

CASE: UE 199
WITNESS: Lisa Schwartz

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 200

DIRECT TESTIMONY

June 23, 2008

1 **Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS**
2 **ADDRESS.**

3 A. My name is Lisa Schwartz. I am a lead worker/senior analyst employed by the
4 Public Utility Commission of Oregon. My business address is 550 Capitol
5 Street NE Suite 215, Salem, Oregon 97301-2551.

6 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK**
7 **EXPERIENCE.**

8 A. My Witness Qualification Statement is found in Staff Exhibit 201.

9 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

10 A. The purpose of my testimony is to propose an adjustment to the capacity factor
11 of the Rolling Hills wind project, laying the foundation for staff witness Brown's
12 power cost adjustment for the plant.

13 **Q. DID YOU PREPARE EXHIBITS?**

14 A. Yes. I prepared Staff Exhibits 202 and 203. Exhibit 202 is selected pages from
15 PacifiCorp's renewable resources update to the Commission at the June 10,
16 2008, regular public meeting. Exhibit 203 is PacifiCorp's responses to data
17 requests.

18 **Q. PLEASE EXPLAIN CAPACITY FACTOR.**

19 A. Capacity factor is a measure of the productivity of a generating plant.
20 Specifically, capacity factor is the ratio of the plant's actual energy production
21 over a period of time – say, a year – to the amount of power the plant would
22 have produced if it had run at full capacity. For a wind turbine, the amount of

1 power at full capacity is its nameplate capacity multiplied by the number of
2 hours in a year.

3 **Q. WHY IS CAPACITY FACTOR ESPECIALLY IMPORTANT FOR WIND**
4 **PLANTS?**

5 A. Capacity factor is the most direct measure of a wind project's productivity and,
6 therefore, its economic benefit. Capacity factor is highly sensitive to the
7 average wind speed at the site. Because the power available in the wind is
8 proportional to the cube of its speed, a small difference in wind speed among
9 sites results in a big difference in energy production over the course of a year.

10 **Q. WOULD YOU PLEASE PROVIDE AN EXAMPLE?**

11 A. The American Wind Energy Association provides the following example.¹ A
12 wind turbine at a site with an average wind speed of 12 miles per hour (mph)
13 could in theory generate nearly a third more electricity than the same turbine at
14 a site where the average wind speed is 11 mph. (The cube of 12 — 1,728 — is
15 about 30 percent larger than the cube of 11 — 1,331.) Due to differences in
16 turbine efficiencies at various average wind speeds, the actual difference in
17 capacity factor at the two sites would be less than the above calculation.
18 However, the capacity factor at the better wind site would be significantly
19 higher than the proportionate 9 percent increase in wind speed.

20 **Q. WHAT ARE THE IMPLICATIONS FOR ELECTRICITY COSTS?**

¹ At http://www.awea.org/faq/wwt_basics.html.

1 A. A small difference in average wind speed among sites translates into a large
2 difference in the amount of electricity produced and, therefore, a large
3 difference in the cost of the electricity generated.

4 **Q. WHAT CAPACITY FACTOR DOES PACIFICORP ESTIMATE FOR THE**
5 **ROLLING HILLS WIND PLANT?**

6 A. PacifiCorp expects a capacity factor of about 31 percent. See Staff Exhibit 202
7 at 3.

8 **Q. HOW IS CAPACITY FACTOR DETERMINED FOR A WIND PLANT THAT**
9 **IS NOT YET IN SERVICE?**

10 A. Wind project developers — PacifiCorp in this case — estimate the capacity
11 factor based on historical wind speed data collected at the site.

12 **Q. WHAT ADJUSTMENT DO YOU RECOMMEND THE COMMISSION MAKE**
13 **TO THE CAPACITY FACTOR OF THE ROLLING HILLS PLANT?**

14 A. I recommend the Commission adjust the capacity factor of the plant to 38
15 percent.

16 **Q. WHY DO YOU PROPOSE THIS ADJUSTMENT?**

17 A. If PacifiCorp had issued a Request for Proposals (RFP) for renewable
18 resources to test this self-build resource against market bids, as it was required
19 to do under Order No. 06-446, the company likely would have acquired a
20 resource with this capacity factor — or better.

21 **Q. PLEASE EXPLAIN THE COMPETITIVE BIDDING ISSUE.**

22 A. PacifiCorp acquired four of the new wind projects included in its 2009
23 Transition Adjustment Mechanism (TAM) and Renewable Adjustment Clause

1 filings without an RFP.² See Staff/203 at 1. Of these four projects, two are 99-
2 megawatt (MW) facilities developed by PacifiCorp on Company-owned land —
3 Glenrock and Rolling Hills. These projects are at the same site and are under
4 development by PacifiCorp in the same year. See Staff/202 at 2-3 and
5 Staff/203 at 2-4. The capacity factor at the first of these project sites, Glenrock,
6 is 38 percent. See Staff/202 at 2. If the Company had issued an RFP for
7 renewable resources, including resources in Wyoming where these projects
8 are located, the Company likely would have acquired a resource with a
9 capacity factor at this level.

10 **Q. HOW DID YOU REACH THAT CONCLUSION?**

11 A. PacifiCorp assumed a conservative 35 percent capacity factor for Wyoming
12 wind resources in its 2007 Integrated Resource Plan (IRP).³ The average
13 capacity factor of wind plants in Wyoming serving PacifiCorp is 38 percent. See
14 Staff Exhibit 203 at 6-9. Among projects under development by PacifiCorp in
15 Wyoming, the Company expects a capacity factor of about 40 percent for the
16 99 MW Seven Mile Hill project. The project is on land leased by a third party,
17 Eurus Wind Power Development. PacifiCorp expects a 39 percent capacity
18 factor on its 19.5 MW addition to that project (Seven Mile Hill II), also expected
19 to be in service by year-end. See Staff Exhibit 202 at 1 and 4. PacifiCorp states
20 that the wind turbines that are being used at the Rolling Hills site were
21 originally slated for another site in a different state. See Staff Exhibit 203 at 5.

² PacifiCorp acquired the Mountain Wind contracts in the TAM filing under the federal Public Utility Regulatory Policies Act.

³ See Table 5.3, PacifiCorp's 2007 IRP at 95, available on the Company's Web site at <http://www.pacificorp.com/File/File74765.pdf> and in Docket LC 42.

1 At the June 10, 2008, Commission public meeting, the Company stated that
2 the capacity factor for the Rolling Hills project is much lower than the Glenrock
3 project at the same PacifiCorp-owned site because the turbines were placed in
4 a less desirable location on the site.⁴

5 **Q. DID PACIFICORP ANALYZE WHETHER A BETTER SITE WOULD HAVE**
6 **BEEN AVAILABLE FOR THESE TURBINES?**

7 A. Staff is not aware of any analysis PacifiCorp performed to determine whether
8 another Wyoming site would have provided a greater benefit to customers than
9 the Rolling Hills site, with its relatively low capacity factor for that state. The
10 Company did not acquire the project through an RFP, so there was no price
11 discovery through the Commission's established process for determining the
12 best deal for ratepayers, and no Commission-appointed Independent Evaluator
13 to advise the Commission on the fairness of the process. The site PacifiCorp
14 chose for its leftover turbines has a far lower capacity factor than other
15 Wyoming sites already developed, sites under development and sites likely to
16 be offered in a competitive acquisition process.

17 **Q. THE ROLLING HILLS PROJECT IS UNDER 100 MW. DID PACIFICORP**
18 **HAVE ANY OBLIGATION TO ISSUE AN RFP UNDER THE**
19 **COMMISSION'S COMPETITIVE BIDDING GUIDELINES?**

20 A. Yes. While PacifiCorp is attempting to distinguish the Rolling Hills and
21 Glenrock projects as separate resources, they are both on the same site, both
22 to be completed this year and both 99 MW. Further, the Company is building

⁴ Audio at <http://www.oregon.gov/PUC/meetings/pmemos/2008/061008/agenda.shtml>.

1 another 39 MW of capacity at the Glenrock site to be in-service by year-end.

2 See Staff Exhibit 202 at 5. The Commission's guidelines require that Major
3 Resources — those 100 MW or greater and for a term of five years or longer,
4 including utility-owned plants — be acquired through a Commission-approved
5 competitive bidding process unless the Commission grants a Company-
6 requested waiver. See Order No. 06-446 at 3.

7 **Q. DID THE COMPANY REQUEST SUCH A WAIVER?**

8 A. No.

9 **Q. HAS THE COMMISSION PREVIOUSLY DETERMINED WHETHER**
10 **PROPOSED MULTIPLE RENEWABLE RESOURCE PROJECTS SHOULD**
11 **IN FACT BE CONSIDERED A SINGLE PROJECT?**

12 A. Yes. In Order No. 06-538, corrected by Order No. 06-586, the Commission
13 adopted a stipulation that defines whether two or more Qualifying Facilities⁵
14 (QFs) under the Public Utility Regulatory Policies Act are distinct projects for
15 the purpose of receiving standard rates and a standard contract. The Rolling
16 Hills and Glenrock projects — and the addition to the Glenrock project — would
17 be considered a single project under the adopted stipulation. The stipulation
18 defines a project as distinct and eligible for the standard rates and contract "...if
19 the nameplate capacity of the QF, together with any other electric generating
20 facility using the same motive force, owned or controlled by the same person(s)
21 or affiliated person(s), and located at the same site, does not exceed 10 MW."

22 See Stipulation Exhibit A at 1. Projects are considered to be located at the

⁵ Qualifying Facilities include Small Power Production Facilities (renewable resources) and Cogeneration Facilities.

1 same site "... if they are located within a five-mile radius of any generating
2 facilities or equipment providing fuel or motive force associated with the QF for
3 which qualification for the standard rates and standard contract is sought." *Id.*
4 Applying this principle to the Commission's 100 MW threshold for Major
5 Resources in Order No. 06-446, PacifiCorp was required to issue an RFP or
6 request a waiver.

7 **Q. WHAT IS THE RESULTING REVENUE REQUIREMENT ADJUSTMENT**
8 **FOR YOUR RECOMMENDED MODIFICATION TO THE CAPACITY**
9 **FACTOR OF THE ROLLING HILLS PROJECT?**

10 A. Staff witness Brown provides the adjustment in Staff/100.

11 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

12 A. Yes.

CASE: UE 199
WITNESS: Lisa Schwartz

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 201

Witness Qualification Statement

June 23, 2008

WITNESS QUALIFICATION STATEMENT

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NAME: Lisa Schwartz

EMPLOYER: Oregon Public Utility Commission

TITLE: Lead Worker/Senior Analyst, Electric and Natural Gas Division

ADDRESS: 550 Capitol Street NE #215
Salem, OR 97301-2551

EDUCATION: Master of Science, Land Resources (1982)
University of Wisconsin - Madison, Wisconsin

Bachelor of Science, Environmental Studies (1980)
George Washington University - Washington, D.C.

EXPERIENCE: I have worked at the Oregon Public Utility Commission since May 2002. I am staff lead for electric utility resource planning, competitive bidding and renewable resources. I also provide analysis and recommendations on other electricity issues including advanced metering, demand response, distributed generation and climate change. I was a policy and communications analyst at the Oregon Department of Energy for more than six years and a research assistant and assistant administrator of the Oregon State University Extension Energy Program for about nine years.

CASE: UE 199
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**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 202

**Exhibits in Support
of Direct Testimony**

June 23, 2008

Seven Mile Hill



Self-development.

Land leases acquired from Eurus Wind Power Development, LLC (Eurus is a subsidiary of Tokyo Electric Power Company and Toyota Tsusho Corporation).

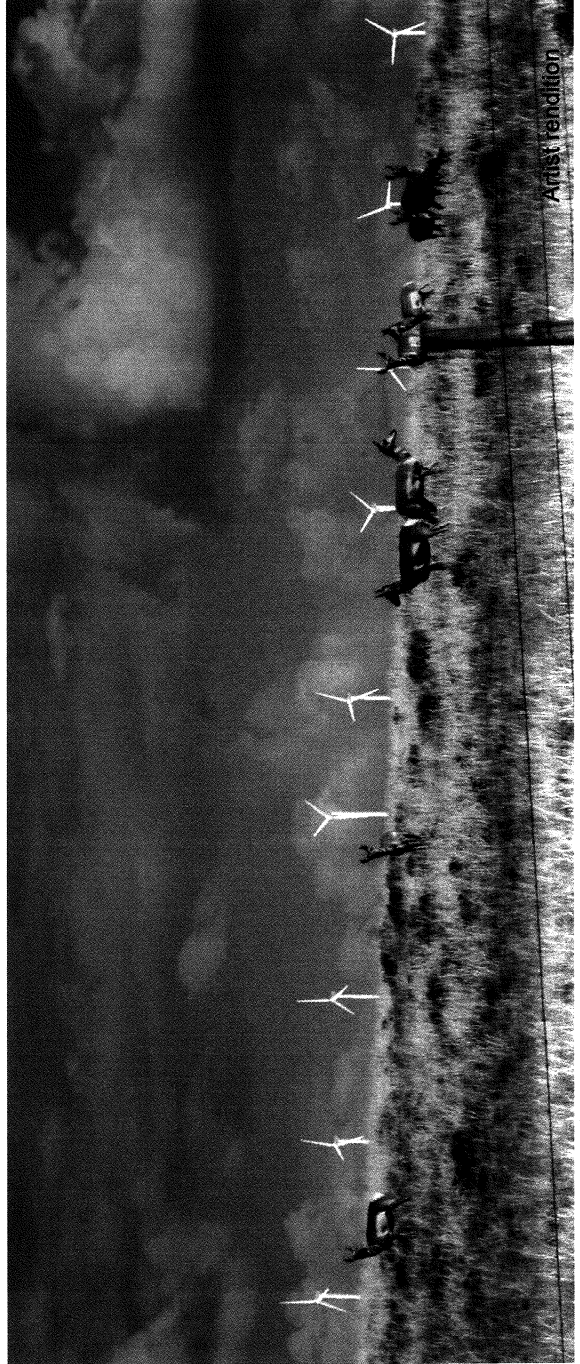
- 99 MW
- ~40% net capacity factor expected
- 66 General Electric 1.5 megawatt turbines
- 80 meter (263 feet) hub height
- 77 meter (253 feet) rotor diameter

Located near Medicine Bow, Wyoming
Under construction, expected to be in-service by December 2008

Glenrock

Self-develop project located on PacifiCorp owned land that includes reclaimed Glenrock Coal mine lands near Casper, Wyoming. Under Construction, expected in-service by December 2008

- 99 MW
- ~38% net capacity factor expected
- 66 General Electric 1.5 megawatt turbines
- 80 meter (263 feet) hub height 77 meter (253 feet) rotor diameter



Rolling Hills



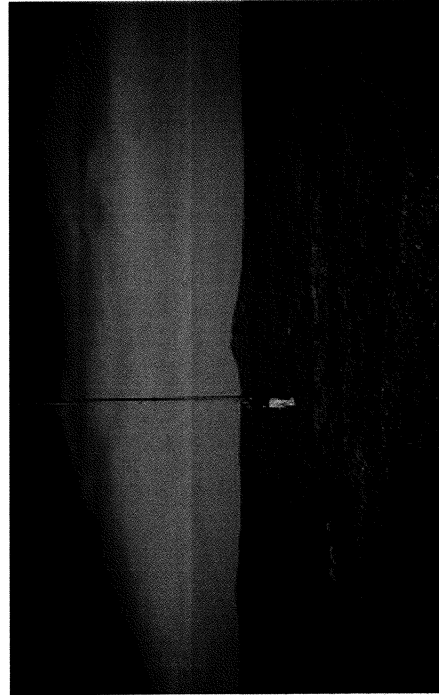
Self-develop project located on PacifiCorp owned land that includes reclaimed Glenrock Coal mine lands.

- 99 MW
- ~31% net capacity factor expected
- 66 General Electric 1.5 megawatt turbines
- 80 meter (263 feet) hub height
- 77 meter (253 feet) rotor diameter

Located near Casper, Wyoming

Under construction, expected to be in-service by December 2008

Seven Mile Hill II



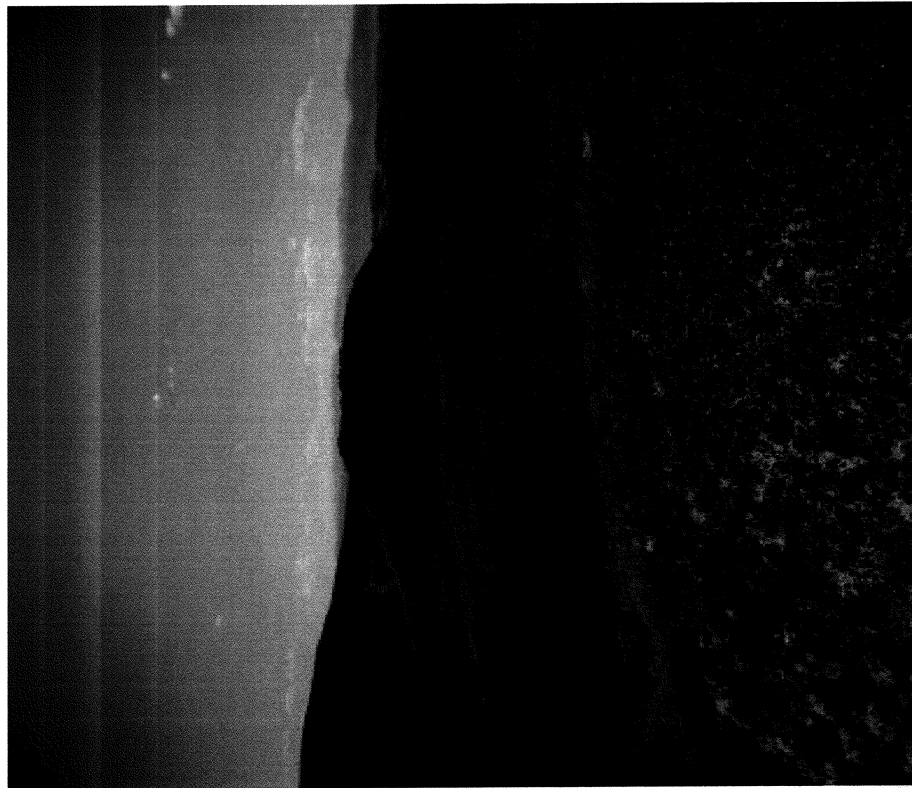
Self-develop.

Land leases acquired from Eurus Wind Power Development, LLC (Eurus is a subsidiary of Tokyo Electric Power Company and Toyota Tsusho Corporation).

- 19.5 MW
- 39% net capacity factor expected
- 13 General Electric 1.5 megawatt turbines
- 80 meter (263 feet) hub height
- 77 meter (253 feet) rotor diameter

Located near Medicine Bow, Wyoming
Under construction, expected to be in-service by December 2008

Glenrock III



Self-develop project located on PacifiCorp owned land that includes reclaimed Glenrock Coal mine lands.

- 39 MW
- ~31% net capacity factor expected
- 26 General Electric 1.5 megawatt turbines
- 80 meter (263 feet) hub height
- 77 meter (253 feet) rotor diameter

Located near Casper, Wyoming

Under construction, expected to be in-service by December 2008

CASE: UE 199
WITNESS: Lisa Schwartz

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 203

**Exhibits in Support
of Direct Testimony**

June 23, 2008

UE-199/PacifiCorp
June 19, 2008
OPUC Data Request 62

OPUC Data Request 62

Please provide PacifiCorp's responses to Staff Data Request No. 1 and ICNU Data Request Nos. 1.4 and 1.5 in Docket UE 200.

Response to OPUC Data Request 62

Please refer to Attachment OPUC 62.

UE-200/PacifiCorp
April 17, 2008
OPUC Data Request 1

OPUC Data Request 1

Please state which of the eight projects included in the RAC filing resulted from a PacifiCorp Request for Proposals (RFP) process. Also state how in each of the other cases the Company determined that the acquired project was the most cost-effective means of achieving its targeted renewable resource acquisitions.

Response to OPUC Data Request 1

Leaning Juniper 1, Marengo, and Marengo II resulted from RFP 2003-B (Docket UM 1118). More specifically, the development asset, turbines, and construction services for Leaning Juniper 1 resulted from RFP 2003-B. The development asset and construction services for Marengo resulted from RFP 2003-B. The Marengo bidder linked the purchase of the Marengo II development asset and a construction encumbrance to the Marengo transaction.

The decision to acquire Goodnoe Hills was informed by the then-current market for similarly situated assets.

The engineer, procure, construct services and collector substation transformer for Seven Mile Hill, Glenrock, and Rolling Hills resulted from a PacifiCorp RFP issued by the Company's procurement department. The engineer, procure, construct services and the major generation equipment supply for the Blundell Bottoming cycle project resulted from a PacifiCorp RFP issued by the Company's procurement department.

Each renewable resource included in the filing was pursued with the intent of meeting the 1400 MW acquisition target defined in the Company's preferred portfolio beginning with the 2003 Integrated Resource Plan (IRP) in Docket LC 31, as well as the 2004 IRP in Docket LC 39. In Order No. 07-018 at 6, the Oregon Commission indicated that it expected "the company to fully explore * * * renewable resources * * * at levels incremental to the amounts in the acknowledged 2004 IRP Action Plan." The Commission noted in this regard "that competitive bidding may not be the appropriate mechanism to acquire all resources that may be part of the best cost/risk portfolio." *Id.*

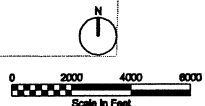
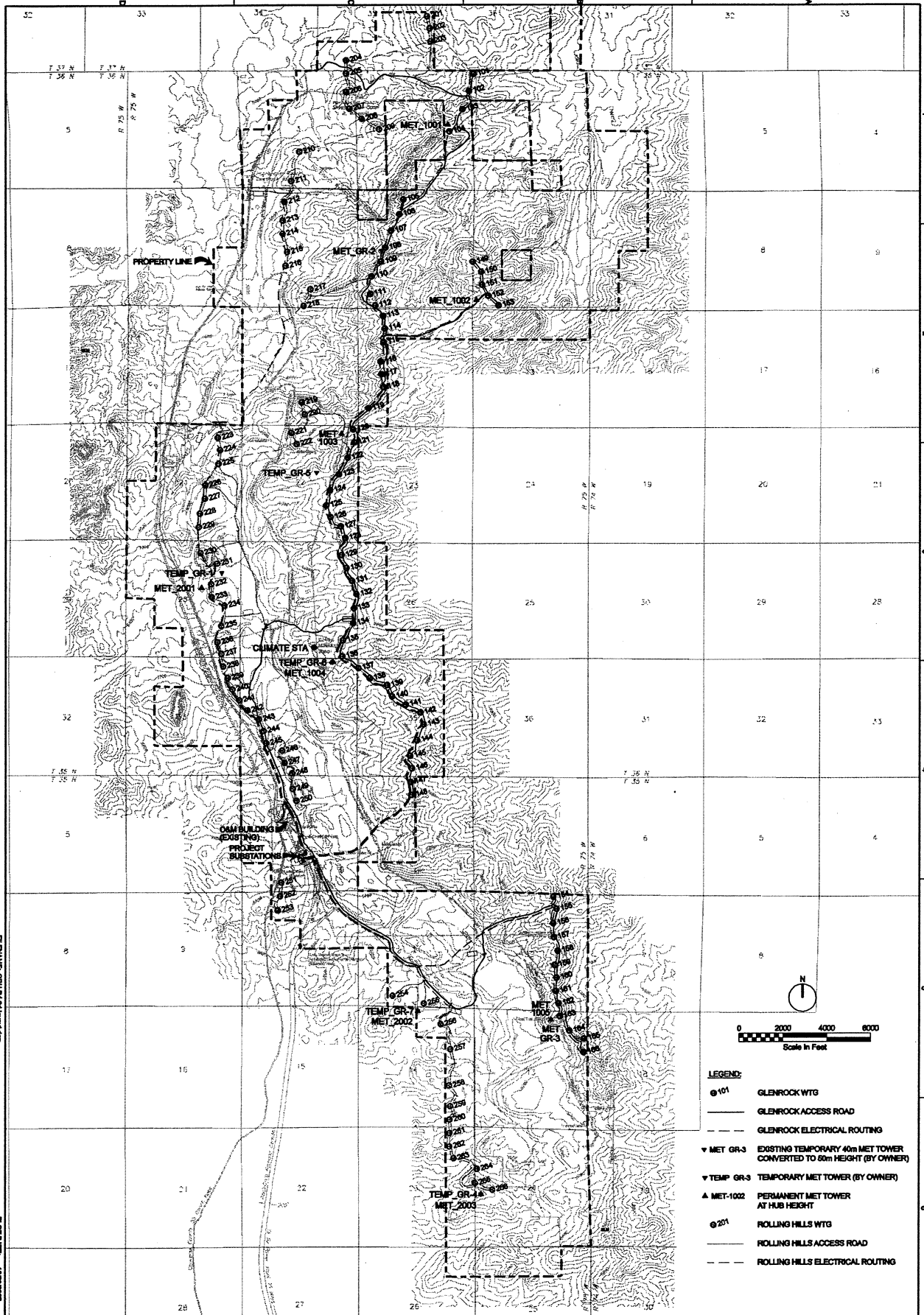
The Company followed the Commission's direction in working to meet its renewable resource targets, using both the competitive bidding process and other acquisition processes as appropriate. The Company considered factors such as market changes, the rise in major equipment and construction costs, and the reasonable expectation that a resource could be placed in-service before the then-current expiration of the Federal production tax credit. In each case, whether or not the competitive bidding process was used, the Company employed prudent analytical tools to determine the cost-effectiveness of the resource.

ICNU Data Request 1.4

Please provide a map showing the three wind resources referenced in the above question, similar to that provided in the response to WIEC 18.5 in the recent Wyoming general rate case.

Response to ICNU Data Request 1.4

A map similar to that provided in response to WIEC 18.5 in the recent Wyoming general rate case cannot be provided since the three projects (Seven Mile Hill, Glenrock, and Rolling Hills) do not reside on the same site. Please refer to Attachment ICNU 1.4 for a copy of the map provided in response to WIEC 18.5 showing Glenrock and Rolling Hills. Please refer to page 5 in Exhibit PPL/201 in the Company's filing for the location of Seven Mile Hill.



- LEGEND:**
- ⊙ 101 GLENROCK WTG
 - GLENROCK ACCESS ROAD
 - - - GLENROCK ELECTRICAL ROUTING
 - ▼ MET GR-3 EXISTING TEMPORARY 40m MET TOWER CONVERTED TO 50m HEIGHT (BY OWNER)
 - ▼ TEMP GR-3 TEMPORARY MET TOWER (BY OWNER)
 - ▲ MET-1002 PERMANENT MET TOWER AT HUB HEIGHT
 - ⊙ 201 ROLLING HILLS WTG
 - ROLLING HILLS ACCESS ROAD
 - - - ROLLING HILLS ELECTRICAL ROUTING

REVISION: 08/14/2007
 PLOT DATE: 12/29/2007

DATE	DESIGN	DATE	DESIGN
08/14/07	08/14/07	08/14/07	08/14/07
08/14/07	08/14/07	08/14/07	08/14/07
08/14/07	08/14/07	08/14/07	08/14/07

CH2MHILL

**GLENROCK / ROLLING HILLS
FACILITY LAYOUT, REV 4.3
REV 4.3**

PACIFICORP ENERGY
SALT LAKE CITY, UTAH
WIND PROJECTS
CONVERSE COUNTY, WYOMING

NO.	DATE	REVISION	BY	APVD
DSGN	DR	CHK		

PRELIMINARY

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UE-200/PacifiCorp
April 22, 2008
ICNU 1st Set Data Request 1.5

ICNU Data Request 1.5

Is there any reason why the Rolling Hills and Glenrock wind resources couldn't have been built as a single wind resource of 198 mW? If so, explain.

Response to ICNU Data Request 1.5

The decision to add the Rolling Hills resource to the portfolio had not been made at the time the decision was made to add the Glenrock resource to the portfolio. In addition, the wind turbines being utilized for the Rolling Hills project were procured for use at another wind project site located in another state. The decision to add the Rolling Hills resource to the portfolio was made after the Company determined that the anticipated capacity factor for the other project was undesirable. Subsequently, the Company made the decision to add the Rolling Hills resource to the portfolio based on information known to it at that time.

UE-199/PacifiCorp
June 19, 2008
OPUC Data Request 61

OPUC Data Request 61

Please provide PacifiCorp's response to Staff Data Request No. 36 in Docket UM 1368.

Response to OPUC Data Request 61

Please refer to Attachment OPUC 61.

UM-1368/PacifiCorp
June 17, 2008
OPUC Data Request 36

OPUC Data Request 36

Please provide a spreadsheet in the original format with formula intact showing the following:

- a. Project-specific and total existing capacity (in MW) of renewable resources owned or contracted to PacifiCorp and eligible for renewable portfolio standards in one or more states served by PacifiCorp
- b. Project-specific and total estimated energy production (in MWh) in 2011, 2015, 2020 and 2025 for renewable resources owned or contracted to PacifiCorp and eligible for renewable portfolio standards in one or more states served by PacifiCorp
- c. Project-specific and total capacity (in MW) of committed renewable resources expected to be on-line by year-end 2008 that will be eligible for renewable portfolio standards in one or more states served by PacifiCorp
- d. Project-specific and total estimated energy production (in MWh) in 2011, 2015, 2020 and 2025 of committed renewable resources expected to be on-line by year-end 2008 that will be eligible for renewable portfolio standards in one or more states served by PacifiCorp
- e. Which state renewable portfolio standard the facility is eligible for
- f. Estimates of remaining renewable energy production requirements (in MWh) to meet the company's Oregon RPS requirements in 2011, 2015, 2020 and 2025
- g. Estimated renewable resource capacity (in MW) represented by item f, above, in 2011, 2015, 2020 and 2025
- h. Estimates of remaining renewable energy production requirements (in MWh) to meet the company's RPS requirements in 2011, 2015, 2020 and 2025 in each of the other states PacifiCorp serves
- i. Estimated renewable resource capacity (in MW) represented by item h, above, in 2011, 2015, 2020 and 2025

State all assumptions, including resource type (wind, geothermal, hydro, etc.), capacity factor and load forecasts.

Response to OPUC Data Request 36

The Company has not undertaken detailed analyses such as those contemplated in OPUC Data Request 36. Notwithstanding, the Company provides the following in response to this request:

- a. Please refer to Attachment OPUC 36a for renewable resources owned or contracted to PacifiCorp. Please note Qualifying Facilities (QFs)

UM-1368/PacifiCorp
June 17, 2008
OPUC Data Request 36

have been grouped by fuel type, as it is unknown if these facilities can be used toward the Company's RPS compliance.

- b. Please refer to Attachment OPUC 36b for average capacity factor for each renewable type.
- c. Please refer to Attachment OPUC 36c.
- d. Please refer to Attachment OPUC 36b for average capacity factor for each renewable type.
- e. Each state defines eligible renewable resources differently based on legislation passed in its respective state. The eligibility of a facility is not determined by the Company, such determinations are made exclusively by the state renewable portfolio standard program administrator. In California, it is the California Energy Commission; in Oregon, it is the Oregon Department of Energy; in Utah, it is the Utah Public Service Commission; and in Washington, it is the Washington Utilities and Transportation Commission.

In general, three factors are used to determine if a resource is eligible for a state's renewable portfolio standard, 1) age of facility, 2) fuel type, and 3) geographic location. The Company has provided, as appropriate, the location, commercial online date and the fuel type for the resources identified in OPUC 36a and OPUC 36c.

The definition of eligible renewable resources for each state is summarized in Attachment OPUC 36e. More specific detail is available from each state.

- f. The Company's current best estimate of future renewable energy requirements is provided as Attachment OPUC 36f.
- g. Please refer to the Company's response to subpart f. above.
- h. Please refer to subpart f. above.
- i. Please refer to subpart f. above.

Renewable Resource	Average Capacity Factor
Hydro	47% (1)
Wyoming Wind	38%
Utah Wind	29%
Oregon/Washington Wind	35%
East Side Geothermal	96%
Biomass	91%
Battery Storage	21%
Pumped Storage	20%
Compressed Air Energy Storage	25%
Hydrokinetic (Wave)	21%
Solar Concentrating (PV)	30%
Solar Concentrating (natural gas backup)	up to 60%
Solar Concentrating (thermal storage)	47%

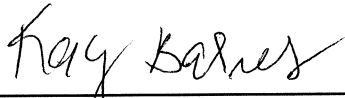
(1) sum of the actual average annual generation (from the 30 years 1978-2007) of the 35 small hydro plants listed in Attachment OPUCa divided by the sum of the capacities listed in Attachment OPUCa.

CERTIFICATE OF SERVICE

UE 199

I certify that I have this day served the foregoing document upon all parties of record in this proceeding by delivering a copy in person or by mailing a copy properly addressed with first class postage prepaid, or by electronic mail pursuant to OAR 860-13-0070, to the following parties or attorneys of parties.

Dated at Salem, Oregon, this 23rd day of June, 2008.



Kay Barnes
Public Utility Commission
Regulatory Operations
550 Capitol St NE Ste 215
Salem, Oregon 97301-2551
Telephone: (503) 378-5763

UE 199
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