.004	1.081	0.360	0.105	0.001	0.360	0.000	0.000	47814	47816	0	0	1	Unknown	Unknown	Unknown	0.28
0	Roundup 2	NORTHWE	0.004	1.081	0.384	0.104	0.002	0.393	0.000	0.033	40905	40903	0	0	2	Unknown	Unknown	Unknown	0.28
0	Cove 230/6	NORTHWE	0.004	1.052	0.105	0.030	0.000	0.000	0.000	0.351	45128	45130	0	0	1	Delta	Gwye	Unknown	0.28
0	Columbia 2	NORTHWE	0.004	1.032	0.627	0.327	0.006	1.573	0.004	1.896	40261	40259	0	0	2	Gwye	Gwye	Single Pha	0.51
0	Priest Rapi	NORTHWE	0.004	1.029	0.343	0.098	0.001	0.343	0.000	0.000	46066	46172	46173	46191	1	Unknown	Unknown	Unknown	0.28
0	Priest Rapi	NORTHWE	0.004	1.029	0.343	0.098	0.001	0.343	0.000	0.000	46066	46170	46171	46190	1	Unknown	Unknown	Unknown	0.28
0	Mint Farm	NORTHWE	0.004	0.962	0.321	0.088	0.001	0.321	0.000	0.000	47677	47675	0	0	1	Unknown	Unknown	Unknown	0.28
0	LaGrande 2	NORTHWE	0.004	0.928	0.309	0.084	0.001	0.309	0.000	0.000	40621	40619	0	0	2	Unknown	Unknown	Unknown	0.28
0	Tap 230/11	NORTHWE	0.004	0.895	1.900	0.262	0.014	3.501	0.006	3.203	47082	47080	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Snohomish	NORTHWE	0.004	0.737	4.115	1.762	0.075	12.565	0.050	12.674	40993	41329	0	0	1	Unknown	Unknown	Unknown	0.41
0	John Day P	NORTHWE	0.004	0.510	0.170	0.203	0.001	0.170	0.000	0.000	44086	44071	44072	44081	1	Gwye	Delta	Single Pha	1.10
0	John Day P	NORTHWE	0.004	0.510	0.170	0.202	0.001	0.170	0.000	0.000	44088	44075	44076	44083	1	Gwye	Delta	Single Pha	1.10
0	John Day P	NORTHWE	0.004	0.508	0.169	0.202	0.001	0.169	0.000	0.000	44087	44073	44074	44082	1	Gwye	Delta	Single Pha	1.10
0	John Day P	NORTHWE	0.004	0.504	0.168	0.200	0.001	0.168	0.000	0.000	44089	44077	44078	44084	1	Gwye	Delta	Single Pha	1.10
0	Rock Island	NORTHWE	0.003	1.741	0.580	0.039	0.001	0.580	0.000	0.000	46896	46895	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Orenco 115	NORTHWE	0.003	1.722	0.568	0.081	0.001	0.566	0.000	0.046	43381	43379	0	0	2	Gwye	Gwye	Unknown	0.14
0	Rock Island	NORTHWE	0.003	1.718	0.573	0.040	0.001	0.573	0.000	0.000	46818	46820	46822	46836	4	Gwye	Delta	3-Legged C	0.07
0	Boulder Pa	NORTHWE	0.003	1.706	0.569	0.079	0.001	0.569	0.000	0.000	48522	48526	0	0	1	Unknown	Unknown	Unknown	0.14
0	Anderson I	IDAHO	0.003	1.674	0.558	0.078	0.001	0.558	0.000	0.000	61800	61802	0	0	1	Unknown	Unknown	Unknown	0.14
0	Anderson I	IDAHO	0.003	1.663	0.554	0.078	0.001	0.554	0.000	0.000	61800	61801	0	0	1	Unknown	Unknown	Unknown	0.14
0	Tieton 115	NORTHWE	0.003	1.631	0.544	0.075	0.001	0.544	0.000	0.000	44869	44870	0	0	1	Unknown	Unknown	Unknown	0.14
0	Ross Park 1	NORTHWE	0.003	1.589	0.530	0.077	0.001	0.530	0.000	0.000	48409	48407	0	0	1	Unknown	Unknown	Unknown	0.14
0	Post Falls 1	NORTHWE	0.003	1.582	0.527	0.073	0.001	0.527	0.000	0.000	48329	48333	0	0	1	Unknown	Unknown	Unknown	0.14
0	Fidalgo 115	NORTHWE	0.003	1.570	0.364	0.043	0.000	0.126	0.000	0.397	42118	40415	0	0	5	Unknown	Unknown	Core, Thre	0.12
0	Clearwater	NORTHWE	0.003	1.562	1.291	0.179	0.003	1.621	0.001	1.100	48075	48481	0	0	2	Unknown	Unknown	Unknown	0.14
0	Clearwater	NORTHWE	0.003	1.555	1.286	0.178	0.003	1.614	0.001	1.096	48075	48481	0	0	1	Unknown	Unknown	Unknown	0.14
0	Dixonville 1	NORTHWE	0.003	1.546	0.515	0.074	0.001	0.516	0.000	0.000	45091	45152	0	0	2	Gwye	Gwye	Unknown	0.14
0	Oregon Str	NORTHWE	0.003	1.499	0.500	0.069	0.001	0.500	0.000	0.000	47339	47338	0	0	1	Unknown	Unknown	Unknown	0.14
0	Oregon Str	NORTHWE	0.003	1.499	0.500	0.069	0.001	0.500	0.000	0.000	47339	47337	0	0	1	Unknown	Unknown	Unknown	0.14
0	Dixonville 1	NORTHWE	0.003	1.389	0.463	0.067	0.001	0.463	0.000	0.000	45091	45152	0	0	1	Gwye	Gwye	Unknown	0.14
0	Finley 115/	NORTHWE	0.003	1.377	0.459	0.064	0.001	0.459	0.000	0.000	47312	47311	0	0	1	Unknown	Unknown	Unknown	0.14
0	Goldendale	NORTHWE	0.003	1.357	0.452	0.116	0.001	0.452	0.000	0.000	40477	47162	0	0	1	Gwye	Delta	Single Pha	0.25
0	Grants Pas	NORTHWE	0.003	1.349	0.450	0.064	0.001	0.450	0.000	0.000	45121	45393	0	0	1	Gwye	Gwye	Unknown	0.14
0	Long Lake 1	NORTHWE	0.003	1.302	0.434	0.060	0.001	0.434	0.000	0.000	48199	48205	0	0	1	Unknown	Unknown	Unknown	0.14
0	Long Lake 1	NORTHWE	0.003	1.293	0.431	0.060	0.001	0.431	0.000	0.000	48201	48211	0	0	1	Unknown	Unknown	Unknown	0.14
0	Long Lake 1	NORTHWE	0.003	1.282	0.427	0.059	0.001	0.427	0.000	0.000	48199	48207	0	0	1	Unknown	Unknown	Unknown	0.14
0	Grants Pas	NORTHWE	0.003	1.272	0.424	0.061	0.001	0.424	0.000	0.000	45121	45393	0	0	2	Gwye	Gwye	Unknown	0.14
0	Long Lake 1	NORTHWE	0.003	1.268	0.423	0.059	0.001	0.423	0.000	0.000	48201	48209	0	0	1	Unknown	Unknown	Unknown	0.14
0	Longview 2	NORTHWE	0.003	0.827	0.828	0.236	0.004	1.106	0.001	0.940	40671	47423	0	0	1	Unknown	Unknown	Unknown	0.28
0	Mint Farm	NORTHWE	0.003	0.716	0.239	0.066	0.001	0.239	0.000	0.000	47677	47676	0	0	1	Unknown	Unknown	Unknown	0.28
0	Silver Cree	NORTHWE	0.003	0.703	0.226	0.064	0.001	0.227	0.000	0.062	40987	40985	0	0	1	Unknown	Unknown	Unknown	0.28
0	McKenzie 2	NORTHWE	0.003	0.688	0.229	0.031	0.001	0.229	0.000	0.000	46809	46859	0	0	3	Gwye	Delta	3-Legged C	0.13
0	Wells (DOF	NORTHWE	0.003	0.678	1.004	0.139	0.008	1.937	0.004	1.886	47102	47099	0	0	1	Gwye	Gwye	3-Legged C	0.13
0	Grand Cou	NORTHWE	0.003	0.675	0.225	0.065	0.001	0.225	0.000	0.000	41753	41733	0	0	1	Unknown	Unknown	Unknown	0.28
0	Marengo V	NORTHWE	0.003	0.675	0.225	0.063	0.001	0.225	0.000	0.000	44860	44859	0	0	1	Gwye	Gwye	Unknown	0.28
0	Grand Cou	NORTHWE	0.003	0.663	0.221	0.064	0.001	0.221	0.000	0.000	41754	41734	0	0	1	Unknown	Unknown	Unknown	0.28
0	Grand Cou	NORTHWE	0.003	0.663	0.221	0.064	0.001	0.221	0.000	0.000	41754	41735	0	0	1	Unknown	Unknown	Unknown	0.28
0	Silver Cree	NORTHWE	0.003	0.652	0.209	0.060	0.001	0.210	0.000	0.057	40987	40985	0	0	2	Unknown	Unknown	Unknown	0.28
0	Pine Creek	NORTHWE	0.003	0.639	1.020	0.286	0.009	2.220	0.005	2.399	48317	48315	0	0	2	Unknown	Unknown	Unknown	0.28
0	Fredericks	NORTHWE	0.003	0.636	0.212	0.061	0.001	0.212	0.000	0.000	47578	47576	0	0	1	Unknown	Unknown	Unknown	0.28
0	North Fork	NORTHWE	0.002	1.172	0.391	0.057	0.001	0.391	0.000	0.000	43361	43359	0	0	1	Gwye	Delta	Unknown	0.14
0	Enid Rd. 11	NORTHWE	0.002	1.162	0.387	0.027	0.001	0.387	0.000	0.000	46296	46297	0	0	1	Gwye	Delta	3-Legged C	0.07
0	The Dalles	NORTHWE	0.002	1.155	0.385	0.101	0.001	0.385	0.000	0.000	44056	44042	0	0	1	Gwye	Delta	Single Pha	0.25
0	Fidalgo 115	NORTHWE	0.002	1.135	0.378	0.053	0.001	0.378	0.000	0.000	42118	41204	0	0	4	Unknown	Unknown	Unknown	0.14
0	Drummond	PACE	0.002	1.009	0.243	0.029	0.000	0.182	0.000	0.155	65470	66760	0	0	1	Gwye	Gwye	Core, Thre	0.12
0	Hazelwood	NORTHWE	0.002	0.993	0.331	0.047	0.001	0.331	0.000	0.000	45131	45226	0	0	1	Gwye	Gwye	Unknown	0.14
0	Drain 115/	NORTHWE	0.002	0.949	0.316	0.038	0.001	0.316	0.000	0.000	40353	41200	0	0	1	Gwye	Gwye	Core, Thre	0.12
0	Weyerhaeu	NORTHWE	0.002	0.923	0.308	0.020	0.001	0.308	0.000	0.000	46267	46268	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Rock Island	NORTHWE	0.002	0.904	0.301	0.020	0.001	0.301	0.000	0.000	46892	46891	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Rock Island	NORTHWE	0.002	0.899	0.300	0.020	0.001	0.300	0.000	0.000	46890	46889	0	0	1	Gwye	Delta	3-Legged C	0.07
0	Bethel (PG	NORTHWE	0.002	0.883	1.274	0.181	0.005	2.742	0.003	2.880	43037	43035	0	0	1	Gwye	Gwye	Unknown	0.14
0	Sugermill 1	PACE	0.002	0.830	0.277	0.053	0.001	0.277	0.000	0.000	66430	66432	0	0	1	Unknown	Unknown	Unknown	0.19
0	Rock Island	NORTHWE	0.002	0.816	0.272	0.019	0.001	0.272	0.000	0.000	46817	46806	46810	46826	2	Gwye	Delta	3-Legged C	0.07
0	Encogen N	NORTHWE	0.002	0.810	0.270	0.038	0.001	0.270	0.000	0.000	42010	42014	0	0	1	Gwye	Delta	Unknown	0.14
0	Encogen N	NORTHWE	0.002	0.788	0.263	0.037	0.001	0.263	0.000	0.000	42010	42012	0	0	1	Gwye	Delta	Unknown	0.14
0	Encogen N	NORTHWE	0.002	0.788	0.263	0.037	0.001	0.263	0.000	0.000	42010	42013	0	0	1	Gwye	Delta	Unknown	0.14
0	Encogen N	NORTHWE	0.002	0.777	0.259	0.036	0.001	0.259	0.000	0.000	42010	42011	0	0	1	Gwye	Delta	Unknown	0.14

45001	45003	0	0	1	0.15
48339	48337	0	0	1	0.14
48339	48337	0	0	2	0.14
60045	60040	0	0	3	0.14
47102	47099	0	0	1	0.14
45303	45297	0	0	1	0.14
65670	65672	0	0	1	0.14
45031	45380	0	0	1	0.14
65850	65851	65852	98533	1	0.14
45051	45050	0	0	1	0.14
47844	47840	0	0	1	0.13
47861	47456	0	0	1	0.13
47861	47459	0	0	1	0.13
46069	46176	46177	46193	1	0.13
46069	46174	46175	46192	1	0.13
65480	66822	0	0	1	0.12
47578	47577	0	0	1	0.12
65860	65850	0	0	1	0.12
60045	60040	60050	60056	2	0.12
42350	42351	0	0	1	0.12
45004	44978	0	0	1	0.12
40477	47162	0	0	1	0.12
69524	69525	0	0	1	0.12
47814	47817	0	0	1	0.12
45467	45468	0	0	1	0.11
40671	41227	0	0	1	0.11
47334	47658	0	0	1	0.11
47847	47990	0	0	1	0.11
46209	46210	0	0	1	0.11
65535	66815	0	0	1	0.11
44201	44195	44196	44199	3	0.11
44879	45464	0	0	1	0.11
41008	41014	0	0	2	0.11
60390	60393	0	0	1	0.11
60390	60392	0	0	1	0.11
44060	44049	0	0	1	0.11
40127	40125	0	0	1	0.11
48193	48189	0	0	1	0.11
47814	47816	0	0	1	0.10
43371	43369	0	0	1	0.10
44060	44051	0	0	1	0.10
40905	40903	0	0	1	0.10
44060	44050	0	0	1	0.10
40905	40903	0	0	2	0.10
65915	65914	0	0	2	0.10
40029	40032	0	0	1	0.10
65915	65914	0	0	1	0.10
48193	48191	0	0	1	0.10
44059	44048	0	0	1	0.10
40029	40030	0	0	1	0.10
40029	40028	0	0	1	0.10
44056	44042	0	0	1	0.10
42130	42134	0	0	1	0.10
40567	40562	0	0	4	0.10
46066	46170	46171	46190	1	0.10
46066	46172	46173	46191	1	0.10
45105	45184	0	0	1	0.10
66547	66548	0	0	1	0.10
41049	46631	0	0	2	0.10
48323	48327	0	0	1	0.10
60045	60040	60051	60058	4	0.10
41330	40984	0	0	1	0.10
47314	47315	0	0	1	0.09
47314	47316	0	0	2	0.09
47314	47313	0	0	3	0.09
41049	46631	0	0	3	0.09
40767	40765	0	0	1	0.09
46209	46210	0	0	2	0.09
46255	46256	0	0	1	0.09
47035	47402	0	0	1	0.09
42701	42702	0	0	1	0.09
66185	66160	0	0	1	0.09
47677	47675	0	0	1	0.09
66185	66165	0	0	1	0.09
40567	40561	0	0	3	0.09
66185	66175	0	0	1	0.09
66185	66170	0	0	1	0.09
48113	45097	0	0	1	0.09
45045	45094	0	0	1	0.09
40347	40346	0	0	1	0.09
40017	48007	0	0	1	0.08
40621	40619	0	0	2	0.08
43381	43379	0	0	2	0.08
44274	44271	0	0	1	0.08
44274	44273	0	0	3	0.08
61800	61802	0	0	1	0.08
44274	44272	0	0	2	0.08
61800	61801	0	0	1	0.08
48522	48526	0	0	1	0.08
48409	48407	0	0	1	0.08
44869	44870	0	0	1	0.08
45091	45152	0	0	2	0.07
60207	61254	0	0	2	0.07
48329	48333	0	0	1	0.07
41356	40281	0	0	1	0.07
46831	46821	0	0	1	0.07
47339	47338	0	0	1	0.07
47339	47337	0	0	1	0.07
46856	46851	0	0	1	0.07
46856	46850	0	0	1	0.07
46855	46848	0	0	1	0.07
47677	47676	0	0	1	0.07
45091	45152	0	0	1	0.07
44860	44859	0	0	1	0.07
46854	46845	0	0	1	0.07
46852	46841	0	0	1	0.07
46852	46842	0	0	1	0.07
46855	46849	0	0	1	0.07
41753	41733	0	0	1	0.07
47312	47311	0	0	1	0.06
40987	40985	0	0	1	0.06
41754	41734	0	0	1	0.06
45121	45393	0	0	1	0.06
41754	41735	0	0	1	0.06
46853	46844	0	0	1	0.06
46853	46843	0	0	1	0.06
46854	46846	0	0	1	0.06
47578	47576	0	0	1	0.06
45121	45393	0	0	2	0.06
48201	48211	0	0	1	0.06
48199	48205	0	0	1	0.06
40987	40985	0	0	2	0.06
48201	48209	0	0	1	0.06
48199	48207	0	0	1	0.06
46809	46858	0	0	2	0.06
46809	46857	0	0	1	0.06
45001	45003	0	0	2	0.06
43361	43359	0	0	1	0.06
46855	46847	0	0	1	0.06
40843	40841	0	0	2	0.06
66430	66432	0	0	1	0.05
42118	41204	0	0	4	0.05
47425	47405	0	0	1	0.05
45131	45226	0	0	1	0.05
65075	65080	0	0	1	0.04
42118	40415	0	0	5	0.04
46818	46812	46814	46828	3	0.04
46894	46893	0	0	1	0.04
47862	47467	0	0	1	0.04
46818	46820	46822	46836	4	0.04
47862	47462	0	0	1	0.04
46896	46895	0	0	1	0.04
42010	42014	0	0	1	0.04
40353	41200	0	0	1	0.04
65080	65070	0	0	1	0.04
42010	42012	0	0	1	0.04
42010	42013	0	0	1	0.04
42010	42011	0	0	1	0.04
65670	65675	0	0	1	0.03

3	-400 Baseli	0	Prospect 1	NORTHWE	0.00	2.02	1.49	0.21	0.01	2.72	0.00	2.05	45259	45446	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Longview 2	NORTHWE	0.01	2.02	0.67	0.18	0.00	0.67	0.00	0.00	40672	41226	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Longview 2	NORTHWE	0.01	2.02	0.67	0.18	0.00	0.67	0.00	0.00	40672	41225	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Longview 2	NORTHWE	0.01	1.99	0.66	0.18	0.00	0.66	0.00	0.00	40672	41224	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66160	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66165	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66170	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66175	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	White Rive	NORTHWE	0.00	1.93	0.64	0.09	0.00	0.64	0.00	0.00	42701	42702	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Kelso 115/	NORTHWE	0.00	1.93	0.64	0.09	0.00	0.64	0.00	0.00	47035	47402	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	McNary 11	NORTHWE	0.00	1.91	0.64	0.16	0.00	0.64	0.00	0.00	44128	44113	44114	44121	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Canemah 1	NORTHWE	0.00	1.90	1.21	0.17	0.00	1.84	0.00	1.22	43083	43081	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Centralia S	NORTHWE	0.02	1.90	0.63	0.75	0.01	0.63	0.00	0.00	47731	47734	47735	47732	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Centralia S	NORTHWE	0.02	1.90	0.63	0.75	0.01	0.63	0.00	0.00	47731	47736	47737	47733	1	Unknown	Unknown	Unknown	1.10
3	-400 Baseli	0	Biglow Can	NORTHWE	0.01	1.90	0.63	0.19	0.00	0.63	0.00	0.00	47844	47841	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Biglow Can	NORTHWE	0.01	1.87	0.62	0.18	0.00	0.62	0.00	0.00	47844	47842	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	McNary 23	NORTHWE	0.01	1.84	0.62	0.33	0.00	0.62	0.00	0.00	44127	44109	44110	44119	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	McNary 23	NORTHWE	0.01	1.83	0.61	0.33	0.00	0.61	0.00	0.00	44127	44111	44112	44120	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	1.83	2.72	1.01	0.05	10.17	0.04	9.76	40285	41357	0	0	1	Unknown	Unknown	Unknown	0.36
3	-400 Baseli	0	Nine Canyo	NORTHWE	0.00	1.82	0.68	0.10	0.00	0.71	0.00	0.11	47314	47313	0	0	3	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Nine Canyo	NORTHWE	0.00	1.82	0.68	0.10	0.00	0.71	0.00	0.11	47314	47316	0	0	2	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Nine Canyo	NORTHWE	0.00	1.82	0.68	0.10	0.00	0.71	0.00	0.11	47314	47315	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Dry Gulch	NORTHWE	0.00	1.81	0.61	0.09	0.00	0.61	0.00	0.00	48113	45097	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Chiloquin 1	NORTHWE	0.00	1.81	0.60	0.09	0.00	0.60	0.00	0.00	45045	45094	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Diamond H	NORTHWE	0.01	1.80	0.62	0.18	0.00	0.63	0.00	0.04	45089	45388	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Bonneville	NORTHWE	0.00	1.79	0.60	0.15	0.00	0.60	0.00	0.00	40139	44005	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Bonneville	NORTHWE	0.00	1.79	0.60	0.15	0.00	0.60	0.00	0.00	40139	44001	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	1.78	0.59	0.17	0.00	0.59	0.00	0.00	41752	41728	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.01	1.78	0.59	0.17	0.00	0.59	0.00	0.00	41752	41727	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Addy 115/	NORTHWE	0.00	1.77	0.59	0.08	0.00	0.59	0.00	0.00	40017	48007	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	1.77	0.59	0.04	0.00	0.59	0.00	0.00	46894	46893	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Hermiston	NORTHWE	0.01	1.76	0.59	0.16	0.00	0.59	0.00	0.00	45137	45455	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hermiston	NORTHWE	0.01	1.76	0.59	0.16	0.00	0.59	0.00	0.00	45137	45457	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	1.76	0.59	0.04	0.00	0.59	0.00	0.00	46818	46812	46814	46828	3	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	1.74	0.58	0.04	0.00	0.58	0.00	0.00	46896	46895	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Goodnoe H	NORTHWE	0.01	1.74	0.74	0.21	0.00	0.92	0.00	0.45	47329	40380	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Meadow C	PACE	0.01	1.73	0.58	0.12	0.00	0.58	0.00	0.00	69524	69525	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Orenco 11	NORTHWE	0.00	1.72	0.57	0.08	0.00	0.57	0.00	0.05	43381	43379	0	0	2	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	White Cree	NORTHWE	0.01	1.72	0.57	0.17	0.00	0.57	0.00	0.00	47858	47979	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	1.72	0.57	0.04	0.00	0.57	0.00	0.00	46818	46820	46822	46836	4	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Wallula 23	NORTHWE	0.01	1.72	0.57	0.16	0.00	0.57	0.00	0.00	45331	45329	0	0	1	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	Boulder Pa	NORTHWE	0.00	1.70	0.57	0.08	0.00	0.57	0.00	0.00	48522	48526	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Boise Bend	IDAHO	0.01	1.66	0.92	0.13	0.01	1.70	0.00	1.44	60045	60040	60050	60056	2	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.65	0.55	0.29	0.00	0.55	0.00	0.00	44057	44043	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Tieton 115	NORTHWE	0.00	1.63	0.54	0.08	0.00	0.54	0.00	0.00	44869	44870	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Anderson I	IDAHO	0.00	1.63	0.54	0.08	0.00	0.54	0.00	0.00	61800	61802	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Anderson I	IDAHO	0.00	1.62	0.54	0.08	0.00	0.54	0.00	0.00	61800	61801	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Ross Park	NORTHWE	0.00	1.59	0.53	0.08	0.00	0.53	0.00	0.00	48409	48407	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Boise Bend	IDAHO	0.01	1.59	1.07	0.15	0.01	2.12	0.00	1.85	60045	60040	0	0	3	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Post Falls 1	NORTHWE	0.00	1.58	0.53	0.07	0.00	0.53	0.00	0.00	48329	48333	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Fidalgo 115	NORTHWE	0.00	1.57	0.36	0.04	0.00	0.13	0.00	0.40	42118	40415	0	0	5	Unknown	Unknown	Core, Thre	0.12
3	-400 Baseli	0	Dixonville	NORTHWE	0.00	1.55	0.52	0.07	0.00	0.52	0.00	0.00	45091	45152	0	0	2	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.53	0.51	0.07	0.00	0.51	0.00	0.00	46856	46851	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.52	0.51	0.27	0.00	0.51	0.00	0.00	44057	44044	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.51	0.50	0.07	0.00	0.50	0.00	0.00	46856	46850	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Calapooya	NORTHWE	0.01	1.49	0.48	0.14	0.00	0.48	0.00	0.04	45031	45380	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Oregon Str	NORTHWE	0.00	1.49	0.50	0.07	0.00	0.50	0.00	0.00	47339	47337	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Oregon Str	NORTHWE	0.00	1.49	0.50	0.07	0.00	0.50	0.00	0.00	47339	47338	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.47	0.49	0.07	0.00	0.49	0.00	0.00	46855	46848	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.44	0.48	0.07	0.00	0.48	0.00	0.00	46854	46845	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Clearwater	NORTHWE	0.00	1.44	1.19	0.16	0.00	1.49	0.00	1.01	48075	48481	0	0	2	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Clearwater	NORTHWE	0.00	1.43	1.19	0.16	0.00	1.49	0.00	1.01	48075	48481	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.43	0.48	0.25	0.00	0.48	0.00	0.00	44058	44046	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Mayfield 2	NORTHWE	0.01	1.42	0.48	0.25	0.00	0.48	0.00	0.00	46625	46623	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.42	0.47	0.07	0.00	0.47	0.00	0.00	46855	46849	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.41	0.47	0.07	0.00	0.47	0.00	0.00	46852	46841	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.40	0.47	0.07	0.00	0.47	0.00	0.00	46852	46842	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Wallula 23	NORTHWE	0.01	1.40	0.47	0.13	0.00	0.47	0.00	0.00	45331	45329	0	0	2	Gwye	Delta	Unknown	0.28
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.39	0.46	0.25	0.00	0.46	0.00	0.00	44058	44045	0	0	1	Gwye	Delta	Single Pha	0.51
3	-400 Baseli	0	Dixonville	NORTHWE	0.00	1.39	0.46	0.07	0.00	0.46	0.00	0.00	45091	45152	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Biglow Can	NORTHWE	0.01	1.39	0.46	0.14	0.00	0.46	0.00	0.00	47844	47840	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Finley 115/	NORTHWE	0.00	1.38	0.46	0.06	0.00	0.46	0.00	0.00	47312	47311	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Snohomish	NORTHWE	0.01	1.38	0.18	0.10	0.00	0.76	0.00	1.21	41330	40984	0	0	1	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	Libby - PAC	NORTHWE	0.01	1.36	0.45	0.11	0.00	0.45	0.00	0.00	44201	44195	44196	44199	3	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Goldendale	NORTHWE	0.00	1.36	0.45	0.12	0.00	0.45	0.00	0.00	40477	47162	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.35	0.45	0.06	0.00	0.45	0.00	0.00	46853	46843	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Grants Pas	NORTHWE	0.00	1.35	0.45	0.07	0.00	0.45	0.00	0.00	45121	45393	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.34	0.45	0.06	0.00	0.45	0.00	0.00	46853	46844	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.34	0.45	0.06	0.00	0.45	0.00	0.00	46854	46846	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Santiam 23	NORTHWE	0.01	1.33	1.33	0.38	0.01	2.05	0.00	2.44	40939	45475	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Snohomish	NORTHWE	0.01	1.33	0.43	0.23	0.01	1.27	0.00	1.70	41329	40988	0	0	2	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	Priest Rapi	NORTHWE	0.01	1.31	0.44	0.12	0.00	0.44	0.00	0.00	46069	46174	46175	46192	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Priest Rapi	NORTHWE	0.01	1.31	0.44	0.12	0.00	0.44	0.00	0.00	46069	46176	46177	46193	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Shepherds	NORTHWE	0.01	1.31	0.44	0.13	0.00	0.44	0.00	0.00	47861	47456	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Shepherds	NORTHWE	0.01	1.31	0.44	0.13	0.00	0.44	0.00	0.00	47861	47459	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.31	0.44	0.11	0.00	0.44	0.00	0.00	44060	44049	0	0	1	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Long Lake	NORTHWE	0.00	1.30	0.43	0.06	0.00	0.43	0.00	0.00	48199	48205	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.30	0.43	0.10	0.00	0.43	0.00	0.00	44060	44051	0	0	1	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Long Lake	NORTHWE	0.00	1.29	0.43	0.06	0.00	0.43	0.00	0.00	48201	48211	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.29	0.43	0.10	0.00	0.43	0.00	0.00	44060	44050	0	0	1	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Long Lake	NORTHWE	0.00	1.28	0.43	0.06	0.00	0.43	0.00	0.00	48199	48207	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	McKenzie 2	NORTHWE	0.01	1.28	0.43	0.06	0.00	0.43	0.00	0.00	46809	46858	0	0	2	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Grants Pas	NORTHWE	0.00	1.27	0.42	0.06	0.00	0.42	0.00	0.00	45121	45393	0	0	2	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Fredericks	NORTHWE	0.01	1.27	0.42	0.12	0.00	0.42	0.00	0.00	47578	47577	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Long Lake	NORTHWE	0.00	1.27	0.42	0.06	0.00	0.42	0.00	0.00	48201	48209	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	McKenzie 2	NORTHWE	0.01	1.27	0.42	0.06	0.00	0.42	0.00	0.00	46809	46857	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	The Dalles	NORTHWE	0.01	1.26	0.42	0.10	0.00	0.42	0.00	0.00	44059	44048	0	0	1	Gwye	Delta	Core, Thre	0.23
3	-400 Baseli	0	Klondike W	NORTHWE	0.01	1.24	0.60	0.18	0.00	0.79	0.00	0.37	47830	47327	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rocky Reac	NORTHWE	0.01	1.22	0.41	0.06	0.00	0.41	0.00	0.00	46855	46847	0	0	1	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Jones Cany	NORTHWE	0.01	1.20	0.40	0.12	0.00	0.40	0.00	0.00	47814	47817	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Longview 2	NORTHWE	0.01	1.19	0.40	0.11	0.00	0.40	0.00	0.00	40671	41227	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	North Fork	NORTHWE	0.00	1.17	0.39	0.06	0.00	0.39	0.00	0.00	43361	43359	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Enid Rd. 11	NORTHWE	0.00	1.16	0.39	0.03	0.00	0.39	0.00	0.00	46296	46297	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	The Dalles	NORTHWE	0.00	1.16	0.39	0.10	0.00	0.39	0.00	0.00	44056	44042	0	0	1	Gwye	Delta	Single Pha	0.25
3	-400 Baseli	0	Fidalgo 115	NORTHWE	0.00	1.14	0.38	0.05	0.00	0.38	0.00	0.00	42118	41204	0	0	4	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Sifton 230/	NORTHWE	0.00	1.10	0.75	0.17	0.01	1.76	0.00	2.08	40983	40979	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Jones Cany	NORTHWE	0.00	1.09	0.36	0.11	0.00	0.36	0.00	0.00	47814	47816	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Roundup 2	NORTHWE	0.00	1.09	0.39	0.11	0.00	0.40	0.00	0.03	40905	40903	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Sifton 230/	NORTHWE	0.00	1.09	0.75	0.18	0.01	1.76	0.00	2.08	40981	40979	0	0	1	Gwye	Gwye	Core, Thre	0.23
3	-400 Baseli	0	Dixonville	NORTHWE	0.01	1.09	0.17	0.20	0.00	0.00	0.00	0.36	45095	44900	0	0	1	Gwye	Gwye	Unknown	1.10
3	-400 Baseli	0	Roundup 2	NORTHWE	0.00	1.08	0.38	0.11	0.00	0.39	0.00	0.03	40905	40903	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Cove 230/6	NORTHWE	0.00	1.05	0.11	0.03	0.00	0.00	0.00	0.35	45128	45130	0	0	1	Delta	Gwye	Unknown	0.28
3	-400 Baseli	0	Columbia 2	NORTHWE	0.00	1.04	0.62	0.33	0.01	1.57	0.00	1.89	40261	40259	0	0	2	Gwye	Gwye	Single Pha	0.51
3	-400 Baseli	0	Priest Rapi	NORTHWE	0.00	1.03	0.34	0.10	0.00	0.34	0.00	0.00	46066	46172	46173	46191	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Priest Rapi	NORTHWE	0.00	1.03	0.34	0.10	0.00	0.34	0.00	0.00	46066	46170	46171	46190	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Drummond	PACE	0.00	1.01	0.24	0.03	0.00	0.18	0.00	0.16	65470	66760	0	0	1	Gwye	Gwye	Core, Thre	0.12
3	-400 Baseli	0	Hazelwood	NORTHWE	0.00	0.99	0.33	0.05	0.00	0.33	0.00	0.00	45131	45226	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Mint Farm	NORTHWE	0.00	0.96	0.32	0.09	0.00	0.32	0.00	0.00	47677	47675	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Coyote Spr	NORTHWE	0.01	0.96	0.32	0.38	0.00	0.32	0.00	0.00	43123	43111	43119	43115	1	Gwye	Delta	Unknown	1.10
3	-400 Baseli	0	Drain 115/	NORTHWE	0.00	0.95	0.32	0.04	0.00	0.32	0.00	0.00	40353	41200	0	0	1	Gwye	Gwye	Core, Thre	0.12
3	-400 Baseli	0	Weyerhaeu	NORTHWE	0.00	0.92	0.31	0.02	0.00	0.31	0.00	0.00	46267	46268	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	LaGrande 2	NORTHWE	0.00	0.92	0.31	0.08	0.00	0.31	0.00	0.00	40621	40619	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	0.91	0.30	0.02	0.00	0.30	0.00	0.00	46892	46891	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	0.90	0.30	0.02	0.00	0.30	0.00	0.00	46890	46889	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Tap 230/11	NORTHWE	0.00	0.90	1.90	0.26	0.01	3.50	0.01	3.20	47082	47080	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Bethel (PG	NORTHWE	0.00	0.88	1.27	0.18	0.01	2.74	0.00	2.88	43037	43035	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Sugermill 1	PACE	0.00	0.83	0.28	0.05	0.00	0.28	0.00	0.00	66430	66432	0	0	1	Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Longview 2	NORTHWE	0.00	0.83	0.83	0.24	0.00	1.11	0.00	0.94	40671	47423	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	0.82	0.27	0.02	0.00	0.27	0.00	0.00	46817	46806	46810	46826	2	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Encogen N	NORTHWE	0.00	0.81	0.27	0.04	0.00	0.27	0.00	0.00	42010	42014	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Encogen N	NORTHWE	0.00	0.79	0.26	0.04	0.00	0.26	0.00	0.00	42010	42013	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Encogen N	NORTHWE	0.00	0.79	0.26	0.04	0.00	0.26	0.00	0.00	42010	42012	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Encogen N	NORTHWE	0.00	0.78	0.26	0.04	0.00	0.26	0.00	0.00	42010	42011	0	0	1	Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Rock Island	NORTHWE	0.00	0.76	0.25	0.02	0.00	0.25	0.00	0.00	46817	46802	46804	46824	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Weyerhaeu	NORTHWE	0.00	0.75	0.25	0.02	0.00	0.25	0.00	0.00	46267	46266	0	0	1	Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Snohomish	NORTHWE	0.00	0.74	4.12	1.76	0.08	12.57	0.05	12.67	40993	41329	0	0	1	Unknown	Unknown	Unknown	0.41
3	-400 Baseli	0	Mint Farm	NORTHWE	0.00	0.72	0.24	0.07	0.00	0.24	0.00	0.00	47677	47676	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Horse Butt	PACE	0.00	0.71	0.68	0.10	0.00	0.87	0.00	0.63	66547	66548	0	0	1	Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Hogan 115	NORTHWE	0.00	0.71	1.46	0.21	0.01	2.92	0.00	2.83	43253	43251	0	0	1	Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Silver Cree	NORTHWE	0.00	0.70	0.23	0.06	0.00	0.23	0.00	0.06	40987	40985	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	McKenzie 2	NORTHWE	0.00	0.69	0.23	0.03	0.00	0.23	0.00	0.00	46809	46859	0	0	3	Gwye	Delta	3-Legged C	0.13
3	-400 Baseli	0	Wells (DOF	NORTHWE	0.00	0.68	1.00	0.14	0.01	1.94	0.00	1.89	47102	47099	0	0	1	Gwye	Gwye	3-Legged C	0.13
3	-400 Baseli	0	Grand Cou	NORTHWE	0.00	0.68	0.23	0.07	0.00	0.23	0.00	0.00	41753	41733	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.00	0.66	0.22	0.06	0.00	0.22	0.00	0.00	41754	41734	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Grand Cou	NORTHWE	0.00	0.66	0.22	0.06	0.00	0.22	0.00	0.00	41754	41735	0	0	1	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Silver Cree	NORTHWE	0.00	0.65	0.21	0.06	0.00	0.21	0.00	0.06	40987	40985	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Pine Creek	NORTHWE	0.00	0.64	1.02	0.29	0.01	2.22	0.01	2.40	48317	48315	0	0	2	Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Marengo V	NORTHWE	0.00	0.64	0.21	0.06	0.00	0.21	0.00	0.00	44860	44859	0	0	1	Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Fredericks	NORTHWE	0.00	0.64	0.21	0.06	0.00	0.21	0.00	0.00	47578	47576	0	0	1	Unknown	Unknown	Unknown	0.28

6	+550 Basel	0	Albina 115	NORTHWE	0.00	0.29	1.03	0.15	0.01	2.44	0.00	2.34	45001	45003	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Post Street	NORTHWE	0.01	3.06	1.02	0.14	0.00	1.02	0.00	0.00	48339	48337	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Post Street	NORTHWE	0.01	2.98	0.99	0.14	0.00	0.99	0.00	0.00	48339	48337	0	0	2	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Boise Bend	IDAHO	0.01	1.56	1.04	0.14	0.01	2.06	0.00	1.82	60045	60040	0	0	3	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Wells (DOF	NORTHWE	0.00	0.68	1.00	0.14	0.01	1.94	0.00	1.89	47102	47099	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Troutdale	NORTHWE	0.02	4.94	0.49	0.14	0.00	0.00	0.00	1.65	45303	45297	0	0	1	Delta	Gwye	Unknown	0.28
6	+550 Basel	0	Goshen 16	PACE	0.01	2.09	0.70	0.14	0.00	0.70	0.00	0.00	65670	65672	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Calapooya	NORTHWE	0.01	1.49	0.48	0.14	0.00	0.48	0.00	0.04	45031	45380	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Jefferson 1	PACE	0.00	0.00	0.73	0.14	0.00	1.28	0.00	1.28	65850	65851	65852	98533	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Cold Spring	NORTHWE	0.02	4.69	0.47	0.14	0.00	0.00	0.00	1.56	45051	45050	0	0	1	Delta	Gwye	Unknown	0.28
6	+550 Basel	0	Biglow Can	NORTHWE	0.01	1.39	0.46	0.13	0.00	0.46	0.00	0.00	47844	47840	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Shepherds	NORTHWE	0.01	1.31	0.44	0.13	0.00	0.44	0.00	0.00	47861	47456	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Shepherds	NORTHWE	0.01	1.31	0.44	0.13	0.00	0.44	0.00	0.00	47861	47459	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Priest Rapi	NORTHWE	0.01	1.32	0.44	0.13	0.00	0.44	0.00	0.00	46069	46176	46177	46193	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Priest Rapi	NORTHWE	0.01	1.32	0.44	0.13	0.00	0.44	0.00	0.00	46069	46174	46175	46192	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	East Jackso	PACE	0.01	2.63	0.88	0.12	0.00	0.88	0.00	0.00	65480	66822	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Fredericks	NORTHWE	0.01	1.27	0.42	0.12	0.00	0.42	0.00	0.00	47578	47577	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Jefferson 1	PACE	0.01	2.04	0.68	0.12	0.02	6.21	0.02	6.16	65860	65850	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Boise Bend	IDAHO	0.01	1.62	0.89	0.12	0.01	1.66	0.00	1.42	60045	60040	60050	60056	2	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Tolt 115/1	NORTHWE	0.01	2.59	0.86	0.12	0.00	0.86	0.00	0.00	42350	42351	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Ager 115/6	NORTHWE	0.01	2.54	0.85	0.12	0.00	0.85	0.00	0.00	45004	44978	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Goldendale	NORTHWE	0.00	1.36	0.45	0.12	0.00	0.45	0.00	0.00	40477	47162	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Meadow C	PACE	0.01	1.73	0.58	0.12	0.00	0.58	0.00	0.00	69524	69525	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Jones Cany	NORTHWE	0.01	1.19	0.40	0.12	0.00	0.40	0.00	0.00	47814	47817	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Roberts Cr	NORTHWE	0.01	2.51	0.84	0.11	0.00	0.84	0.00	0.00	45467	45468	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Longview 2	NORTHWE	0.01	1.19	0.40	0.11	0.00	0.40	0.00	0.00	40671	41227	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Morrow Pc	NORTHWE	0.01	2.40	0.80	0.11	0.00	0.80	0.00	0.00	47334	47658	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Willow Cre	NORTHWE	0.00	2.10	0.79	0.11	0.00	0.82	0.00	0.12	47847	47990	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Carmen Sn	NORTHWE	0.01	4.65	1.55	0.11	0.00	1.55	0.00	0.00	46209	46210	0	0	1	Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Residual (L	PACE	0.01	3.19	0.76	0.11	0.00	0.63	0.00	1.04	65535	66815	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Libby - PAC	NORTHWE	0.01	1.36	0.45	0.11	0.00	0.45	0.00	0.00	44201	44195	44196	44199	3	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Winston Ri	NORTHWE	0.00	2.24	0.75	0.11	0.00	0.75	0.00	0.00	44879	45464	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Sno-king 2	NORTHWE	0.02	4.09	0.77	0.11	0.00	1.05	0.00	1.89	41008	41014	0	0	2	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Danskin W	IDAHO	0.01	3.83	1.28	0.11	0.00	1.28	0.00	0.00	60390	60393	0	0	1	Gwye	Delta	3-Legged C	0.08
6	+550 Basel	0	Danskin W	IDAHO	0.01	3.83	1.28	0.11	0.00	1.28	0.00	0.00	60390	60392	0	0	1	Gwye	Delta	3-Legged C	0.08
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.31	0.44	0.11	0.00	0.44	0.00	0.00	44060	44049	0	0	1	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Boardman	NORTHWE	0.01	2.59	0.90	0.11	0.00	0.96	0.00	0.18	40127	40125	0	0	1	Gwye	Gwye	Core, Thre	0.12
6	+550 Basel	0	Little Falls	NORTHWE	0.00	2.22	0.74	0.11	0.00	0.74	0.00	0.00	48193	48189	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Jones Cany	NORTHWE	0.00	1.08	0.36	0.10	0.00	0.36	0.00	0.00	47814	47816	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Oak Grove	NORTHWE	0.00	2.15	0.72	0.10	0.00	0.72	0.00	0.00	43371	43369	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.30	0.43	0.10	0.00	0.43	0.00	0.00	44060	44051	0	0	1	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Roundup 2	NORTHWE	0.00	1.08	0.39	0.10	0.00	0.40	0.00	0.03	40905	40903	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.29	0.43	0.10	0.00	0.43	0.00	0.00	44060	44050	0	0	1	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Roundup 2	NORTHWE	0.00	1.08	0.38	0.10	0.00	0.39	0.00	0.03	40905	40903	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Macks Inn	PACE	0.01	2.56	0.85	0.10	0.00	0.85	0.00	0.00	65915	65914	0	0	2	Unknown	Unknown	Core, Thre	0.12
6	+550 Basel	0	Albeni Falls	NORTHWE	0.01	2.76	0.92	0.10	0.00	0.92	0.00	0.00	40029	40032	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Macks Inn	PACE	0.01	2.56	0.85	0.10	0.00	0.85	0.00	0.00	65915	65914	0	0	1	Unknown	Unknown	Core, Thre	0.12
6	+550 Basel	0	Little Falls	NORTHWE	0.00	2.15	0.72	0.10	0.00	0.72	0.00	0.00	48193	48191	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	The Dalles	NORTHWE	0.01	1.26	0.42	0.10	0.00	0.42	0.00	0.00	44059	44048	0	0	1	Gwye	Delta	Core, Thre	0.23
6	+550 Basel	0	Albeni Falls	NORTHWE	0.01	2.76	0.92	0.10	0.00	0.92	0.00	0.00	40029	40030	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Albeni Falls	NORTHWE	0.01	2.76	0.92	0.10	0.00	0.92	0.00	0.00	40029	40028	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	The Dalles	NORTHWE	0.00	1.16	0.39	0.10	0.00	0.39	0.00	0.00	44056	44042	0	0	1	Gwye	Delta	Single Pha	0.25
6	+550 Basel	0	Texaco 115	NORTHWE	0.00	2.23	0.74	0.10	0.00	0.74	0.00	0.00	42130	42134	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Ice Harbor	NORTHWE	0.01	2.63	0.88	0.10	0.00	0.88	0.00	0.00	40567	40562	0	0	4	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Priest Rapi	NORTHWE	0.00	1.03	0.34	0.10	0.00	0.34	0.00	0.00	46066	46170	46171	46190	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Priest Rapi	NORTHWE	0.00	1.03	0.34	0.10	0.00	0.34	0.00	0.00	46066	46172	46173	46191	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Fishhole 11	NORTHWE	0.00	2.17	0.72	0.10	0.00	0.72	0.00	0.00	45105	45184	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Horse Butt	PACE	0.00	0.71	0.68	0.10	0.00	0.87	0.00	0.63	66547	66548	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Tacoma 23	NORTHWE	0.01	3.47	0.33	0.10	0.01	1.28	0.01	2.35	41049	46631	0	0	2	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Plummel 1	NORTHWE	0.00	2.06	0.69	0.10	0.00	0.69	0.00	0.00	48323	48327	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Boise Bend	IDAHO	0.01	2.00	0.70	0.10	0.00	0.98	0.00	0.82	60045	60040	60051	60058	4	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Snohomish	NORTHWE	0.01	1.38	0.18	0.10	0.00	0.76	0.00	1.21	41330	40984	0	0	1	Gwye	Gwye	Single Pha	0.51
6	+550 Basel	0	Nine Canyo	NORTHWE	0.00	1.81	0.68	0.09	0.00	0.71	0.00	0.11	47314	47315	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Nine Canyo	NORTHWE	0.00	1.81	0.68	0.09	0.00	0.71	0.00	0.11	47314	47316	0	0	2	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Nine Canyo	NORTHWE	0.00	1.81	0.68	0.09	0.00	0.71	0.00	0.11	47314	47313	0	0	3	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Tacoma 23	NORTHWE	0.01	3.39	0.32	0.09	0.01	1.25	0.01	2.29	41049	46631	0	0	3	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Murray 23	NORTHWE	0.03	8.19	0.65	0.09	0.02	3.71	0.01	6.35	40767	40765	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Carmen Sn	NORTHWE	0.01	3.87	1.29	0.09	0.00	1.29	0.00	0.00	46209	46210	0	0	2	Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Thurston 1	NORTHWE	0.01	3.60	1.34	0.09	0.00	1.53	0.00	0.33	46255	46256	0	0	1	Gwye	Gwye	3-Legged C	0.07
6	+550 Basel	0	Kelso 115/	NORTHWE	0.00	1.93	0.64	0.09	0.00	0.64	0.00	0.00	47035	47402	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	White Rive	NORTHWE	0.00	1.93	0.64	0.09	0.00	0.64	0.00	0.00	42701	42702	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66160	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Mint Farm	NORTHWE	0.00	0.96	0.32	0.09	0.00	0.32	0.00	0.00	47677	47675	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66165	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Ice Harbor	NORTHWE	0.00	2.23	0.74	0.09	0.00	0.74	0.00	0.00	40567	40561	0	0	3	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66175	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Palisades (	PACE	0.00	1.97	0.66	0.09	0.00	0.66	0.00	0.00	66185	66170	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Dry Gulch	NORTHWE	0.00	1.85	0.62	0.09	0.00	0.62	0.00	0.00	48113	45097	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Chiloquin 1	NORTHWE	0.00	1.81	0.60	0.09	0.00	0.60	0.00	0.00	45045	45094	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Dexter 115	NORTHWE	0.00	2.21	0.74	0.09	0.00	0.74	0.00	0.00	40347	40346	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Addy 115/	NORTHWE	0.00	1.77	0.59	0.08	0.00	0.59	0.00	0.00	40017	48007	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	LaGrande 2	NORTHWE	0.00	0.94	0.31	0.08	0.00	0.31	0.00	0.00	40621	40619	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Orenco 11	NORTHWE	0.00	1.72	0.57	0.08	0.00	0.57	0.00	0.05	43381	43379	0	0	2	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Lookout Pc	NORTHWE	0.00	2.17	0.72	0.08	0.00	0.72	0.00	0.00	44274	44271	0	0	1	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Lookout Pc	NORTHWE	0.00	2.17	0.72	0.08	0.00	0.72	0.00	0.00	44274	44273	0	0	3	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Anderson I	IDAHO	0.00	1.72	0.57	0.08	0.00	0.57	0.00	0.00	61800	61802	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Lookout Pc	NORTHWE	0.00	2.17	0.72	0.08	0.00	0.72	0.00	0.00	44274	44272	0	0	2	Gwye	Delta	Core, Thre	0.12
6	+550 Basel	0	Anderson I	IDAHO	0.00	1.71	0.57	0.08	0.00	0.57	0.00	0.00	61800	61801	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Boulder Pa	NORTHWE	0.00	1.71	0.57	0.08	0.00	0.57	0.00	0.00	48522	48526	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Ross Park	NORTHWE	0.00	1.59	0.53	0.08	0.00	0.53	0.00	0.00	48409	48407	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Tieton 115	NORTHWE	0.00	1.63	0.54	0.08	0.00	0.54	0.00	0.00	44869	44870	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Dixonville	NORTHWE	0.00	1.55	0.52	0.07	0.00	0.52	0.00	0.00	45091	45152	0	0	2	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Locust 230	IDAHO	0.01	3.41	0.54	0.07	0.01	1.28	0.01	2.17	60207	61254	0	0	2	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Post Falls 1	NORTHWE	0.00	1.58	0.53	0.07	0.00	0.53	0.00	0.00	48329	48333	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Grand Cou	NORTHWE	0.02	5.29	0.25	0.07	0.01	2.26	0.01	4.02	41356	40281	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rocky Reac	NORTHWE	0.02	5.87	0.51	0.07	0.00	0.99	0.01	2.92	46831	46821	0	0	1	Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Oregon Str	NORTHWE	0.00	1.51	0.50	0.07	0.00	0.50	0.00	0.00	47339	47338	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Oregon Str	NORTHWE	0.00	1.51	0.50	0.07	0.00	0.50	0.00	0.00	47339	47337	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.53	0.51	0.07	0.00	0.51	0.00	0.00	46856	46851	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.51	0.50	0.07	0.00	0.50	0.00	0.00	46856	46850	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.47	0.49	0.07	0.00	0.49	0.00	0.00	46855	46848	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Mint Farm	NORTHWE	0.00	0.72	0.24	0.07	0.00	0.24	0.00	0.00	47677	47676	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Dixonville	NORTHWE	0.00	1.39	0.46	0.07	0.00	0.46	0.00	0.00	45091	45152	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Marengo V	NORTHWE	0.00	0.71	0.24	0.07	0.00	0.24	0.00	0.00	44860	44859	0	0	1	Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.44	0.48	0.07	0.00	0.48	0.00	0.00	46854	46845	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.41	0.47	0.07	0.00	0.47	0.00	0.00	46852	46841	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.41	0.47	0.07	0.00	0.47	0.00	0.00	46852	46842	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.42	0.47	0.07	0.00	0.47	0.00	0.00	46855	46849	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Grand Cou	NORTHWE	0.00	0.68	0.23	0.07	0.00	0.23	0.00	0.00	41753	41733	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Finley 115/	NORTHWE	0.00	1.38	0.46	0.06	0.00	0.46	0.00	0.00	47312	47311	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Silver Cree	NORTHWE	0.00	0.70	0.23	0.06	0.00	0.23	0.00	0.06	40987	40985	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grand Cou	NORTHWE	0.00	0.66	0.22	0.06	0.00	0.22	0.00	0.00	41754	41734	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grants Pas	NORTHWE	0.00	1.35	0.45	0.06	0.00	0.45	0.00	0.00	45121	45393	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Grand Cou	NORTHWE	0.00	0.66	0.22	0.06	0.00	0.22	0.00	0.00	41754	41735	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.34	0.45	0.06	0.00	0.45	0.00	0.00	46853	46844	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.35	0.45	0.06	0.00	0.45	0.00	0.00	46853	46843	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.34	0.45	0.06	0.00	0.45	0.00	0.00	46854	46846	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Fredericks	NORTHWE	0.00	0.64	0.21	0.06	0.00	0.21	0.00	0.00	47578	47576	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Grants Pas	NORTHWE	0.00	1.27	0.42	0.06	0.00	0.42	0.00	0.00	45121	45393	0	0	2	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Long Lake	NORTHWE	0.00	1.29	0.43	0.06	0.00	0.43	0.00	0.00	48201	48211	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Long Lake	NORTHWE	0.00	1.30	0.43	0.06	0.00	0.43	0.00	0.00	48199	48205	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Silver Cree	NORTHWE	0.00	0.65	0.21	0.06	0.00	0.21	0.00	0.06	40987	40985	0	0	2	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Long Lake	NORTHWE	0.00	1.27	0.42	0.06	0.00	0.42	0.00	0.00	48201	48209	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Long Lake	NORTHWE	0.00	1.28	0.43	0.06	0.00	0.43	0.00	0.00	48199	48207	0	0	1	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	McKenzie 2	NORTHWE	0.01	1.27	0.42	0.06	0.00	0.42	0.00	0.00	46809	46858	0	0	2	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	McKenzie 2	NORTHWE	0.01	1.26	0.42	0.06	0.00	0.42	0.00	0.00	46809	46857	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Albina 115	NORTHWE	0.00	2.04	0.41	0.06	0.00	0.00	0.00	0.68	45001	45003	0	0	2	Delta	Gwye	Unknown	0.14
6	+550 Basel	0	North Fork	NORTHWE	0.00	1.17	0.39	0.06	0.00	0.39	0.00	0.00	43361	43359	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Rocky Reac	NORTHWE	0.01	1.22	0.41	0.06	0.00	0.41	0.00	0.00	46855	46847	0	0	1	Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Port Angel	NORTHWE	0.01	2.38	0.48	0.06	0.00	0.00	0.00	0.79	40843	40841	0	0	2	Delta	Gwye	Core, Thre	0.12
6	+550 Basel	0	Sugermill 1	PACE	0.00	0.83	0.28	0.05	0.00	0.28	0.00	0.00	66430	66432	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Fidalgo 115	NORTHWE	0.00	1.14	0.38	0.05	0.00	0.38	0.00	0.00	42118	41204	0	0	4	Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Olive Way	NORTHWE	0.00	0.63	0.36	0.05	0.00	0.80	0.00	0.80	47425	47405	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Hazelwood	NORTHWE	0.00	0.99	0.33	0.05	0.00	0.33	0.00	0.00	45131	45226	0	0	1	Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Antelope 2	PACE	0.01	2.70	0.16	0.04	0.01	1.62	0.01	2.52	65075	65080	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Fidalgo 115	NORTHWE	0.00	1.57	0.36	0.04	0.00	0.13	0.00	0.40	42118	40415	0	0	5	Unknown	Unknown	Core, Thre	0.12
6	+550 Basel	0	Rock Island	NORTHWE	0.00	1.76	0.59	0.04	0.00	0.59	0.00	0.00	46818	46812	46814	46828	3	Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Rock Island	NORTHWE	0.00	1.76	0.59	0.04	0.00	0.59	0.00	0.00	46894	46893	0	0	1	Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Shepherds	NORTHWE	0.00	0.42	0.14	0.04	0.00	0.14	0.00	0.00	47862	47467	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rock Island	NORTHWE	0.00	1.72	0.57	0.04	0.00	0.57	0.00	0.00	46818	46820	46822	46836	4	Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Shepherds	NORTHWE	0.00	0.42	0.14	0.04	0.00	0.14	0.00	0.00	47862	47462	0	0	1	Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rock Island	NORTHWE	0.00	1.74	0.58	0.04	0.00	0.58	0.00	0.00	46896	46895	0	0	1	Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Encogen N	NORTHWE	0.00	0.81	0.27	0.04	0.00	0.27	0.00	0.00	42010	42014	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Drain 115/	NORTHWE	0.00	0.95	0.32	0.04	0.00	0.32	0.00	0.00	40353	41200	0	0	1	Gwye	Gwye	Core, Thre	0.12
6	+550 Basel	0	Antelope 1	PACE	0.00	0.33	0.19	0.04	0.00	0.75	0.00	0.66	65080	65070	0	0	1	Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Encogen N	NORTHWE	0.00	0.79	0.26	0.04	0.00	0.26	0.00	0.00	42010	42012	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Encogen N	NORTHWE	0.00	0.79	0.26	0.04	0.00	0.26	0.00	0.00	42010	42013	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Encogen N	NORTHWE	0.00	0.78	0.26	0.04	0.00	0.26	0.00	0.00	42010	42011	0	0	1	Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Goshen 16	PACE	0.01	2.02	0.20	0.03	0.00	1.49	0.00	2.11	65670	65675	0	0	1	Unknown	Unknown	Unknown	0.16

0	Rock Islanc	NORTHWE	0.002	0.756	0.252	0.017	0.001	0.252	0.000	0.000	46817	46802	46804	46824	1		Gwye	Delta	3-Legged C	0.07
0	Shepherds	NORTHWE	0.002	0.416	0.139	0.040	0.001	0.139	0.000	0.000	47862	47462	0	0	1		Unknown	Unknown	Unknown	0.28
0	Shepherds	NORTHWE	0.002	0.416	0.139	0.040	0.001	0.139	0.000	0.000	47862	47467	0	0	1		Unknown	Unknown	Unknown	0.28
0	Weyerhaeu	NORTHWE	0.001	0.745	0.248	0.018	0.000	0.248	0.000	0.000	46267	46266	0	0	1		Gwye	Delta	3-Legged C	0.07
0	Horse Butt	PACE	0.001	0.709	0.678	0.096	0.002	0.867	0.000	0.631	66547	66548	0	0	1		Unknown	Unknown	Unknown	0.14
0	Hogan 115	NORTHWE	0.001	0.708	1.459	0.208	0.006	2.924	0.003	2.825	43253	43251	0	0	1		Gwye	Gwye	Unknown	0.14
0	Olive Way	NORTHWE	0.001	0.628	0.355	0.050	0.002	0.797	0.001	0.798	47425	47405	0	0	1		Gwye	Gwye	Unknown	0.14
0	Beacon (Sp	NORTHWE	0.001	0.583	1.059	0.149	0.002	1.177	0.000	0.982	48029	48027	0	0	1		Unknown	Unknown	Unknown	0.14
0	De Moss 1	NORTHWE	0.001	0.551	0.207	0.030	0.000	0.216	0.000	0.033	47480	47481	0	0	1		Unknown	Unknown	Unknown	0.14
0	Klondike W	NORTHWE	0.001	0.519	0.195	0.029	0.000	0.204	0.000	0.031	47327	47326	0	0	1		Unknown	Unknown	Unknown	0.14
0	De Moss 1	NORTHWE	0.001	0.487	0.183	0.026	0.000	0.191	0.000	0.029	47472	47473	0	0	1		Unknown	Unknown	Unknown	0.14
0	Klondike W	NORTHWE	0.001	0.422	0.162	0.024	0.000	0.171	0.000	0.030	47327	47323	0	0	1		Unknown	Unknown	Unknown	0.14
0	Simpson 1	NORTHWE	0.001	0.379	0.126	0.018	0.000	0.126	0.000	0.000	46769	46606	0	0	1		Gwye	Delta	Unknown	0.14
0	Jackson Hy	NORTHWE	0.001	0.366	0.122	0.008	0.000	0.122	0.000	0.000	45685	45690	0	0	1		Gwye	Delta	3-Legged C	0.07
0	Hayden Bri	NORTHWE	0.001	0.356	0.137	0.009	0.000	0.163	0.000	0.044	46229	46227	0	0	1		Gwye	Gwye	3-Legged C	0.07
0	Antelope 1	PACE	0.001	0.327	0.192	0.036	0.002	0.751	0.002	0.659	65080	65070	0	0	1		Unknown	Unknown	Unknown	0.19
0	Columbia 2	NORTHWE	0.001	0.314	0.075	0.029	0.001	0.246	0.001	0.347	40261	40259	0	0	1		Gwye	Gwye	Three Phas	0.38
0	Noti Creek	NORTHWE	0.001	0.299	0.100	0.014	0.000	0.100	0.000	0.000	40785	47201	0	0	1		Unknown	Unknown	Unknown	0.14
0	Albina 115,	NORTHWE	0.001	0.293	1.032	0.145	0.005	2.438	0.003	2.343	45001	45003	0	0	1		Gwye	Gwye	Unknown	0.14
0	Vantage 23	NORTHWE	0.001	0.286	0.095	0.027	0.000	0.095	0.000	0.000	41111	46184	46185	46197	1		Unknown	Unknown	Unknown	0.28
0	Vantage 23	NORTHWE	0.001	0.286	0.095	0.027	0.000	0.095	0.000	0.000	41112	46188	46189	46199	1		Unknown	Unknown	Unknown	0.28
0	Vantage 23	NORTHWE	0.001	0.286	0.095	0.027	0.000	0.095	0.000	0.000	41111	46186	46187	46198	1		Unknown	Unknown	Unknown	0.28
0	Redmond 2	NORTHWE	0.001	0.274	0.091	0.025	0.000	0.092	0.000	0.000	40876	41250	0	0	2		Unknown	Unknown	Unknown	0.28
0	Redmond 2	NORTHWE	0.001	0.274	0.091	0.025	0.000	0.092	0.000	0.000	40876	41250	0	0	1		Unknown	Unknown	Unknown	0.28
0	Box Canyo	NORTHWE	0.001	0.265	0.088	0.013	0.000	0.088	0.000	0.000	47009	47012	0	0	1		Unknown	Unknown	Unknown	0.14
0	Box Canyo	NORTHWE	0.001	0.265	0.088	0.013	0.000	0.088	0.000	0.000	47009	47016	0	0	1		Unknown	Unknown	Unknown	0.14
0	Box Canyo	NORTHWE	0.001	0.265	0.088	0.013	0.000	0.088	0.000	0.000	47009	47014	0	0	1		Unknown	Unknown	Unknown	0.14
0	Box Canyo	NORTHWE	0.001	0.265	0.088	0.013	0.000	0.088	0.000	0.000	47009	47010	0	0	1		Unknown	Unknown	Unknown	0.14
0	Drummond	PACE	0.001	0.255	0.178	0.025	0.000	0.240	0.000	0.155	65470	66760	0	0	2		Unknown	Unknown	Unknown	0.14
0	Antelope 1	PACE	0.001	0.253	0.158	0.030	0.002	0.649	0.001	0.579	65080	65065	0	0	1		Unknown	Unknown	Unknown	0.19
0	Jones Cany	NORTHWE	0.001	0.252	0.084	0.024	0.000	0.084	0.000	0.000	47814	44887	0	0	1		Gwye	Gwye	Unknown	0.28
0	Jones Cany	NORTHWE	0.001	0.252	0.084	0.024	0.000	0.084	0.000	0.000	47814	47818	0	0	1		Unknown	Unknown	Unknown	0.28
0	White Cree	NORTHWE	0.001	0.243	1.052	0.302	0.008	2.022	0.004	1.941	47827	47813	0	0	1		Unknown	Unknown	Unknown	0.28
0	Jones Cany	NORTHWE	0.001	0.232	0.077	0.022	0.000	0.077	0.000	0.000	47814	47812	0	0	1		Unknown	Unknown	Unknown	0.28
0	Pine Creek	NORTHWE	0.001	0.206	0.954	0.268	0.007	1.840	0.004	1.771	48317	48316	0	0	1		Unknown	Unknown	Unknown	0.28
0	Goshen 16	PACE	0.001	0.202	0.067	0.013	0.000	0.067	0.000	0.000	65670	65671	0	0	1		Unknown	Unknown	Unknown	0.19
0	Jones Cany	NORTHWE	0.001	0.201	0.067	0.019	0.000	0.067	0.000	0.000	47814	47808	0	0	1		Unknown	Unknown	Unknown	0.28
0	Roundup 2	NORTHWE	0.001	0.198	0.020	0.005	0.000	0.000	0.000	0.066	40905	41253	0	0	3		Delta	Gwye	Unknown	0.28
0	Sacheen 23	NORTHWE	0.001	0.184	2.101	0.814	0.017	4.177	0.008	4.153	40909	40907	0	0	1		Gwye	Gwye	Three Phas	0.38
0	Moscow 23	NORTHWE	0.001	0.181	0.857	0.243	0.007	1.653	0.003	1.593	48249	48251	0	0	1		Unknown	Unknown	Unknown	0.28
0	Glenoma 2	NORTHWE	0.001	0.129	0.765	0.217	0.004	1.075	0.001	1.032	47049	47047	0	0	1		Unknown	Unknown	Unknown	0.28
0	Three Mile	NORTHWE	0.000	0.248	0.083	0.012	0.000	0.083	0.000	0.000	47247	47248	0	0	1		Unknown	Unknown	Unknown	0.14
0	Faraday 11	NORTHWE	0.000	0.189	0.063	0.009	0.000	0.063	0.000	0.000	43193	43189	0	0	1		Gwye	Delta	Unknown	0.14
0	McKenzie 1	NORTHWE	0.000	0.152	0.051	0.004	0.000	0.051	0.000	0.000	46292	46294	0	0	1		Gwye	Gwye	3-Legged C	0.07
0	Nine Mile 1	NORTHWE	0.000	0.125	0.042	0.006	0.000	0.042	0.000	0.000	48269	48267	0	0	1		Unknown	Unknown	Unknown	0.14
0	Hazelwood	NORTHWE	0.000	0.124	0.041	0.006	0.000	0.041	0.000	0.000	45131	45226	0	0	2		Gwye	Gwye	Unknown	0.14
0	Nine Mile 1	NORTHWE	0.000	0.032	0.011	0.001	0.000	0.011	0.000	0.000	48269	48265	0	0	1		Unknown	Unknown	Unknown	0.14
0	The Dalles	NORTHWE	0.000	0.020	0.007	0.002	0.000	0.007	0.000	0.000	44055	44052	0	0	1		Gwye	Delta	Single Phas	0.25
0	Jefferson 1	PACE	0.000	0.000	0.732	0.139	0.004	1.281	0.002	1.281	65850	65851	65852	98533	1		Unknown	Unknown	Unknown	0.19
0	COB Energ	NORTHWE	0.000	0.000	0.072	0.021	0.000	0.102	0.000	0.102	45161	45276	45274	45568	2		Unknown	Unknown	Unknown	0.28
0	COB Energ	NORTHWE	0.000	0.000	0.071	0.021	0.000	0.102	0.000	0.102	45161	45276	45273	45567	1		Unknown	Unknown	Unknown	0.28
0	Electron 11	NORTHWE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42705	42706	0	0	1		Delta	Gwye	Unknown	0.14
0	De Moss 1	NORTHWE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40343	40341	0	0	1		Delta	Gwye	Core, Thre	0.12
0	Hurricane 2	NORTHWE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	45103	45101	0	0	1		Delta	Gwye	Unknown	0.28
0	Shannon 1	NORTHWE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	42177	42178	0	0	1		Delta	Gwye	Unknown	0.14

65670	65675	0	0	2		0.03
46809	46859	0	0	3		0.03
65080	65065	0	0	1		0.03
45128	45130	0	0	1		0.03
47480	47481	0	0	1		0.03
47327	47326	0	0	1		0.03
40261	40259	0	0	1		0.03
65470	66760	0	0	1		0.03
41111	46186	46187	46198	1		0.03
41111	46184	46185	46197	1		0.03
46831	46821	0	0	2		0.03
46296	46297	0	0	1		0.03
41112	46188	46189	46199	1		0.03
47472	47473	0	0	1		0.03
40876	41250	0	0	1		0.03
65470	66760	0	0	2		0.03
40876	41250	0	0	2		0.03
47327	47323	0	0	1		0.02
47814	47818	0	0	1		0.02
47814	44887	0	0	1		0.02
40145	40143	0	0	1		0.02
47814	47812	0	0	1		0.02
45161	45276	45274	45568	2		0.02
45161	45276	45273	45567	1		0.02
46892	46891	0	0	1		0.02
46890	46889	0	0	1		0.02
46267	46268	0	0	1		0.02
46817	46806	46810	46826	2		0.02
47814	47808	0	0	1		0.02
46267	46266	0	0	1		0.02
46769	46606	0	0	1		0.02
46817	46802	46804	46824	1		0.02
47031	47029	0	0	1		0.02
40785	47201	0	0	1		0.01
47009	47014	0	0	1		0.01
47009	47012	0	0	1		0.01
47009	47010	0	0	1		0.01
65670	65671	0	0	1		0.01
47009	47016	0	0	1		0.01
47247	47248	0	0	1		0.01
46229	46227	0	0	1		0.01
43193	43189	0	0	1		0.01
45685	45690	0	0	1		0.01
48269	48267	0	0	1		0.01
45131	45226	0	0	2		0.01
40905	41253	0	0	3		0.01
46292	46294	0	0	1		0.00
44055	44052	0	0	1		0.00
48269	48265	0	0	1		0.00
64058	40537	0	0	1		0.00
40867	62009	0	0	1		0.00
40343	40341	0	0	1		0.00
45103	45101	0	0	1		0.00
42177	42178	0	0	1		0.00
42705	42706	0	0	1		0.00

3	-400 Baseli	0	Olive Way	NORTHWE	0.00	0.63	0.36	0.05	0.00	0.80	0.00	0.80	47425	47405	0	0	1		Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Beacon (Sp	NORTHWE	0.00	0.58	1.06	0.15	0.00	1.18	0.00	0.98	48029	48027	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	De Moss 1	NORTHWE	0.00	0.55	0.21	0.03	0.00	0.22	0.00	0.03	47480	47481	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Klondike W	NORTHWE	0.00	0.52	0.20	0.03	0.00	0.20	0.00	0.03	47327	47326	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	John Day P	NORTHWE	0.00	0.51	0.17	0.20	0.00	0.17	0.00	0.00	44088	44075	44076	44083	1		Gwye	Delta	Single Phas	1.10
3	-400 Baseli	0	John Day P	NORTHWE	0.00	0.51	0.17	0.20	0.00	0.17	0.00	0.00	44086	44071	44072	44081	1		Gwye	Delta	Single Phas	1.10
3	-400 Baseli	0	John Day P	NORTHWE	0.00	0.51	0.17	0.20	0.00	0.17	0.00	0.00	44087	44073	44074	44082	1		Gwye	Delta	Single Phas	1.10
3	-400 Baseli	0	John Day P	NORTHWE	0.00	0.51	0.17	0.20	0.00	0.17	0.00	0.00	44089	44077	44078	44084	1		Gwye	Delta	Single Phas	1.10
3	-400 Baseli	0	De Moss 1	NORTHWE	0.00	0.49	0.18	0.03	0.00	0.19	0.00	0.03	47472	47473	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Klondike W	NORTHWE	0.00	0.42	0.16	0.02	0.00	0.17	0.00	0.03	47327	47323	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Shepherds	NORTHWE	0.00	0.42	0.14	0.04	0.00	0.14	0.00	0.00	47862	47462	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Shepherds	NORTHWE	0.00	0.42	0.14	0.04	0.00	0.14	0.00	0.00	47862	47467	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Simpson 1	NORTHWE	0.00	0.38	0.13	0.02	0.00	0.13	0.00	0.00	46769	46606	0	0	1		Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Jackson Hy	NORTHWE	0.00	0.37	0.12	0.01	0.00	0.12	0.00	0.00	45685	45690	0	0	1		Gwye	Delta	3-Legged C	0.07
3	-400 Baseli	0	Hayden Bri	NORTHWE	0.00	0.36	0.14	0.01	0.00	0.16	0.00	0.04	46229	46227	0	0	1		Gwye	Gwye	3-Legged C	0.07
3	-400 Baseli	0	Antelope 1	PACE	0.00	0.33	0.19	0.04	0.00	0.75	0.00	0.66	65080	65070	0	0	1		Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Columbia 2	NORTHWE	0.00	0.32	0.07	0.03	0.00	0.25	0.00	0.35	40261	40259	0	0	1		Gwye	Gwye	Three Phas	0.38
3	-400 Baseli	0	Noti Creek	NORTHWE	0.00	0.30	0.10	0.01	0.00	0.10	0.00	0.00	40785	47201	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Albina 115	NORTHWE	0.00	0.29	1.03	0.15	0.01	2.44	0.00	2.34	45001	45003	0	0	1		Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Vantage 23	NORTHWE	0.00	0.29	0.10	0.03	0.00	0.10	0.00	0.00	41111	46186	46187	46198	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Vantage 23	NORTHWE	0.00	0.29	0.10	0.03	0.00	0.10	0.00	0.00	41112	46188	46189	46199	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Vantage 23	NORTHWE	0.00	0.29	0.10	0.03	0.00	0.10	0.00	0.00	41111	46184	46185	46197	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Redmond 2	NORTHWE	0.00	0.27	0.09	0.03	0.00	0.09	0.00	0.00	40876	41250	0	0	2		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Redmond 2	NORTHWE	0.00	0.27	0.09	0.03	0.00	0.09	0.00	0.00	40876	41250	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47016	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47014	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47012	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47010	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Drummond	PACE	0.00	0.26	0.18	0.03	0.00	0.24	0.00	0.16	65470	66760	0	0	2		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Jones Cany	NORTHWE	0.00	0.25	0.08	0.03	0.00	0.08	0.00	0.00	47814	44887	0	0	1		Gwye	Gwye	Unknown	0.28
3	-400 Baseli	0	Jones Cany	NORTHWE	0.00	0.25	0.08	0.03	0.00	0.08	0.00	0.00	47814	47818	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Antelope 1	PACE	0.00	0.25	0.16	0.03	0.00	0.65	0.00	0.58	65080	65065	0	0	1		Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Three Mile	NORTHWE	0.00	0.25	0.08	0.01	0.00	0.08	0.00	0.00	47247	47248	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	White Cree	NORTHWE	0.00	0.24	1.05	0.30	0.01	2.02	0.00	1.94	47827	47813	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Jones Cany	NORTHWE	0.00	0.23	0.08	0.02	0.00	0.08	0.00	0.00	47814	47812	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Pine Creek	NORTHWE	0.00	0.21	0.95	0.27	0.01	1.84	0.00	1.77	48317	48316	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Jones Cany	NORTHWE	0.00	0.20	0.07	0.02	0.00	0.07	0.00	0.00	47814	47808	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Goshen 16	PACE	0.00	0.20	0.07	0.01	0.00	0.07	0.00	0.00	65670	65671	0	0	1		Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Roundup 2	NORTHWE	0.00	0.20	0.02	0.01	0.00	0.00	0.00	0.07	40905	41253	0	0	3		Delta	Gwye	Unknown	0.28
3	-400 Baseli	0	Faraday 11	NORTHWE	0.00	0.19	0.06	0.01	0.00	0.06	0.00	0.00	43193	43189	0	0	1		Gwye	Delta	Unknown	0.14
3	-400 Baseli	0	Sacheen 23	NORTHWE	0.00	0.18	2.10	0.81	0.02	4.18	0.01	4.15	40909	40907	0	0	1		Gwye	Gwye	Three Phas	0.38
3	-400 Baseli	0	Moscow 23	NORTHWE	0.00	0.18	0.86	0.24	0.01	1.67	0.00	1.61	48249	48251	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	McKenzie 1	NORTHWE	0.00	0.15	0.05	0.00	0.00	0.05	0.00	0.00	46292	46294	0	0	1		Gwye	Gwye	3-Legged C	0.07
3	-400 Baseli	0	Glenoma 2	NORTHWE	0.00	0.13	0.77	0.22	0.00	1.08	0.00	1.03	47049	47047	0	0	1		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Nine Mile 1	NORTHWE	0.00	0.13	0.04	0.01	0.00	0.04	0.00	0.00	48269	48267	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	Hazelwood	NORTHWE	0.00	0.12	0.04	0.01	0.00	0.04	0.00	0.00	45131	45226	0	0	2		Gwye	Gwye	Unknown	0.14
3	-400 Baseli	0	Nine Mile 1	NORTHWE	0.00	0.03	0.01	0.00	0.00	0.01	0.00	0.00	48269	48265	0	0	1		Unknown	Unknown	Unknown	0.14
3	-400 Baseli	0	The Dalles	NORTHWE	0.00	0.02	0.01	0.00	0.00	0.01	0.00	0.00	44055	44052	0	0	1		Gwye	Delta	Single Phas	0.25
3	-400 Baseli	0	COB Energ	NORTHWE	0.00	0.00	0.07	0.02	0.00	0.10	0.00	0.10	45161	45276	45274	45568	2		Unknown	Unknown	Unknown	0.28
3	-400 Baseli	0	Hurricane 2	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45103	45101	0	0	1		Delta	Gwye	Unknown	0.28
3	-400 Baseli	0	De Moss 1	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40343	40341	0	0	1		Delta	Gwye	Core, Thre	0.12
3	-400 Baseli	0	Electron 11	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42705	42706	0	0	1		Delta	Gwye	Unknown	0.14
3	-400 Baseli	0	Jefferson 1	PACE	0.00	0.00	0.73	0.14	0.00	1.28	0.00	1.28	65850	65851	65852	98533	1		Unknown	Unknown	Unknown	0.19
3	-400 Baseli	0	Shannon 1	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42177	42178	0	0	1		Delta	Gwye	Unknown	0.14
3	-400 Baseli	0	COB Energ	NORTHWE	0.00	0.00	0.07	0.02	0.00	0.10	0.00	0.10	45161	45276	45273	45567	1		Unknown	Unknown	Unknown	0.28

6	+550 Basel	0	Goshen 16	PACE	0.01	2.02	0.20	0.03	0.00	1.49	0.00	2.11	65670	65675	0	0	2		Unknown	Unknown	Core, Thre	0.16
6	+550 Basel	0	McKenzic 2	NORTHWE	0.00	0.69	0.23	0.03	0.00	0.23	0.00	0.00	46809	46859	0	0	3		Gwye	Delta	3-Legged C	0.13
6	+550 Basel	0	Antelope 1	PACE	0.00	0.25	0.16	0.03	0.00	0.65	0.00	0.58	65080	65065	0	0	1		Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Cove 230/(	NORTHWE	0.00	1.05	0.11	0.03	0.00	0.00	0.00	0.35	45128	45130	0	0	1		Delta	Gwye	Unknown	0.28
6	+550 Basel	0	De Moss 1	NORTHWE	0.00	0.55	0.21	0.03	0.00	0.22	0.00	0.03	47480	47481	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Klondike W	NORTHWE	0.00	0.52	0.20	0.03	0.00	0.20	0.00	0.03	47327	47326	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Columbia 2	NORTHWE	0.00	0.31	0.08	0.03	0.00	0.25	0.00	0.35	40261	40259	0	0	1		Gwye	Gwye	Three Phas	0.38
6	+550 Basel	0	Drummond	PACE	0.00	1.01	0.24	0.03	0.00	0.18	0.00	0.16	65470	66760	0	0	1		Gwye	Gwye	Core, Thre	0.12
6	+550 Basel	0	Vantage 23	NORTHWE	0.00	0.29	0.10	0.03	0.00	0.10	0.00	0.00	41111	46186	46187	46198	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Vantage 23	NORTHWE	0.00	0.29	0.10	0.03	0.00	0.10	0.00	0.00	41111	46184	46185	46197	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rocky Rea	NORTHWE	0.02	4.63	0.20	0.03	0.01	1.52	0.01	3.04	46831	46821	0	0	2		Gwye	Gwye	3-Legged C	0.13
6	+550 Basel	0	Enid Rd. 11	NORTHWE	0.00	1.16	0.39	0.03	0.00	0.39	0.00	0.00	46296	46297	0	0	1		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Vantage 23	NORTHWE	0.00	0.29	0.10	0.03	0.00	0.10	0.00	0.00	41112	46188	46189	46199	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	De Moss 1	NORTHWE	0.00	0.49	0.18	0.03	0.00	0.19	0.00	0.03	47472	47473	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Redmond 2	NORTHWE	0.00	0.27	0.09	0.03	0.00	0.09	0.00	0.00	40876	41250	0	0	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Drummond	PACE	0.00	0.26	0.18	0.03	0.00	0.24	0.00	0.16	65470	66760	0	0	2		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Redmond 2	NORTHWE	0.00	0.27	0.09	0.03	0.00	0.09	0.00	0.00	40876	41250	0	0	2		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Klondike W	NORTHWE	0.00	0.42	0.16	0.02	0.00	0.17	0.00	0.03	47327	47323	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Jones Cany	NORTHWE	0.00	0.25	0.08	0.02	0.00	0.08	0.00	0.00	47814	47818	0	0	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Jones Cany	NORTHWE	0.00	0.25	0.08	0.02	0.00	0.08	0.00	0.00	47814	44887	0	0	1		Gwye	Gwye	Unknown	0.28
6	+550 Basel	0	Boundary 2	NORTHWE	0.03	8.37	0.08	0.02	0.01	2.63	0.01	5.43	40145	40143	0	0	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Jones Cany	NORTHWE	0.00	0.23	0.08	0.02	0.00	0.08	0.00	0.00	47814	47812	0	0	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	COB Energ	NORTHWE	0.00	0.00	0.07	0.02	0.00	0.10	0.00	0.10	45161	45276	45274	45568	2		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	COB Energ	NORTHWE	0.00	0.00	0.07	0.02	0.00	0.10	0.00	0.10	45161	45276	45273	45567	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Rock Islanc	NORTHWE	0.00	0.90	0.30	0.02	0.00	0.30	0.00	0.00	46892	46891	0	0	1		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Rock Islanc	NORTHWE	0.00	0.90	0.30	0.02	0.00	0.30	0.00	0.00	46890	46889	0	0	1		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Weyerhaeu	NORTHWE	0.00	0.92	0.31	0.02	0.00	0.31	0.00	0.00	46267	46268	0	0	1		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Rock Islanc	NORTHWE	0.00	0.82	0.27	0.02	0.00	0.27	0.00	0.00	46817	46806	46810	46826	2		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Jones Cany	NORTHWE	0.00	0.20	0.07	0.02	0.00	0.07	0.00	0.00	47814	47808	0	0	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	Weyerhaeu	NORTHWE	0.00	0.75	0.25	0.02	0.00	0.25	0.00	0.00	46267	46266	0	0	1		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Simpson 1	NORTHWE	0.00	0.38	0.13	0.02	0.00	0.13	0.00	0.00	46769	46606	0	0	1		Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Rock Islanc	NORTHWE	0.00	0.76	0.25	0.02	0.00	0.25	0.00	0.00	46817	46802	46804	46824	1		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Douglas 23	NORTHWE	0.01	2.45	0.06	0.02	0.00	0.70	0.00	1.51	47031	47029	0	0	1		Gwye	Gwye	Core, Thre	0.23
6	+550 Basel	0	Noti Creek	NORTHWE	0.00	0.30	0.10	0.01	0.00	0.10	0.00	0.00	40785	47201	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47014	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47012	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47010	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Goshen 16	PACE	0.00	0.20	0.07	0.01	0.00	0.07	0.00	0.00	65670	65671	0	0	1		Unknown	Unknown	Unknown	0.19
6	+550 Basel	0	Box Canyo	NORTHWE	0.00	0.27	0.09	0.01	0.00	0.09	0.00	0.00	47009	47016	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Three Mile	NORTHWE	0.00	0.25	0.08	0.01	0.00	0.08	0.00	0.00	47247	47248	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Hayden Bri	NORTHWE	0.00	0.36	0.14	0.01	0.00	0.16	0.00	0.04	46229	46227	0	0	1		Gwye	Gwye	3-Legged C	0.07
6	+550 Basel	0	Faraday 11	NORTHWE	0.00	0.19	0.06	0.01	0.00	0.06	0.00	0.00	43193	43189	0	0	1		Gwye	Delta	Unknown	0.14
6	+550 Basel	0	Jackson Hy	NORTHWE	0.00	0.37	0.12	0.01	0.00	0.12	0.00	0.00	45685	45690	0	0	1		Gwye	Delta	3-Legged C	0.07
6	+550 Basel	0	Nine Mile 1	NORTHWE	0.00	0.13	0.04	0.01	0.00	0.04	0.00	0.00	48269	48267	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Hazelwood	NORTHWE	0.00	0.12	0.04	0.01	0.00	0.04	0.00	0.00	45131	45226	0	0	2		Gwye	Gwye	Unknown	0.14
6	+550 Basel	0	Roundup 2	NORTHWE	0.00	0.20	0.02	0.01	0.00	0.00	0.00	0.07	40905	41253	0	0	3		Delta	Gwye	Unknown	0.28
6	+550 Basel	0	McKenzie 1	NORTHWE	0.00	0.15	0.05	0.00	0.00	0.05	0.00	0.00	46292	46294	0	0	1		Gwye	Gwye	3-Legged C	0.07
6	+550 Basel	0	The Dalles	NORTHWE	0.00	0.02	0.01	0.00	0.00	0.01	0.00	0.00	44055	44052	0	0	1		Gwye	Delta	Single Phas	0.25
6	+550 Basel	0	Nine Mile 1	NORTHWE	0.00	0.03	0.01	0.00	0.00	0.01	0.00	0.00	48269	48265	0	0	1		Unknown	Unknown	Unknown	0.14
6	+550 Basel	0	Hilltop 345	SIERRA	0.02	4.07	4.62	0.00	0.07	11.97	0.05	11.22	64058	40537	0	0	1		Unknown	Unknown	Unknown	0.41
6	+550 Basel	0	Rattlesnak	NORTHWE	0.01	2.15	0.91	0.00	0.01	2.38	0.01	2.42	40867	62009	0	0	1		Unknown	Unknown	Unknown	0.28
6	+550 Basel	0	De Moss 1	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	40343	40341	0	0	1		Delta	Gwye	Core, Thre	0.12
6	+550 Basel	0	Hurricane	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45103	45101	0	0	1		Delta	Gwye	Unknown	0.28
6	+550 Basel	0	Shannon 1	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42177	42178	0	0	1		Delta	Gwye	Unknown	0.14
6	+550 Basel	0	Electron 11	NORTHWE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42705	42706	0	0	1		Delta	Gwye	Unknown	0.14

FY15 TI QUARTERLY STATUS REPORT

TIP number and Project Name: TIP 359: Improved System Modeling for GMD and EMP Assessments

FY16 Quarter: Quarter 1
Overall Status: Green

Activities and Accomplishments *(include information to substantiate* **overall status assessment; what happened since the last report?***):*

- The cooperative agreement with the University of Illinois (UIUC) was fully executed on November 20th, 2015. They are sub-contracting with one of the other PIs at Computational Physics Inc (CPI). As of January 1, 2016 this agreement was still being negotiated. Assuming the subcontract is signed by early January, this should not have any project impact.

Stage Gate 1: Complete

- UIUC has verified that the power system modeling data set to be used with this project is sufficiently detailed and accurate enough to represent the GIC resistance model of generation sites within the study area and boundary areas. Figure 1 shows calculated transmission line GICs using this model for a uniform 2 V/km eastward field; the size of the yellow arrows on each transmission line are proportional to the GIC flow. Figure 2 shows substation neutral flows for the same model ; the size of the substation is proportional to its GIC neutral flow, with red used to indicate substations with flows out of the ground into the system and green substations with flows into the ground.

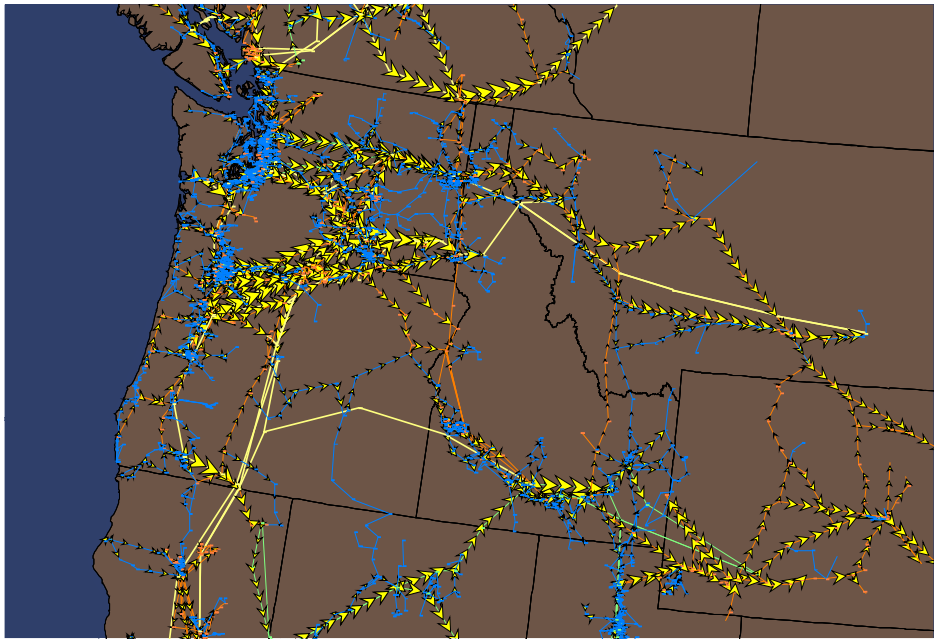


Figure 1: Transmission Line GICs in Study Footprint

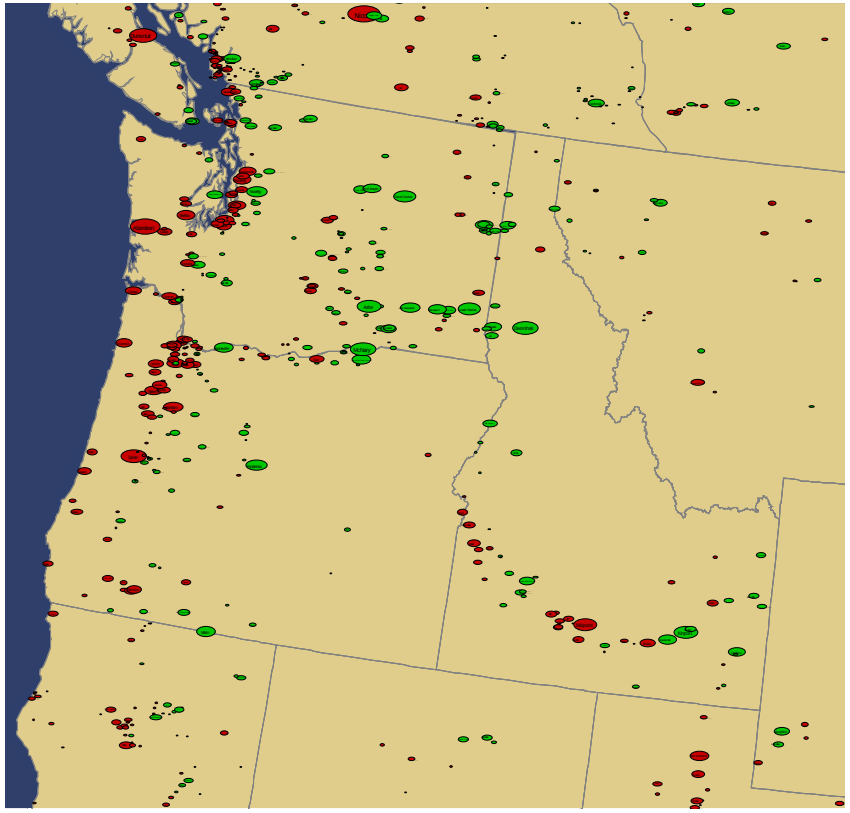


Figure 2: Substation GICs in Study Footprint

- During the January to March quarter UIUC researchers will be working on Task 1 and 2, and CPI on Task 2. In particular, for Task 1 UIUC researchers will be doing sensitivity analysis on the model to determine the most important parameters and working on mapping the planning models to the EMS models, and will be working with BPA to get the BPA transformer neutral flow GICs mapped to the models. For Task 2 UIUC will begin work on the tool that will be used to validate the system-wide GIC model. For Task 2 CPI will be working on developing an improved conductivity model for the BPA footprint based on published papers and available NSF Earthscope data.

Project Expenses: Green

FY	Total Project Budget	BPA Budget	Cost Share	BPA YTD Actual	YTD Cost Share Actual	BPA FTE	BPA FTE Actual
2016	264,330	132,165	132,165	3633	0	0	0

Schedule *(Identify major tasks and **stage gate(s)** scheduled for next reporting period)*: Green

Task	Planned Completion	Actual Completion

Setting Up System Model	April 2016	
GIC Ground Conductivity Model	August 2016	
Benchmark E-field Model	October 2016	
Grounding Resistance Model	December 2016	
Transformer Reactive Power Models	September 2017	
Transformer Harmonic Analysis	September 2017	
EMP Assessment	September 2017	

Risk Management: Green

Risk Event	Cause and Effect	Risk Response Plan	Monitoring and Control

General Concerns: None

Approvals

Project Manager: No
Project Sponsor: No
TI PMO: No

TIP 359: Improved System Modeling for GMD and EMP Assessments

Context

The potential for geomagnetic disturbances (GMDs) and electromagnetic pulse (EMP) to cause significant impacts on the power grid is now a well-recognized issue. Recently, NERC has been directed by FERC to develop reliability standards to address GMD assessments*, with the GMD operational/reliability standards already in effect (NERC standard EOP-010-1). GMDs induce very low frequency (much less than 1 Hz) electric fields at the earth's surface and consequently drive quasi-dc geomagnetically induced current (GIC) in the grid. GICs can cause half-cycle saturation of transformers, giving rise to harmonics and increased reactive power absorption in transformers. This transformer reactive power loss could severely impact the system voltage stability, while harmonics currents can cause misoperation of protection devices. Unintended isolation of needed components such as capacitor banks and transformers during GMDs further increase the vulnerability of the network to voltage collapse, as seen in the March 1989 collapse of Hydro-Quebec.

Description

This work builds upon the recent successful GMD modeling and validation works by the University of Illinois and other industrial partners. These efforts include an EPRI project on GIC flow modeling and the collaboration with AEP to assess their system.

The project will provide BPA engineers with a methodology for a validated GMD flow model and benchmark GMD scenarios, as required to be available per the upcoming FERC standards.

The first goal of this project is to establish an integrated system-data model to validate the GIC flow model. This can be used by BPA to construct a benchmark GMD storm scenario as required by standards, and to improve the accuracy of the GIC flow modeling. The second goal is to develop and validate the modeling of transformer response to the GIC flow using BPA system power flow data, as an extension to the GIC flow validation to improve the quantitative understanding of the negative GMD impacts in planning studies. The third goal of this project is to build on the GMD modeling to develop models and tools for EMP assessment of power systems, in the necessary power system dynamics time frame.

Why It Matters

Better GMD/EMP model results by validating the source of uncertainty using real data provide a higher probability of mitigating the potential impacts at both system level (higher reactive power losses) or asset level (transformer/capacitor misoperation). And better GMD/EMP assessment models would provide operators with the tools needed to mitigate system voltage collapse and transformer heating, which would help prevent wide-area power outages.

The research activities on GMD assessment and benchmark electric field construction directly fulfills the requirements per the recently released NERC reliability/ operational standard EOP-010-1.

Goals and Objectives

The overall objective of this work is to contribute to geomagnetic disturbance (GMD) and electromagnetic pulse (EMP) assessments for the BPA system, with various-level models of improved accuracy. This ultimate benefit includes enhanced decision-making regarding planning, operations and mitigation strategies in the presence of GMDs. This will be achieved by validating several GMD-related system parameters and modeling approaches for the BPA system, thanks to available data measurement during GMD storms.

Deliverables

All the validation results and methods developed in each of the tasks described earlier will be provided to BPA. Discussion on the accuracy of the GIC flow model will be offered to guide future placement of GIC monitoring devices. Documentation on the usage of those methods will also be provided.

The validation studies performed using these methods and the results of those will be delivered through reports, including the discrepancies found and the following analysis. Deliverables will include the development of the benchmark Electric field model for the BPA footprint, as required by the NERC standards. At each stage gate, all required and applicable reports, documents and tools will be submitted to BPA for evaluation of sufficient progress.

A final report will be provided, describing the execution and achievements of the entire project in detail, as well as charting out the future directions.

TIP 359: Improved System Modeling for GMD and EMP Assessments

Project Start Date: October 1, 2015

Project End Date: September 30, 2017

Reports & References

* "Reliability Standards for Geomagnetic Disturbances," FERC Final Rule, Docket No. RM12-22-000; Order No. 779, May 16 2013

Links

Participating Organizations

University of Illinois at Urbana-Champaign (UIUC)
Computational Physics, Inc. (CPI), Boulder, CO

Funding

Total Project Cost:	$503,000
BPA Share:	$251,000
BPA FY2016 Budget:	~~$132,000~~ $125,000

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Hao Zhu, Ph.D. Assistant Professor Electrical Engineering & Computer Science, UIUC

Control #: 3274-1578

Volume II: Project Description: Technical Proposal for Evaluation Purposes by or on behalf of the Bonneville Power Administration

BPA Technology Innovation Opportunity for Fiscal Year 2016

Improved System Modeling for GMD and EMP Assessments

Organization : The Board of Trustees of the University of Illinois
Prepared for : Bonneville Power Administration
Date : May 1, 2015

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1 Goal and Scope of the Agreement

The general goal of this proposed work is to enhance the geomagnetic disturbance (GMD) assessment for the BPA system by developing a methodology for validating various types of GMD models. The first objective is to develop an integrated system-data model in order to validate the GIC flow model. This can be used by BPA to improve the accuracy of the GIC flow modeling within its footprint. The second objective is to develop and validate the modeling of transformer response to the GIC flow using BPA system SCADA data, as an extension to the GIC flow validation to improve the quantitative understanding of the negative GMD impacts for planning studies. The final objective is to develop models and tools that enable the assessment of electromagnetic pulse (EMP) impacts on power systems.

The proposed work directly addresses a key R&D gap (RD18: Tools for GMD/EMP assessment), mentioned in the *BPA Transmission Technology Roadmap,* published in March 2014. The major technology developments of this project will be to provide better models and benchmark GMD scenarios for the BPA footprint, validate the GIC flow model parameter accuracy, as well as the provide better quantitative models to characterize the transformer behavior due to GIC flows. A measurement-driven validation framework will be developed that could compliment or partially replace direct testing of transformers, while ensuring the results accurately reflect the actual system response.

We identify this proposed work as an important driver in helping achieve BPA's goal of improving its risk-based study tools, as mentioned in the Technology Roadmap. This work will provide BPA engineers with a methodology for a validated GMD flow model and benchmark GMD scenarios, as required to be available per the upcoming FERC standards.

2 Background

The potential for geomagnetic disturbances (GMDs) to cause significant impacts on the power grid is now a well-recognized issue. Recently, NERC has been directed by FERC to develop reliability standards to address GMD assessments [1], with the GMD operational/reliability standards already in effect (NERC standard EOP-010-1). GMDs induce very low frequency (much less than 1 Hz) electric fields at the earth's surface and consequently drive quasi-dc GICs in the grid. GICs can cause half-cycle saturation of transformers, giving rise to harmonics and increased reactive power absorption in transformers. This transformer reactive power loss could severely impact the system voltage stability, while harmonics currents can cause misoperation of protection devices. Unintended isolation of needed components such as capacitor banks and transformers during GMDs further increase the vulnerability of the network to voltage collapse, as seen in the March 1989 collapse of Hydro-Quebec.

While the models used to perform GMD assessments have come a long way, many sources of uncertainty still exist in these models. Such uncertainty lies within the geo-electric field scenario, the local accuracy of wide area conductivity models, the GIC system model, as well as within the transformer models. These uncertainties are acknowledged in the proposed standards by the directive to use locally-accurate models, where they are available. In light of these serious modeling concerns, recent efforts have been made towards validating the assessment of GMD impact in the planning cases, by using field transformer neutral GIC measurements. This proposal is aimed at solving this two-fold problem.

The proposed work builds upon the recent successful GMD modeling and validation works by the University of Illinois and other industrial partners. These efforts include an EPRI project on GIC flow modeling and the collaboration with AEP to assess their system. This previous experience laid the groundwork for the GMD

model validation tasks that we are proposing. Furthermore, the team has an ongoing BPA project on transient simulation tool verification and validation. This project familiarized us significantly with the BPA system. It was also instrumental in helping build expertise in the software packages utilized by BPA. All of these past efforts invariably make us confident in succeeding with the proposed project.

Motivated by the potential negative impacts of GMDs, utilities such as BPA are deploying advanced GIC monitors that measure a variety of useful data such as transformer neutral currents, reactive power losses, harmonics, and tank wall vibrations. These measurements present a great opportunity to help validate existing GMD models for the BPA system. The proposed validation efforts will directly address the challenges encountered by most utilities in the GMD assessment, including the ground conductivity models used in determining the induced electric fields for the benchmark GMD scenario, insufficient SCADA data on GIC flow model parameters, as well as inadequate transformer behavior understanding.

In contrast to GMDs which are naturally occurring disturbances, EMPs are man-made nuclear disturbances that can have significant impacts on power system operations. There are 3 different types of EMP waves (E1, E2, and E3) that can affect the power grid, of which the E3 wave is somewhat similar to a GMD, in the sense that they both induce electric fields at the earth's surface and induce dc currents (i.e. GICs) in the power grid. Hence, GMD modeling can be leveraged to study EMP impacts. However, the key differences in EMPs as compared to GMDs, such as the higher magnitudes of electric fields as well as their much faster rise times puts this problem in a much faster time-scale than GMDs. In the proposed project, EMPs will be modeled in the appropriate power system dynamics (i.e. transient stability) time frame to enable sound EMP assessments.

3 Location of the Project

This project will be performed at University of Illinois at Urbana-Champaign in Urbana, Illinois, and at Computational Physics, Inc in Boulder, CO.

4 BPA-Furnished Property of Services

BPA will provide no property for this project. Initially, BPA will provide UIUC with the GIC related measurement data and the associated GIC system model such as state-estimator cases. The project team has an ongoing Technology Innovation Project (TIP 268), with experiences in handling BPA's EMS data. The necessary NDAs for such cases are already in place. Additional system information such as substation geo-location and network resistance values is needed for the GIC flow analysis. The best measurement data sets would be those associated with GMD events at higher intensity. While a strong GMD event is unlikely to project timeframe, most modest GMDs occur with sufficient regularity that we believe there should be sufficient historical and new events over the project timeframe to achieve the validation goals. Any recent historical data would be needed preferably as soon as possible, no later than approximately six months from the start of the project.

All the data will be transferred to the primary applicant, in any suitable electronic format as found fit by BPA to the following address:

Professor Thomas J. Overbye
4054 ECE Building, MC 702
306 N. Wright Street
Urbana, IL 61801

Email: overbye@illinois.edu

5 Recipient-Furnished Property or Services

The applicants will provide no property for this project. The applicants will provide all services in support on this project except those mentioned under section 4 above.

6 Definitions and Acronyms

UIUC – University of Illinois at Urbana-Champaign

CPI – Computational Physics Inc

GMD – Geomagnetic disturbance

GIC – Geomagnetically induced current

EMP – Electromagnetic Pulse

7 Documentation

None.

8 General Requirements

In order to meet the objectives of this proposed project, three main tasks must be performed. The last two tasks have been divided into three subtasks for clarity and better management. The tasks and subtasks are listed below:

1. Setting up an integrated system-data model for validating GMD impacts
2. Validating the system-wide GIC flow model
   a. Improving the accuracy of the ground conductivity model at BPA footprint
   b. Determining a realistic benchmark electric field model
   c. Verifying the substation grounding resistance data from the system model
3. Validating the GIC-induced transformer behavior
   a. Validating the effect of GIC-induced transformer reactive power losses
   b. Developing a validated transformer harmonics analysis model
4. Developing models to study the impact of EMPs (E3 type) on the power grid

9 Specific Requirements

A. Objectives / Technical Problem

The overall objective of this proposed work is to contribute to GMD and EMP assessments for the BPA system, with various-level models of improved accuracy. This ultimate benefit includes enhanced decision-making regarding planning, operations and mitigation strategies in the presence of GMDs and EMPs. This will be achieved by validating related system parameters and modeling approaches for the BPA system, using available data measured during GMD storms. The first goal of this project is to

establish an integrated system-data model to validate the GIC flow model. This can be used by BPA to construct a benchmark GMD storm scenario allowed by standards to more accurately assess GMD affects than the default benchmark events, and to improve the accuracy of the GIC flow modeling. The second goal is to develop and validate the modeling of transformer response to the GIC flow using BPA system power flow data, as an extension to the GIC flow validation to improve the quantitative understanding of the negative GMD impacts in planning studies.

B. Description of tasks to be performed

Four major tasks will be accomplished in this project. Tasks 2 and 3 have been divided into three subtasks for clarity and better management. Some aspects of each task will be co-dependent on other tasks. Hence, the tasks will be executed in a logical order, and there will be parallel performance of some aspects of the tasks. The task interactions have been included in each task description.

Task 1. Setting up an integrated system-data model for validating GMD impacts

A major task while performing any type of validation in power systems is to re-create a system model as it was during a disturbance or an event, in this case for a GMD storm. To this end, real-time or EMS models provided by BPA corresponding to the GMD event(s) will be utilized. The project team has experience in handling BPA's EMS models and mapping them to planning cases to extract dynamic models, in an ongoing Technology Innovation Project (TIP 268). The necessary NDAs for such cases are already in place.

To model electric fields and their induction effects, additional system information is needed, such as the geo-locations for each substation and the bus-substation mapping. Thanks to our previous WECC footprint studies, we already have access to a majority part of this data.

Calculating GICs needs additional dc network resistance values such as those of transformer windings, and substation grounding (including the effect of shield wires). These values are not available in standard planning cases or EMS models. To enable a more accurate analysis, these values will need to be provided by BPA, from transformer test reports for instance, for as many system elements as possible. However, if these values are not available, the transformer resistance can be estimated using the series ac resistances of the transformers in the power flow case. For substation grounding resistances actual values are certainly preferred for accuracy. If these are not available, heuristics can be used (such as either considering the grounding values to be zero ohms, which usually overestimates the GICs) or rough estimates can be made based on the highest nominal voltage level of the substation. In cases where these parameter values are available from BPA, it will enable the validation of these parameter estimation algorithms used in GIC tools, leading to better default parameter values.

Different types of measurement data will be used in this project, each of which will require some pre-processing techniques, as observed in our previous works. In addition to transformer neutral current meters to monitor the GIC flow, measurements on transformer reactive power losses and (if available) harmonics would greatly benefit the validation of transformer models in Task 3. The transformer reactive power losses can be determined from standard SCADA data. Moreover, magnetometer measurements from relevant observatories (i.e. in or near the BPA footprint) can be leveraged to estimate the electric field from the real geomagnetic field data, during the GMD storms when GICs and transformer quantities are measured.

The duration of this task will be 7 months, with the first two aspects, i.e. system modeling requirements for calculating electrical field and GICs to be completed in 4 months. Collecting and incorporating various meter measurements during the GMD storms will be finished by the end of the 7-month duration.

Task 2. Validating the system-wide GIC flow model

The system-wide GIC flow analysis is essential for understanding the impacts of GMD events. However, there exist a variety of sources of uncertainty throughout the GIC calculation due to insufficient information regarding input parameters within or even outside of power systems. The lack of accuracy in the GIC parameters calls for validating the real measurement data during GMD events as collected in Task 1.

The GICs in transformer neutrals are related to the input electric (E-) field through a linear flow model. Such linear transformation solely depends on system information, including transmission line topology, substation geo-locations, as well as the winding resistance values, all of which need to be modeled in Task 1. In addition, although the induced geo-electric field is driven by changes in the geomagnetic field, the earth ground conductivity at a range of depths determines the magnitude of the electric field response. Therefore, we have developed a systematic approach to validating the GIC flow model based on measurements of transformer neutral currents and geomagnetic field. The electric field can be estimated based on two approaches, one by filtering the geomagnetic field based on the earth conductivity model, and one by data fitting the transformer neutral GIC data. Results from the two approaches can be compared with each other, in order to validate the accuracy of the assumed models on ground conductivity and GIC network flows.

Nonetheless, as widely recognized in latest NERC GMD Taskforce meetings, there is potentially a high degree of uncertainty in the ground models published by U.S. Geological Survey (USGS). Figure 1 illustrates the USGS earth ground conductivity models for different physiographic regions of the U.S., with a detailed model showing the range of uncertainties. This range of uncertainty from the USGS earth ground conductivity models has been further identified to lead to a factor of 3-4 difference in the Electric field intensity. More recently at the NERC meeting in March 2014, a location-dependent Electric field model as required by the standards, was proposed to calculate the peak Electric field relative to the reference location benchmark as given by $E_{peak} = E_{benchmark} \times \alpha \times \beta$ in Volts/km. Specifically, α is a scaling factor according to local geomagnetic latitude, while the β factor accounts for regional earth conductivity. This task will contribute to investigate the uncertainties in the ground conductivity, develop a benchmark Electric field, and validate the system model at the BPA footprint, as listed in the following three subtasks.

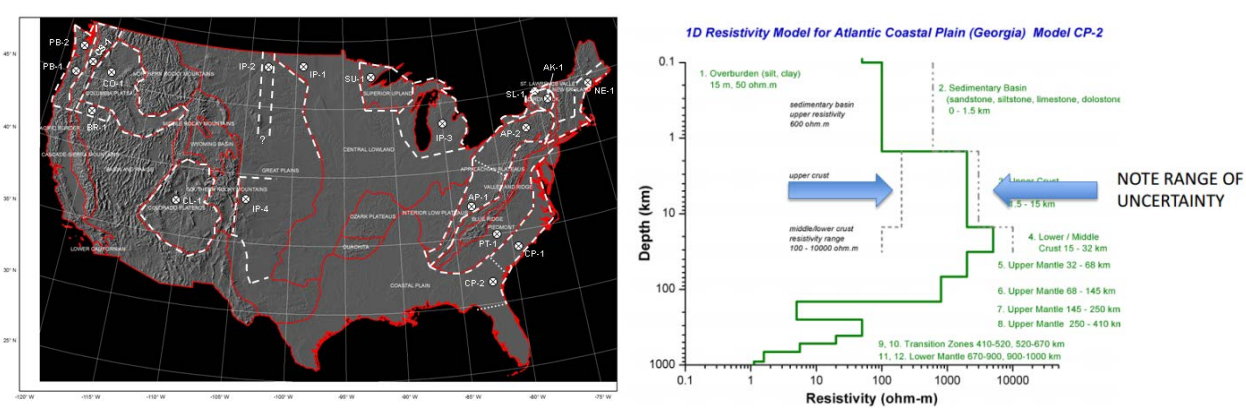


Figure 1. Location of 1D earth resistivity models with respect to physiographic regions of the U.S., with a detailed model shown to highlight uncertainties (Sources: http://geomag.usgs.gov/conductivity/)

a. Improving the accuracy of the ground conductivity model at BPA footprint: As mentioned earlier, a linear estimation approach can be used to obtain the electric field from the field GIC measurements during the disturbances. Since this estimate is obtained from real data, it offers a better representation of the actual peak electric field intensity, and thus has the potential to be used to validate the ground conductivity model for BPA footprint provided by USGS. As an example, Figure 2 illustrates the proposed electric field estimates after normalization using both GIC measurements and geomagnetic field data. It corresponds to a GMD event on March 9th, 2012, impacting a major electric utility at the U.S. Midwest region. A strong correlation between the two estimates has been observed, corroborating the validity of our proposed approach to improving the ground conductivity model by investigating the electric field intensity as estimated from the GIC measurements.

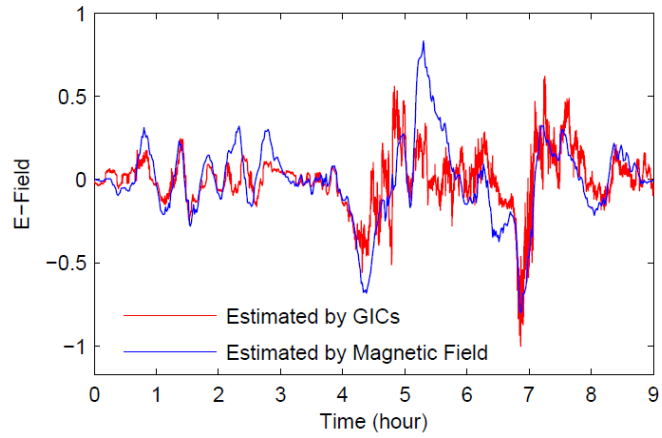


Figure 2. Comparison of northward electric fields estimated by using transformer GIC measurements and the observed magnetic field data, for a GMD storm in 2012

After the completion of the accuracy assessment of the regional USGS 1-D conductivity profiles, improvements to the local conductivity models will be made. We will first analyze the range of impact of the specified uncertainty of the existing 1-D models, using default models to identify the range of induced electric field that can occur within the error range of the regional USGS 1-D conductivity models. To narrow these uncertainties, we will improve the models over the BPA footprint by the following by adding local and lateral variations in conductivity. To achieve this goal, the following steps will be performed: a) comparison of the default 1-D models with published 3-D results from Earthscope, b) supplementation of 1-D models by adding local variations or subregions, where necessary, and c) supplementation of 1-D with lateral conductivity variation, where needed. These will produce a set of improved conductivity maps, allowing us to analyze local variations and improve the electric field estimates for a GMD event across the BPA footprint.

b. Determining a realistic benchmark electric field model: The ultimate goal of this step is to determine a range of realistic and extreme GMD storm scenarios for BPA, in order to benefit the system vulnerability analysis in the GMD mitigation programs. It is not enough to characterize a single electric field maximum over an entire region. Instead we will model the time and spatially-varying electric field over the BPA footprint. Using the improved ground conductivity model developed in the steps described above, a much more locally-accurate electric field GIC-driver than the default NERC event will be produced.

First, the improved conductivity information will be used to provide a more accurate estimate of the alpha and beta parameters used in the proposed standards for determining the maximum electric field value used in vulnerability analyses. This is the information required in the first step (GMD vulnerability analysis) of the proposed FERC regulations, and can be used as a broad-scale quantification of GIC risk across a regional area.

However, to fully understand the local impacts of an induced electric field for a given GMD event (and the impact of lateral variations in deep earth conductivity), knowledge of the evolution of the electric field over time and location must be developed. To quantify these location-specific and temporal variations, several maps of electric field magnitudes over the BPA footprint will be made (see the US example in Figure 3). These include: a) a map of the largest values, by geographic location, of induced electric field modeled over the BPA footprint, b) the variation in spectral characteristics of the induced electric field over the BPA foot print, which are used in transformer heating analyses, and c) a series of maps showing the electric field variation over time for the improved benchmark event over the BPA footprint. These can be used to understand and analyze the impact of "hotspots" in GIC evolution over a GMD event, and identify the most vulnerable assets within a broader system.

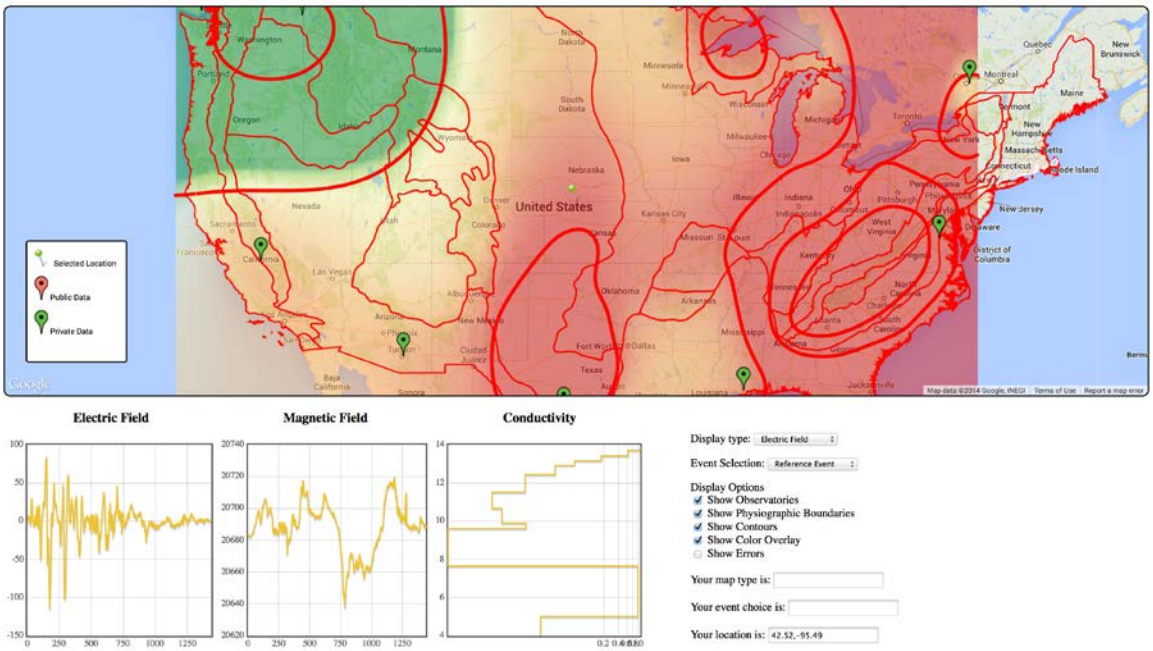


Figure 3. The US map including the evolution of electric field over space and time.

c. <u>Verifying the substation grounding resistance data from the system model:</u> This is another important aspect for GIC flow model validation. Previous works of the project team have identified that GIC values can be highly sensitive to several network parameters, such as the assumed substation grounding resistance. Based on our experiences with other utilities' systems, it is highly likely that the substation grounding resistances and/or transformer winding resistances are not accurately available from the EMS database. Hence, it is of crucial importance to study the GIC sensitivity to various network parameters of the BPA system, and accordingly to identify those can most significantly improve the accuracy of GIC flow model. The research team has worked with PowerWorld software platform to incorporate such sensitivity analysis for line resistance values, but substation grounding resistances have been recently identified to be more influential. One key pay-off of this research effort is to determine the substation locations where higher priority is needed to finding the grounding resistance values. Lastly, the aforementioned validation method based on field GIC measurements will be leveraged similarly to improve the accuracy of the grounding information at the high-priority substations. An algorithm for better estimating grounding resistances using GIC measurements has been developed and successfully implemented by the

research team. Figure 4 illustrates the performance of this estimation algorithm for a 20-bus test case, which iteratively improves the accuracy of grounding resistance values to a much more acceptable level.

The overall objective of this task is to use actual measurements to identify several crucial sources of inaccuracy in the input electric field and system model, and to eventually eliminate them for achieving a better GIC flow model for the BPA system. Task 2 will be performed as early as possible for 12 months, to make sure the success of the following Tasks 3 and 4.

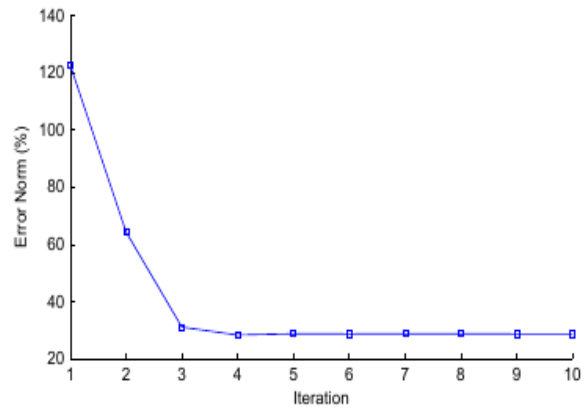


Figure 4. Error percentage in estimating grounding resistance decreases within just a few iterations for a 20-bus test case.

Task 3. Validating the GIC-induced transformer behavior

This task furthers the understanding of GMD impacts on the BPA system by improving the modeling of transformer response to the GIC flow. The flow of GICs in transformer windings causes half-cycle saturation of the transformer cores which leads to increased transformer hotspot heating, harmonic generation, and reactive power (var) absorption. Each of these effects can strongly impact large-scale power system reliability. Nonetheless, it is widely recognized that assessments of such effects at the system level are lacking, which motivates us to validate the BPA system power flow measurements during GMD storms, as collected in Task 1.

The 2012 NERC Interim GMD report concludes a major risk of system due to increased var absorption in the transformers and the resultant system-wide low voltages. NERC GMDTF recently (in March 2014) stated that planners will need to develop validated var loss models for transformers in their system, in order to perform voltage stability assessment studies. A widely-used methodology to calculate GIC-saturated var loss assumes that it scales linearly with the product of the effective GIC and bus terminal voltage. However, the linear scaling factor is generally missing for existing transformers, and could only be vaguely inferred from experiences. Due to the significant variation in transformers' scaling factors, actively validating these values for existing transformers in the BPA system is truly valuable for system voltage stability analysis.

Another equally important aspect of transformer validation is the harmonics analysis. The dc offset caused by GIC flow injects harmonic currents to the grid, and consequently affects operations of protection systems. This is exactly the case for the 1989 Hydro-Quebec blackout, where equipment protection relays were trigged within seconds leading to system voltage collapse. In addition, harmonic currents are also the culprit for transformer hot-spot heating, which could cause significant equipment damage. Albeit its potential financial effects, the harmonics analysis due to GIC is generally lacking in the literature, especially when integrated with the impact on system power flows. Clearly, it is extremely important to develop a GIC harmonics model validated by the BPA system power flow analysis.

Therefore, the task will be divided into the following subtasks.

a. Validating the effect of GIC-induced transformer reactive power losses: Compliment and partially replace in-depth transformer testing, we propose to validate the transformer var loss model using measurements from GIC monitoring devices and the SCADA system. Our prior work with BPA for estimating transmission line parameters has benefited us invaluable experience to handle challenges involved in utilizing SCADA data for parameter estimation, such as measurement noise and the lack of a known distribution of measurement errors. A finding of this work was also that the performance for reactance estimation (which is derived from measured var losses) is substantially better than that of resistance (which was an expected result given that the reactive power losses are substantially greater than the real power losses). Hence, it is very promising to leverage the same methodology to estimate the GIC var loss model, and satisfactory outcomes are expected. As an example, Figure 5 illustrates the model fitting results based on the var consumption measurements obtained by PMU devices. The PMU data are generated by the PowerWorld transient stability toolbox for a 20-bus test case. The strong agreement between the measurements and their values based on given var loss model ensures the feasibility of this approach. This method can be directly performed to validate the var loss scaling parameters for all transformers with GIC and corresponding SCADA data available. For transformers without such data, we will consider an inference framework by analyzing how the estimated scaling factors depend on transformer characteristics.

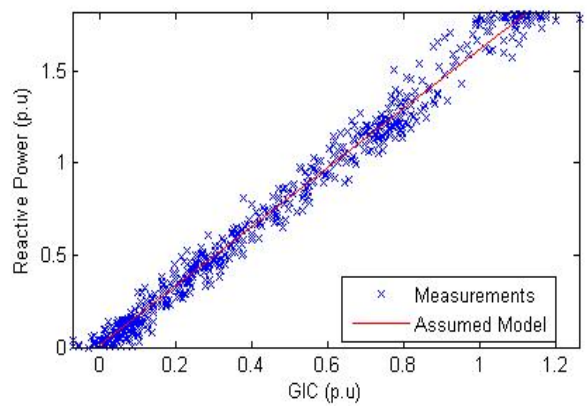


Figure 5. A measurement-based approach for validating the transformer var loss model that scales linearly with GIC values.

b. Developing a validated transformer harmonics analysis model: Thanks to the installed GIC monitoring devices in the BPA system, it is also feasible to investigate how the harmonics measurements vary with the GIC values. Similar to the var loss validation, a statistical learning framework can be adopted to develop an analytical characterization of the transformer harmonics model. Specifically, the transformer characteristics and neutral GIC measurements will be used as the input to infer how harmonics currents depend on these variables. Using the SCADA data on the harmonics level at other transformers, we can further improve and validate the accuracy of the developed harmonics model. Last, we will be interested to integrate the GIC-induced harmonics model with the power flow analysis using e.g., shooting method, in order to evaluate the negative impact on and hence the vulnerability of all system components including protection systems and distribution transformers.

The system-level GIC validation tool developed in Task 2 will be utilized to provide an accurate GIC input for validating the transformer models in the subtasks delineated under Task 3. Hence, Task 3 will start immediately once sufficient progress has made on Task2, and will last for 12 months.

Task 4. Developing models to study the impact of EMPs (E3 type) on the power grid

A high-altitude electromagnetic pulse (EMP) is a high-altitude nuclear detonation, which has a potential to blanket a large portion of the country with damaging electromagnetic radiation. An EMP wave emits three types of waves of energy, depending on their frequencies, as shown in Figure 6.

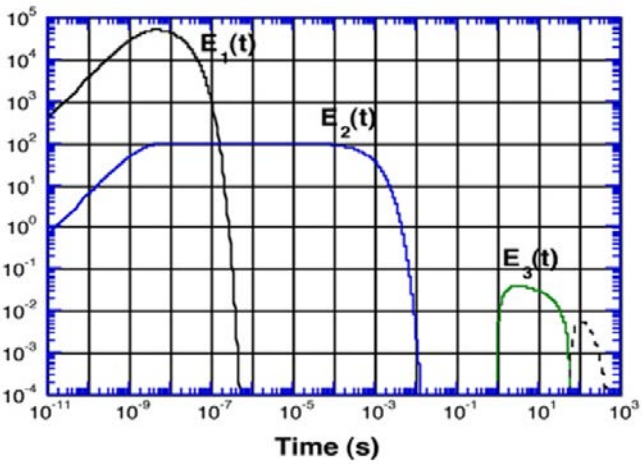


Figure 6. Waveforms of electric fields generated by the HEMP in Volts/m from IEC 61000-2-9

Of these waves, the E3 wave interacts with the power grid in a manner similar to GMDs, in that they induce geoelectric fields at the earth's surface, giving rise to GICs. A key difference, however, between the electric fields induced by EMPs and GMDs is the faster rise times (on the order of seconds), with much higher peak magnitudes caused by EMPs. For instance, the E3 wave in Figure 5 has a peak value of around 40 Volts/km, with a rise time of a few seconds. Thus, an E3 EMP operates on the same time frame as of power system dynamics, making it important to study their impacts in the transient stability domain.

This task will first involve developing the methodology to integrate EMP impacts into power system transient stability tools, and provide these tools to BPA for performing EMP assessments. In particular, the EMP disturbance will be translated into time-varying electric fields, GICs, and then the transformer reactive losses, which will be included in the transient stability solution. Such tools can be used for voltage stability studies in the presence of EMPs. Once this has been modeled, next since the underlying power system network model and transformer models are the same as that used for GMDs, this task will build on the achievements of Tasks 1 and 2 to further improve the EMP modeling to achieve more reliable simulation results, and it will last for 12 months.

The project team's expertise in both GMD and transient stability modeling will help in the successful execution of this task.

C. Project Management Protocols

UIUC will be responsible for the project management tasks related to this project.

i. Communications plan:

The UIUC team will work closely on this project, through (bi-)weekly meetings and discussions. Work progress will be reported timely to BPA through quarterly reports. At each stage gate, all applicable documents and reports will be submitted to BPA for evaluation of sufficient progress. Presentations will be delivered as a part of reporting, wherever required. The validation methods and tools developed in this work will also be provided to BPA in a timely manner. A final report of all the research results and tools developed will be submitted.

The CPI team will coordinate closely under the direction of the UIUC team, participating in meetings and discussions where deemed necessary by the UIUC lead. The CPI team will provide documentation and reports to UIUC in a timely manner to support all deliverables to BPA.

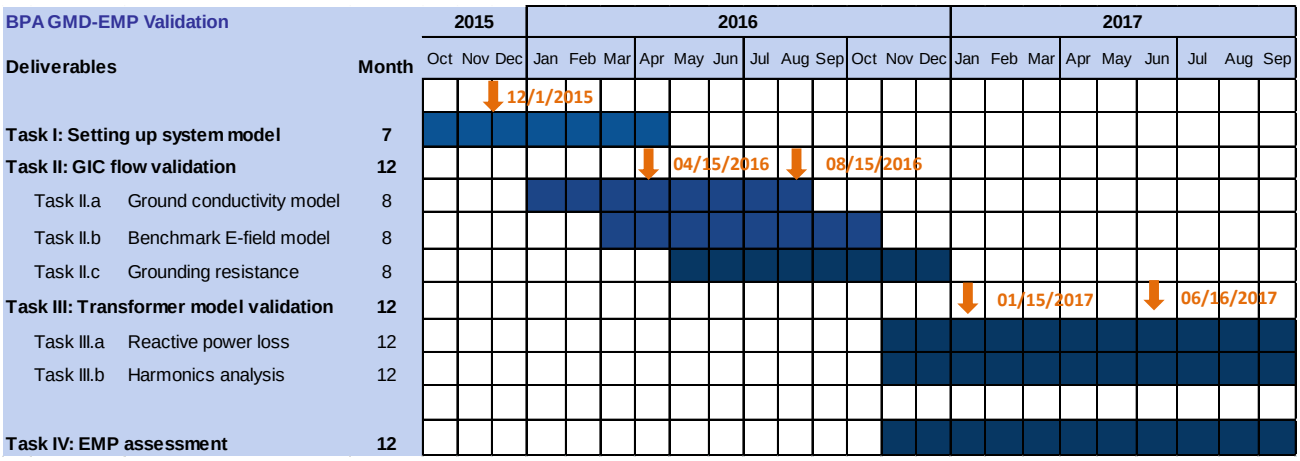
ii. Contingency plan:

The progress of the project will be evaluated at the two stage gates that have been designed for this project. This project undertakes broad and challenging tasks, which may take longer than planned for. Hence, it is somewhat possible that some tasks may not have anticipated progress at the stage gates. In case this contingency occurs, a natural remedy would be to devote the remaining hours to completing as many aspects of the tasks, charted out in the description, as possible.

iii. Stage Gates:

There will be five~~two~~ stage gates in this two-year project. The first-year stage gates will be on 12/1/2015, 04/15/2016 and 08/15/2016. The second-year ones will be on 01/15/2017 and 06/16/2017. The criteria for determining success at each stage gate have been mentioned in the Process Flow Chart in Part v.

iv. Gantt chart of all the stage gates, tasks and subtasks:

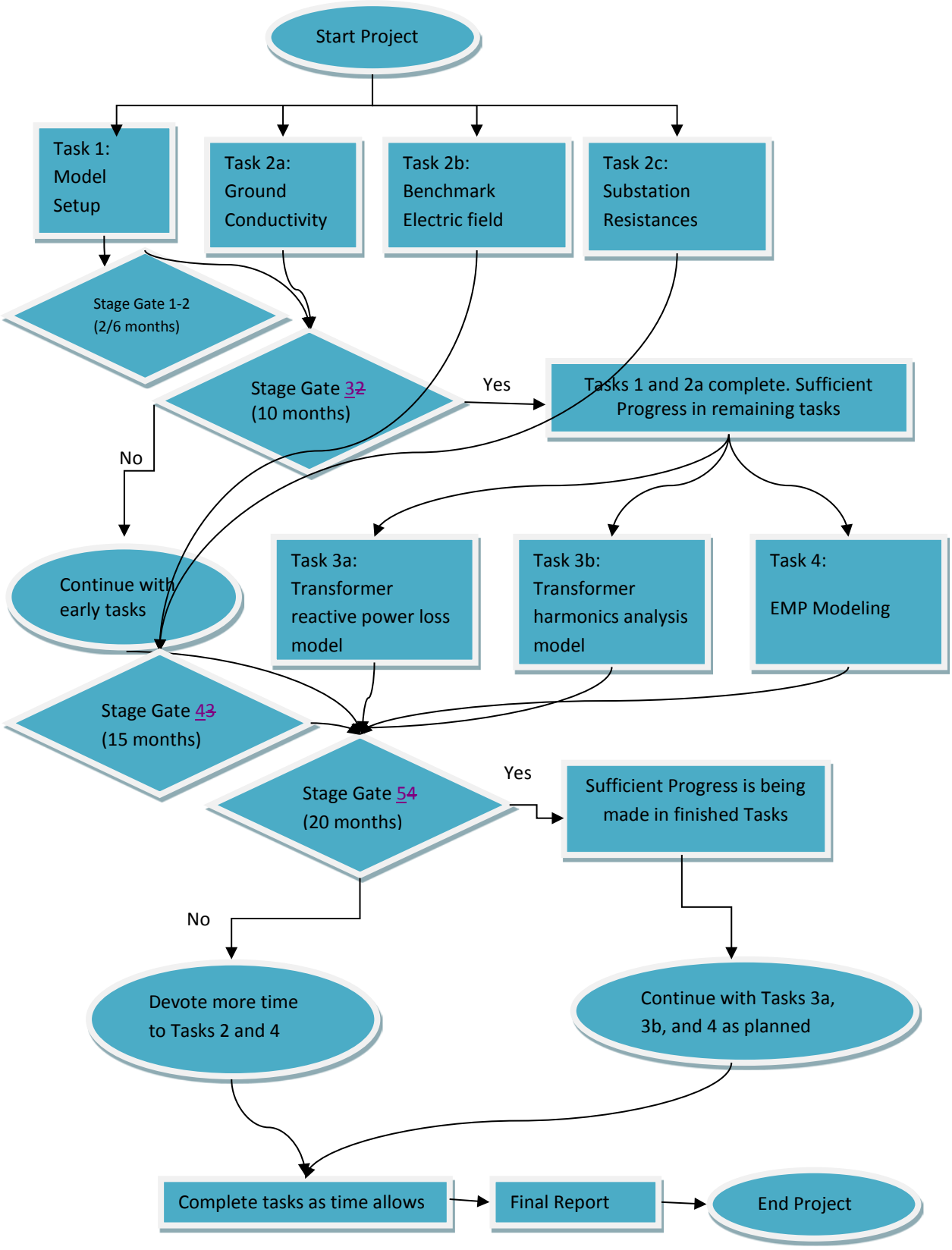


The deliverables and evaluation points at each stage gate are listed here.

Stage Gate 1	Demonstrate modeling data set to be used is sufficiently detailed and accurate enough to represent the GIC resistance model of generation sites within the study area; and boundary equivalent GIC models are sufficient to provide reasonable representation of GIC flow from/to transmission networks beyond the study area.
Stage Gate 2	An improved conductivity model for the BPA footprint will be available, based on published papers and available Earthscope data. It will be compared with the USGS 1D conductivity model for the region.
Stage Gate 3	Initial benchmark electric field maps of the BPA footprint will be created from USGS 1D conductivity models and magnetic field data. These maps include: a) a map of the largest values, by geographic location, of induced electric field b) the variation in spectral characteristics of the induced electric field, and c) a series of maps showing the electric field variation over time. BPA system GIC studies will be performed under the initial non-uniform electric field and the findings will be documented.
Stage Gate 4	Documented report on the algorithms for validating substation grounding resistance and transformer reactive power flow model. Assuming real GIC measurement data are provided to

	us, validation results on the BPA system will be discussed and potential model discrepancies will be pointed out in the report.
Stage Gate 5	Improved benchmark electric field maps will be created by incoporating the BPA conductivity model developed in Stage Gate 2. An improved benchmark electric field time series can be produced based on the validation results derived from GIC measurements. Documented report on the methodology developed to integrate EMP studies into power system transient stability tools. Details on how to use this methodology to perform EMP assessments will be provided.

v. Process Flow Chart:


Start Project
Task 1: Model Setup
Task 2a: Ground Conductivity
Task 2b: Benchmark Electric field
Task 2c: Substation Resistances
Stage Gate 1-2 (2/6 months)
Stage Gate 3~~2~~ (10 months)
Yes
Tasks 1 and 2a complete. Sufficient Progress in remaining tasks
No
Continue with early tasks
Task 3a: Transformer reactive power loss model
Task 3b: Transformer harmonics analysis model
Task 4: EMP Modeling
Stage Gate 4~~3~~ (15 months)
Stage Gate 5~~4~~ (20 months)
Yes
Sufficient Progress is being made in finished Tasks
No
Devote more time to Tasks 2 and 4
Continue with Tasks 3a, 3b, and 4 as planned
Complete tasks as time allows
Final Report
End Project

vi. Technology Transfer

The results of this research project have the potential to move into the application zone, through tests and demonstrations in order to integrate them with existing related tools. The methodology to validate ground conductivity model and substation grounding resistances will be beneficial for BPA to perform routine check-up, with more data during GMD events becoming available. The data-driven validation framework for transformer modeling that will be developed in this work can be used by BPA to regularly test the transformer behavior in their system. Both will also be particularly be useful as newer system components, such as more transmission lines and transformers, are added to the existing planning models. This framework and the underlying procedures developed in this project can be used to assess the vulnerability of the BPA system to extreme GMD scenarios, and to further design blocking device placement or other protection schemes against the negative impacts. The model validation tool can potentially be integrated into BPA's existing model validation framework. New techniques such as GIC-induced transformer harmonics analysis can be integrated to system power flow analysis, which will be a particularly unique contribution in such a framework.

D. Deliverables

All the validation results and methods developed in each of the tasks described earlier will be provided to BPA. Discussion on the accuracy of the GIC flow model will be offered to guide future placement of GIC monitoring devices. Documentation on the usage of those methods will also be provided. The quarterly and stage gate reports will also document the research process behind the development of these tools. The validation studies performed using these methods and the results of those will be delivered through reports, including the discrepancies found and the following analysis. Deliverables will include the development of the benchmark Electric field model for the BPA footprint, as required by the NERC standards. At each stage gate, all required and applicable reports, documents and tools will be submitted to BPA for evaluation of sufficient progress. A final report will be provided, describing the execution and achievements of the entire project in detail, as well as charting out the future directions.

E. Time Schedule

The project will be performed over 24 months from start to completion.

	Duration (number of days)	**Fixed**	**Start** (number of days since award)	**Finish** (number of days since award)
Task 1	210		0	210
Stage Gate 1		12/01/2015		
Stage Gate 2~~1~~		04/15/2016		
Task 2a	240		91	331
Stage Gate 3~~2~~		08/15/2016		
Task 2b	240		151	391
Task 2c	240		211	451
Stage Gate 4~~3~~		01/15/2017		
Task 3a	365		366	730
Task 3b	365		366	730
Task 4	365		366	730

Stage Gate 54		06/16/2017		

10 Technical Exhibits

None.

Technology Innovation

TIP #359: Improved System Modeling for GMD and EMP Assessments

Prof. Tom Overbye, Prof. Hao Zhu,
Komal Shetye
University of Illinois at Urbana-Champaign

Dr. Jennifer Gannon
Computational Physics Inc. (CPI)

Project Background

- Geomagnetically induced currents (GICs) have the potential to severely disrupt electric power grids around the world by causing either a rapid voltage collapse or long term high voltage transformer damage
- GICs are caused by solar events causing geomagnetic disturbances (GMDs)
  - Storm in 1989 took out the Quebec electric grid, much larger storms occurred in 1921 and 1859
  - Storm size can be continental
  - According to NASA Earth had a “near miss” in July 2012 for a storm that would have matched 1859

Project Background

- Impact on the power grid is caused by a changing magnetic field causing an electric field along the lines that induces the quasi-dc GICs
  - Magnitudes of the electric field depend upon size of magnetic field change and deep earth (hundreds of km) conductivities
- The ability to do power flow integrated GIC studies is now in commercial software
  - PowerWorld also allows GIC in transient stability
  - Initially just uniform electric fields, but now non-uniform
- PowerWorld did a uniform electric field study for the BPA in 2013

Project Participants

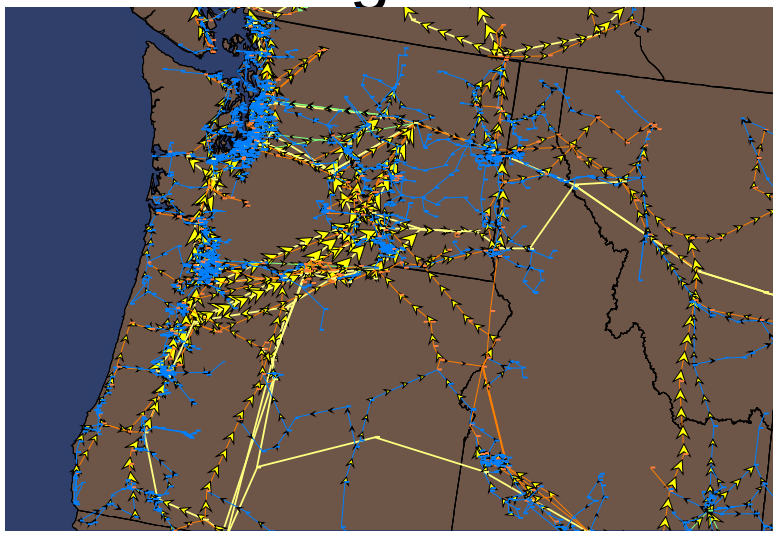
- Project involves collaboration between University of Illinois at Urbana-Champaign (UIUC) and Computational Physics Inc. (CPI) researchers
- The UIUC team is
  - Prof. Tom Overbye: Project lead, model development
  - Prof. Hao Zhu: New validation algorithms
  - Research Engineer Komal Shetye, system studies
  - Graduate Student Adam Birchfield
- The CPI participant is Jennifer Gannon, who will do ground model development and validation
- BPA Project Manager is Alexander L. Stewart

Financial Information FY16

Total FY16 Budget	BPA FY16 Budget	Cost Share FY16 Budget	BPA Actual as of (date)	Cost Share Actual as of (date)	BPA FTE Budget	BPA FTE Actual as of (date)
$256,816	$132,165	$124,651	$3,633	$13,805	0.8	0.2

Project Synopsis

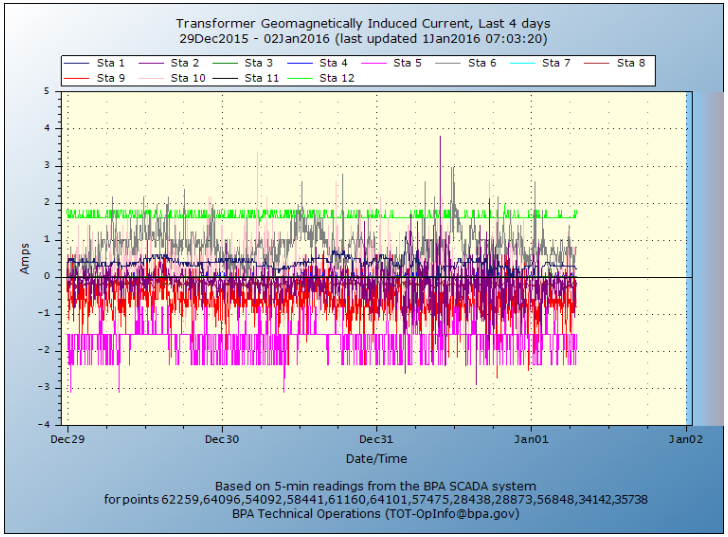
- The overall goal is to enhance the BPA geomagnetic disturbance (GMD) assessment by developing a methodology for validating the models used for GMD analysis

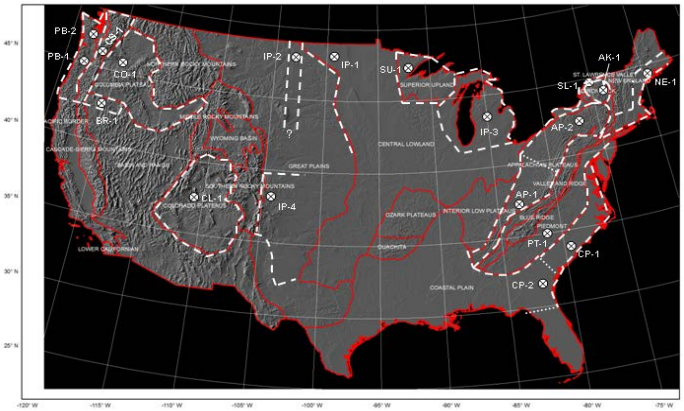


- Task 1 of the project setups the system models. From the previous PowerWorld study we already have most of the needed electrical parameters. These have been reviewed; we will be doing sensitivity analysis on the parameters.

Project Synopsis

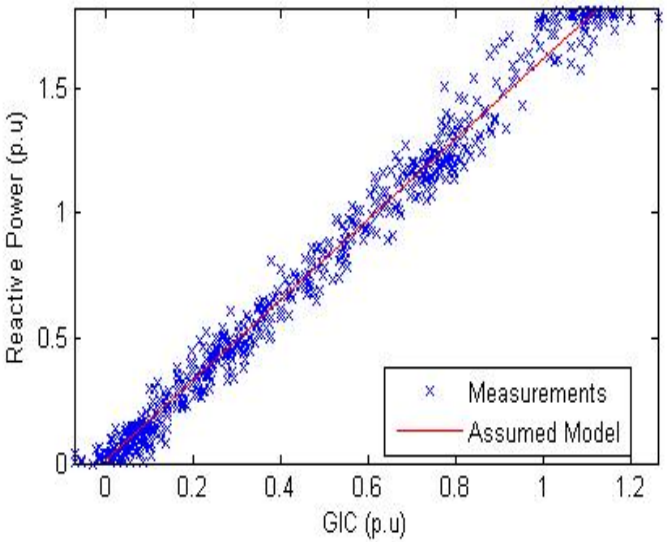
- Task 2 involves validating the model using actual data from BPA transformer neutrals during GMD events
  - There is public BPA data from twelve stations at five minute intervals
  - Validation involves coupling this data with a BPA EMS model and information on the estimated geoelectric field; the geoelectric field depends on the ground conductivity going down 100's of miles





Project Synopsis

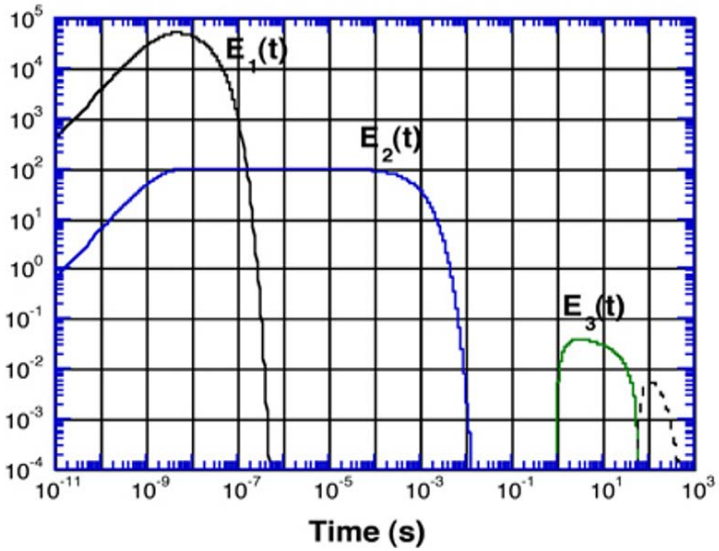
- Task 3 is validation of the GIC induced transformer reactive power behavior
  - Reactive power losses are usually assumed to vary with the effective GICs in the transformer (a is different from the neutral flow)



  - Using SCADA data, coupled with the task 2 results, we will develop a methodology and tools for doing this validation, allowing for non-linear models

Project Synopsis

- Task 4 is to develop models and perform high altitude electromagnetic pulse (EMP) analysis of E3 waveforms impact on the BPA system
  - As shown in the figure (IEC 61000-2-9) EMPs cause three different time varying electric fields: E1, E2, E3; of these E3 is quite similar to GMDs, except larger but shorter in time



  - Leveraging the models developed in the previous tasks, we will setup example EMP waveforms and do the analysis on the BPA system

Expected Benefits

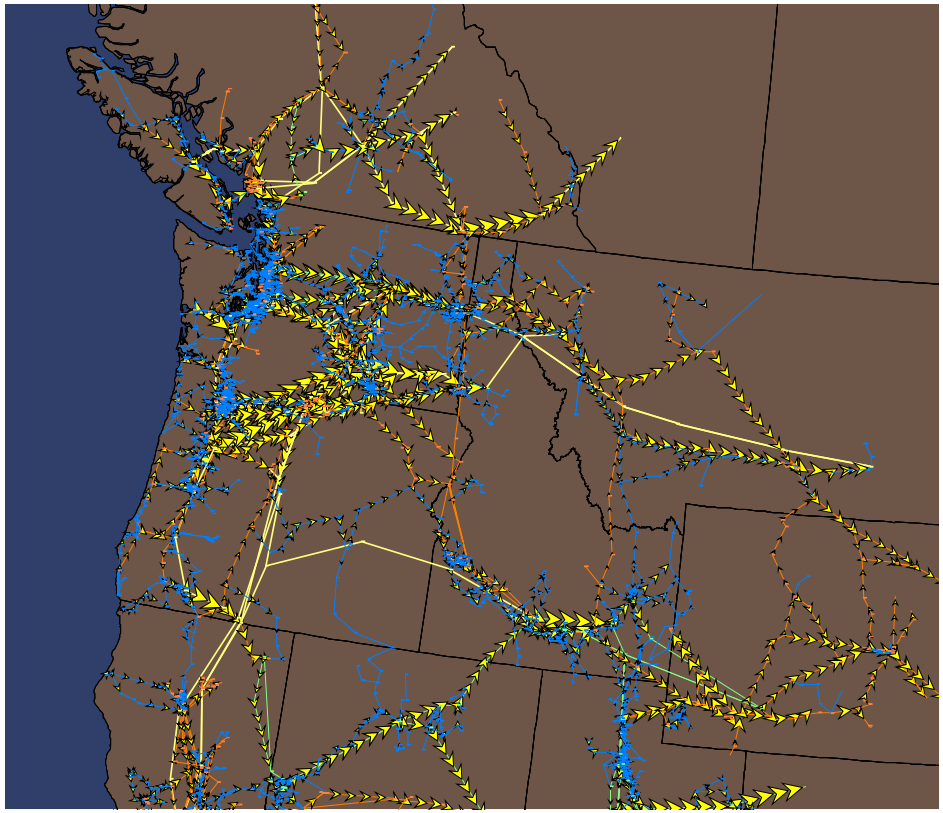
- The key benefit to BPA is to allow a better determination of GMD and EMP risk, allowing for consideration of cost effective risk reduction
- The risk can only be adequately assessed by having accurate models including the underlying ground conductivity
- Expected benefit is at least as medium, perhaps high since it will provide between models and tools for decision making associated with GMD and EMP risk

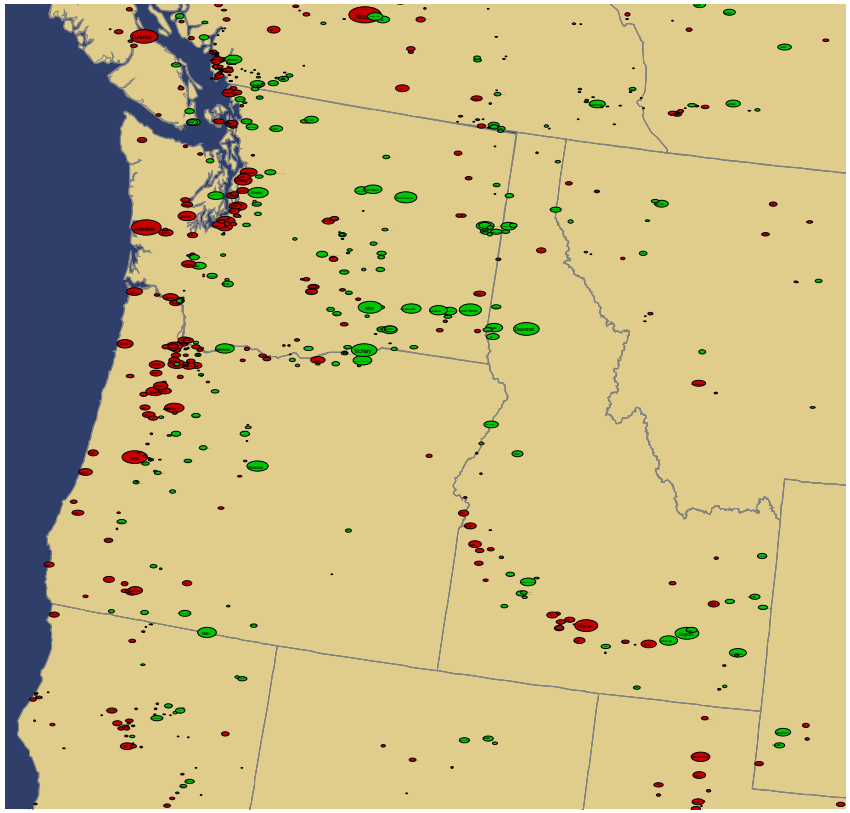
Accomplishments

- UIUC project contract was signed in November 2015, with subcontract set with CPI in January
  - Included FISMA to allow access to EMS models
- We met the requirements of Stage Gate 1. That is, we have received the 2013 GIC models and have verified that the models are sufficiently detailed for this project
  - Detailed GIC models for BPA footprint, approximate models for the rest of WECC
- The project is on schedule

Accomplishments: Stage Gate 1 Results

Images show GICs in BPA footprint and surrounding areas assuming a uniform 2 V/km eastward field. Left image shows the line flows and the right image the substation neutral flows.





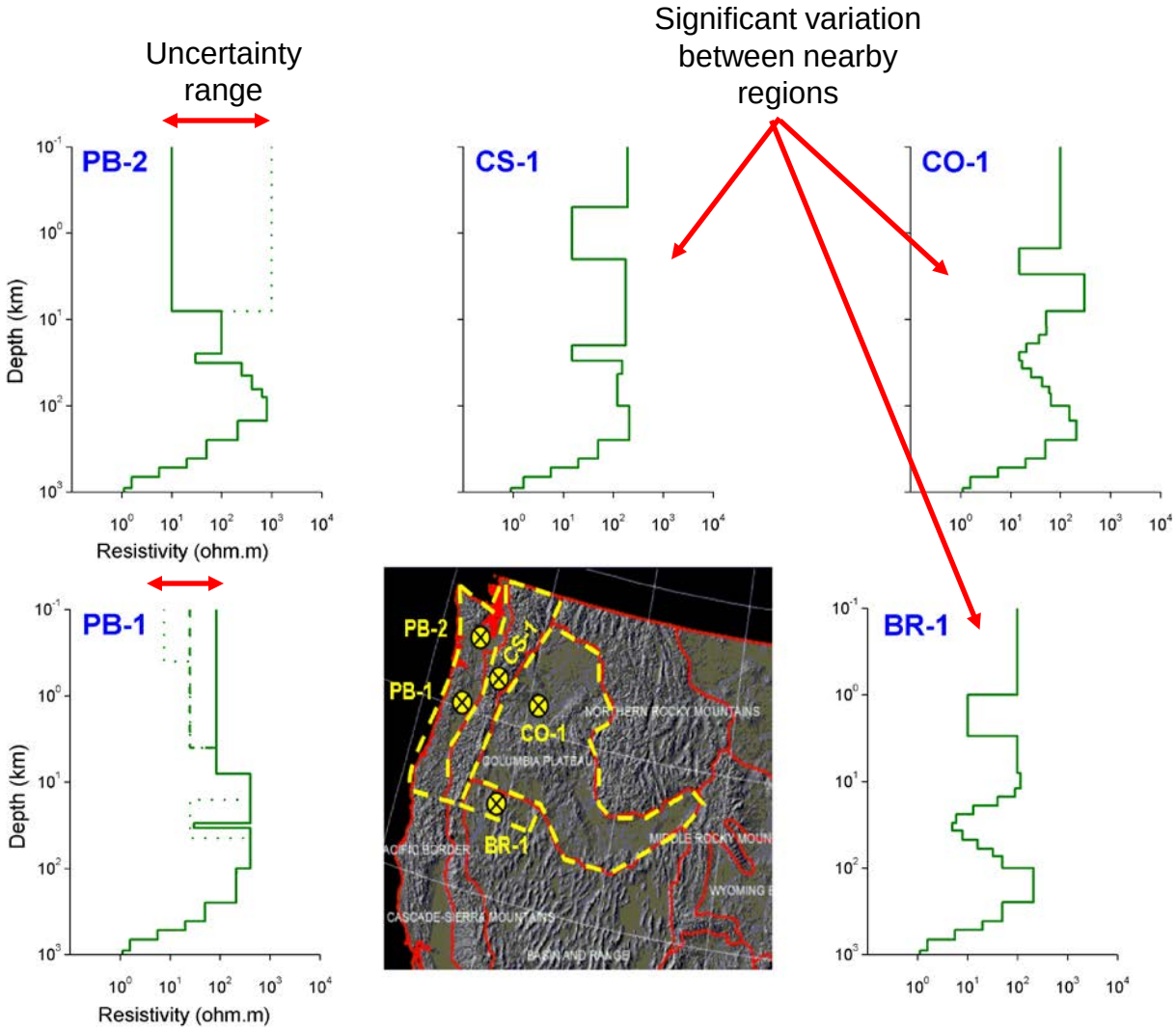
Project Direction/Next Steps

- Task 1 work will involve mapping the existing GIC models to the EMS models and to the actual GIC transformer neutral measurements
  - We will also be doing parameter sensitivity studies
- Task 2 work will involve setting up the ground conductivity model, the benchmark electric field model, and development of the validation tools
- Next stage gate (4/15/16) is an improved conductivity model for the BPA footprint
- Tasks 3 and 4 will start in November 2016
- We are planning on giving a talk on GMDs to the Portland IEEE PES Section in Spring

Technology Transfer/Application to BPA

- Technology readiness levels range from TRL 2 to TRL 6
- Tools, including documented methodologies, will be provided to BPA, for updating GIC models based on transformer neutral measurements
- We will work with software vendors such as PowerWorld Simulator to implement improved ground conductivity models in GIC analysis
- A tool for data driven transformer GIC validation will be provided
- Final project report, publications

Project Direction/Next Steps – Task 2



From Fernberg et al., EPRI, 2012

The 5 existing 1-D (EPRI/USGS) conductivity models that cover the BPA footprint are shown here.

There is a high level of uncertainty in these particular models, as well as considerable lateral variation.

Studies of induced electric field in the region have shown that these simplified models may not adequately reflect local variation.

Project Direction/Next Steps – Task 2

Because of localized conductivity variations throughout the BPA footprint, improvements need to be made to accurately calculate the induced electric field that drives GICs.

There are existing data sources that provide more highly refined local information, including:

1. **Published scientific results**: Numerous published results contributed to the USGS/NERC 1-D conductivity models. These are reflected in the uncertainty ranges given for each model. We will use these data to further refine local and lateral variation.
2. **Earthscope Data**: The NSF Earthscope project has completed 3D conductivity measurements in the BPA region. These data are publicly available and will be incorporated into the improved conductivity model, where possible.
3. **Coastal effects**: Coastal proximity (<100 miles) has been shown to increase induced electric field and GIC hazard. The 1-D models do not include this effect. An estimate will be added to the improved conductivity maps.

Project Direction/Next Steps – Task 2

We will first evaluate the gaps in existing conductivity models and assess the areas where conductivity model improvements are needed by:

1. Comparing USGS/EPRI 1-D models to published 3-D results from Earthscope.
2. Comparing modeled GICs to measured currents.

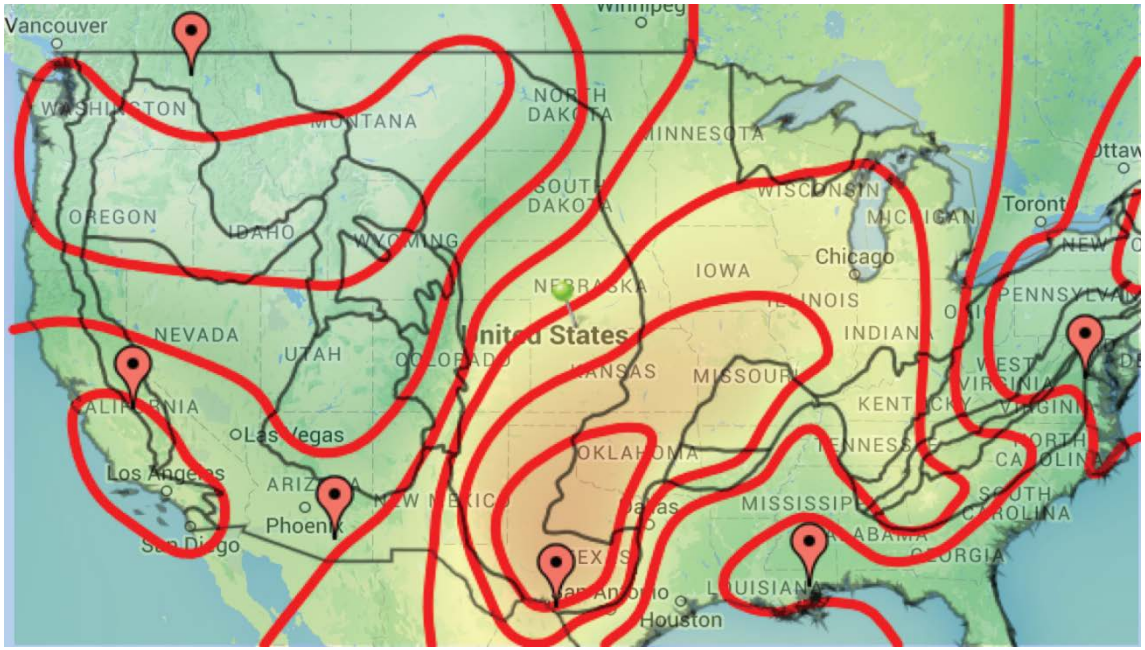
Using results from these comparisons, we will then iteratively improve conductivity maps in the BPA footprint by:

1. Identifying/adding subregions within existing maps.
2. Adding lateral variations and local conductivity features, where needed.
3. Estimating a coastal effect within 100 miles of the coast line.

These will produce a set of improved conductivity maps, allowing us to analyze local variations and improve the electric field estimates for a GMD event across the BPA footprint.

Technology Transfer/Application to BPA

Improved conductivity maps will allow us to produce a realistic spatially-varying electric field map (US example below) and a more accurate reference event electric field for the BPA footprint.



The reference event can be used with available software, such as PowerWorld Simulator, to understand and analyze the impact of “hotspots” in GIC evolution over a GMD event, and identify the most vulnerable assets within a broader system.

Q&A