

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

UM 1734

In the Matter of)
)
PACIFICORP, dba PACIFIC POWER's)
Application to Reduce the Qualifying Facility)
Contract Term and Lower the Qualifying)
Facility Standard Contract Eligibility Cap)
)
_____)

**RESPONSE TESTIMONY OF
JOHN R. LOWE
ON BEHALF OF THE
RENEWABLE ENERGY COALITION**

October 15, 2015

1 **I. INTRODUCTION**

2 **Q. Please state your name and business address.**

3 **A.** My name is John R. Lowe. I am the director of the Renewable Energy Coalition
4 (the “Coalition”). My business address is 12050 SW Tremont Street, Portland,
5 Oregon 97225.

6 **Q. Please describe your background and experience.**

7 **A.** In 1975, I graduated from Oregon State with a B.S. I was employed by
8 PacifiCorp for over thirty years, most of which was spent implementing the
9 Public Utility Regulatory Policies Act (“PURPA”) regulations throughout the
10 utility’s multi-state service territory. My responsibilities included all contractual
11 matters and supervision of others related to both power purchases and
12 interconnections. Since 2009, I have been directing and managing the activities
13 of the Coalition as well as providing consulting services to individual members
14 related to both power purchases and interconnections. Further details are included
15 on Exhibit Coalition/101.

16 **Q. On behalf of who are you appearing in this proceeding?**

17 **A.** I am testifying on behalf of the Coalition.

18 **Q. Please describe the Coalition and its members.**

19 **A.** The Coalition was established in 2009, and is comprised of over thirty members
20 who own and operate over fifty non-intermittent small renewable energy
21 generation qualifying facilities (“QFs”) in Oregon, Idaho, Montana, Washington,
22 Utah, and Wyoming. Several types of entities are members of the Coalition,
23 including irrigation districts, water districts, corporations, and individuals.
24 Except two, all are small hydroelectric projects.

1 **Q. What are the Coalition's interests in this proceeding?**

2 **A.** The Coalition has a number of key interests in this proceeding. First, our goal is
3 to ensure fair and reasonable contract terms and conditions for projects of all size
4 and type, and reasonable access avoided cost rates for small baseload projects
5 historically eligible for Schedule 37 prices. Second, the Coalition's members are
6 primarily existing QFs, and our goal is to ensure that any final order in this
7 proceeding recognizes and accounts for the unique circumstances and benefits of
8 existing projects and does not diminish the opportunity for these projects to
9 continue operating. Finally, the Coalition recognizes that PURPA must work to
10 benefit all interested parties, including the utilities, ratepayers, and new and
11 existing QFs of various sizes. The Coalition's goal is that PURPA policies
12 account for all these interests, and the changes (if any) adopted by Oregon Public
13 Utility (the "Commission") are narrowly tailored to resolve specific problems.
14 Any policy changes should not unduly harm any project type or size, and certainly
15 should not have detrimental impacts to those projects not contributing to the
16 alleged problems that led to PacifiCorp's filing. The Commission should
17 understand the practical impacts of PacifiCorp's proposal, which would include
18 permanently eliminating payment for capacity to any QFs, continuous repetition
19 of contract negotiation, and the uncertainty in price and sale of power leading to
20 severe limitations in project improvements. For hydroelectric projects this will
21 likely translate to the inability to make improvements to increase efficiency and
22 water conservation.

23

1 **Q. Please summarize PacifiCorp’s requests in this case.**

2 **A.** PacifiCorp has requested a reduction in the maximum term of its power purchase
3 agreements (“PPAs”) with all QFs from 20 to three years, and to lower the size
4 threshold for wind and solar QFs to 100 kilowatts (“kW”).

5 **Q. Please summarize your testimony.**

6 **A.** The alleged problems facing PacifiCorp are exaggerated. The problems (if any)
7 are not caused by small baseload Schedule 37 eligible QFs, especially existing
8 ones. The Coalition opposes PacifiCorp’s proposal in its entirety, and does not
9 believe that the company has demonstrated that contract terms or size thresholds
10 should be lowered for any QFs. If the Commission adopts any changes in
11 PURPA policies, then any changes should exempt small baseload projects, and
12 adopt more limited relief than requested by the company.

13 I also explain the unique reasons why that there should be no change in
14 policy for existing projects. Existing projects also are not causing any problems,
15 and in fact are providing significant benefits. Imposing a policy change like a
16 shortened contract term on existing QFs could significant and unnecessary harm
17 the utilities, ratepayers, and these projects. In addition, three-year contract terms
18 could place existing projects’ continued operation in jeopardy.

19 **Q. Is the Coalition sponsoring any other testimony?**

20 **A.** Yes. Jeremiah Camarata, the District Manager at Farmers Irrigation District, and
21 Edson Pugh, the General Manager at Deschutes Valley Water District, are
22 submitting testimony on the impact of reduced size thresholds and contract terms

1 on existing baseload hydro projects. As they explain, such reductions could
2 significantly harm and even shut down their facilities.

3 **Q. Please summarize your specific responses to PacifiCorp's filing?**

4 **A.** First, the Commission should not lower the contract terms for any QFs. However,
5 if the Commission lowers contract terms, then it should not apply to any baseload
6 QFs. For example, the Commission could adopt relief similar to what was done
7 recently by the Idaho Public Utilities Commission ("Idaho Commission") in
8 Docket GNR-E-15-01. The Idaho Commission rejected PacifiCorp's identical
9 proposal to reduce contract terms to three years for all QFs, and adopted a more
10 limited and nuanced change in its PURPA policies. Unlike the Idaho
11 Commission, however, the Oregon Commission should not lower the contract
12 term for any baseload QF, including those over the standard contract size
13 threshold.

14 Second, the Commission should include a capacity payment in the
15 contracts for QFs that renew their contracts, especially if the Commission lowers
16 the contract term to any period which may be shorter than a utility's then-current
17 projected resource sufficiency period.

18 Third, the Commission should not lower the size threshold for standard
19 contracts for any QFs. However, if the Commission intends to lower the size
20 threshold for standard contracts, then it should not apply to small baseload QFs.
21 This is consistent with PacifiCorp's proposal in the case. In addition,
22 Commission should consider a size threshold higher than 100 kW, since a
23 reduction from 10 megawatts ("MW") would be the maximum possible and no

1 justification has been provided for such a severe shift. Finally, the Commission
2 should consider other forms of relief. For example, the Commission could
3 establish an annual cap on the amount of new wind and solar projects, or adopt
4 more stringent security deposits on larger wind and solar projects.

5 **Q. Are there other Oregon policy goals impacted by PacifiCorp's filing?**

6 **A.** Yes. There are a number of regulatory requirements and proposals that support
7 maintaining existing and encouraging new QF development, including responding
8 to the Environmental Protection Agency's ("EPA") new carbon reduction
9 regulations and existing coal plant regulations, Oregon's goals to reduce
10 greenhouse gas emissions, and Oregon's goal that by 2025 at least eight percent
11 of Oregon's retail electrical load comes from small-scale renewable energy
12 projects with a generating capacity of 20 megawatts or less. It will be extremely
13 difficult, if not impossible, to meet the eight percent goal without PURPA policies
14 that allow existing QFs to continue to operate and new projects to be developed.

15 **II. PACIFICORP ALLEGED PROBLEMS**

16
17 **Q. Please describe the alleged problems facing PacifiCorp.**

18 **A.** PacifiCorp has supported its request to reduce the contract term with claims
19 regarding the harm caused by new large wind and solar QFs. For example,
20 PacifiCorp states that they have a large amount of new wind and solar projects
21 under contract, and a large number of additional wind and solar QFs seeking new
22 contracts. Application at 5. PacifiCorp alleges significant customer rate and
23 reliability concerns associated with this large amount of new large wind and solar
24 QFs. Application at 6-10.

1 **Q. Do you agree with PacifiCorp that they are facing significant problems**
2 **associated with new PURPA projects?**

3 **A.** I agree that PacifiCorp is facing a large number of new contract requests and
4 recently executed contracts. This is a legitimate issue that warrants consideration.
5 Managing this problem is a challenge, but does not warrant foreclosing
6 opportunities for small baseload projects that for years have been the heart-and
7 soul of local PURPA project development. The majority of the contracted and/or
8 proposed solar projects are located in Utah, so it is unclear why the Company is
9 proposing a policy change in Oregon that will not impact its alleged problem,
10 unless the real agenda remains undisclosed.

11 In my experience, not all of the QFs that request contracts, or that even
12 those that enter into contracts, ever come on line. I worked at PacifiCorp after
13 PURPA was passed and in the early years of the 1980s and there was a huge
14 number of new requests for hydroelectric projects. Only a small fraction ever
15 entered into contracts and an even lesser number were constructed. There are
16 the traditional forces related to project financing, ordinary risks of development,
17 resource or project location and interconnection costs, utility processes and
18 interests, and many other factors that ultimately reduce the number of proposed
19 projects that are eventually constructed.

20 Utilities like PacifiCorp traditionally and for many reasons over-estimate
21 the costs and harms associated with QFs, and always underestimate their benefits.
22 In any event, it is unlikely that small baseload QFs have created any significant
23 problems that warrant correction by the Commission.

24

1 **III. SIZE THRESHOLDS SHOULD NOT BE REDUCED**

2
3 **Q. Should the Commission address PacifiCorp's alleged problems by lowering**
4 **the standard contract size threshold?**

5
6 **A.** No. The Commission should reject PacifiCorp's proposal to lower the standard
7 contract size threshold. Alternatively, if the Commission is inclined to adopt any
8 relief, then it should: 1) only lower the size threshold for wind and solar, as
9 proposed by PacifiCorp; 2) lower the size threshold to something significantly
10 higher than 100 kilowatts; and/or 3) adopt a different remedy, including a
11 potential annual cap on new wind and solar projects or higher security deposits
12 for new larger projects.

13 **Q. Please describe the standard contract rate threshold.**

14 **A.** The standard contract rate eligibility threshold is the maximum size for a QF to be
15 eligible to sell power at a utility's published avoided cost rates and to apply the
16 standard form agreement, both approved by the Commission.

17 **Q. Is the standard contract and rate threshold important?**

18 **A.** Yes. It is far more difficult in time, money and expertise for QFs to negotiate and
19 complete contracts over the rate eligibility threshold than those below the
20 threshold. All states that I work in allow smaller QFs to obtain published rates
21 instead of negotiating rates or having their rates determined by a utility-controlled
22 computer model runs. This also typically includes the application of a standard
23 form contract minimizing the need to negotiate contract terms.

24 There are a number of important reasons for treating smaller projects
25 differently, some which include developer sophistication, transaction costs,
26 economies of scale, and the inability to economically access alternative markets.

1 It is important to recognize the unique difficulties facing smaller projects, and
2 allowing smaller projects to sell power at a published rate helps mitigate some of
3 these difficulties.

4 Negotiating contracts can be costly in terms of upfront transactional costs.
5 Small QFs do not typically have in house attorneys and experts with the skills to
6 assist in the evaluation and negotiation of contracts. Therefore, they often need to
7 hire outside experts. In addition, negotiating a QF contract with a utility can take
8 a great deal of time. This makes completion of such agreement quite challenging
9 and risky since many factors important to the negotiation can change during an
10 extended process. All of these transactional costs can impose significant
11 economic burdens and risks, and can make a smaller project uneconomic.

12 Small projects also do not have the options available to larger projects.
13 For example, large scale resources developed by utilities or large independent
14 power producers benefit from being sized so that the dollar-per-kilowatt
15 investment required to build the plant is less than for a much smaller sized QF of
16 the same basic technology. Similarly, it is my understanding that the typical
17 short-term power sale trades in the Pacific Northwest electricity market are
18 generally for blocks of 25 MW power, and small QFs cannot effectively
19 participate in this market.

20 **Q. If the Commission lowers the size threshold, is it appropriate to limit such a**
21 **reduction to wind and solar QFs?**

22 **A.** Generally I agree that it is not necessary or appropriate to treat all project types
23 and sizes in a similar fashion. Adjustments to policy on PURPA's
24 implementation are appropriate from time to time, and limiting the size threshold

1 for wind and solar, without the drastic change proposed, may be an appropriate
2 adjustment under current conditions. While I am not agreeing with PacifiCorp's
3 allegations of harm, none of its alleged problems are being caused by existing and
4 small QFs.

5 In addition, existing and operating QFs provide PacifiCorp with
6 significant benefits. For example, PacifiCorp relies upon their continued
7 operation to provide needed capacity benefits. Limiting the size threshold to
8 these operating projects applicable after contract expiration does not address the
9 problems identified by the utilities, and may harm the utility, its ratepayers, and
10 the projects. The Commission's final order in this proceeding should be careful
11 not to harm those QFs that are not contributing to the alleged problems faced by
12 the utilities.

13 **Q. Has PacifiCorp justified lowering the size threshold for wind and solar to 100**
14 **kWs?**

15 **A.** No. PacifiCorp has not explained why the size threshold should be 100 kW,
16 instead of 1 MW, 3 MWs, 5 MWs, or something else. For example, PacifiCorp
17 has not demonstrated that a 200 kilowatt facility is similar to a 10 MW facility,
18 and that very small facilities should not have the protection of standard contracts
19 and rates. In the end, the Commission should adopt the minimum amount of
20 relief to address the alleged problems by PacifiCorp in order to minimize the
21 harm to QFs.

22

1 **Q. Are you concerned about the impact of the Commission’s generic PURPA**
2 **investigation in UM 1610 on this proceeding?**

3 **A.** Yes. For example, PacifiCorp and Staff recommend that the company be allowed
4 to use its complex power cost model to set avoided cost rates for QFs above the
5 size threshold because larger QFs are sophisticated and have sufficient resources
6 to analyze the model. While the Coalition strongly opposes the use of
7 PacifiCorp’s computer model for setting avoided cost rates, it is difficult to
8 imagine that a 200 kilowatt QF, let alone a project of several MWs, will have the
9 sophistication and resources to analyze the avoided cost rates that are set using
10 PacifiCorp’s computer model.

11 **IV. CONTRACT TERMS SHOULD NOT BE REDUCED**

12
13 **Q. Should the Commission address PacifiCorp’s alleged problems by lowering**
14 **the standard contract term?**

15
16 **A.** No. The Commission should reject PacifiCorp’s proposal to lower the standard
17 contract term. Alternatively, if the Commission is inclined to adopt any relief,
18 then it should not apply to small or existing baseload QFs. In GNR-E-15-01,
19 which included similar proposals to lower the contract term, the Idaho
20 Commission rejected PacifiCorp’s proposal to reduce the contract term for all
21 QFs, and only reduced the contract term for QFs under the rate eligibility cap, as
22 proposed by Idaho Power Company (“Idaho Power”).

23 **Q. You previously mentioned existing QFs. Please explain what you mean by**
24 **existing QFs.**

25 **A.** Existing QFs are those projects that are already operating and are generally selling
26 power to the interconnected utility. Some of these projects have been operating
27 since the mid 1980s.

1 Existing projects face some unique challenges. Existing projects must
2 enter into a replacement contract when their current contract expires. First, this
3 means there is no flexibility to the time at which such a new contract would start.
4 This means that a new contract always starts during a contract term that includes
5 an initial period of utility resource sufficiency, and the new contract term may be
6 shorter than the then-current resource sufficiency period. In other words, if a
7 project is not allowed to replace its contract in advance of expiration, and the
8 resource sufficiency is at least three years long, then the new contract will not
9 include a period of resource deficiency based prices. Historically, resource
10 sufficiency is four or more years long, and today's resource sufficiency periods
11 are more than twice that number of years. This is further explained below.

12 Most existing projects have been operating for years, and may require
13 major replacement and/or upgrading of their equipment, conveyance structures,
14 and other facilities including interconnections. New interconnection agreements
15 are often required. There can be significant time and costs involved in addressing
16 these needs or requirements

17 **Q. What are existing projects financing and planning horizon needs related to a**
18 **new or replacement power purchase agreement?**

19
20 A. Existing projects have financing and planning needs very similar to those of
21 proposed projects. Since nearly all of the Coalition's 50-plus projects involve
22 existing projects, this is matter of significance concern and experience. Many
23 members' have already gone through a contract renewal. Often the expiration of
24 a power purchase agreement is the appropriate time to revise and update a project.

1 This could include additions and improvements as well as updating of equipment
2 to then-current standards. These changes are often significant in terms of
3 financial, process and timing considerations that must align with the contracting
4 process and contract terms, including contract length and prices of a power
5 purchase contract renewal. Short-term contract renewals will impact the
6 opportunity to make necessary and mutually desirable project improvements. In
7 the case of hydroelectric projects, this would mean that short contract terms
8 would result in the loss of efficiency and water conservation improvement
9 opportunities.

10 **Q. Are existing QFs treated differently than new QFs?**

11 **A.** Yes. For example, existing QFs are included in the utilities' resource plans. Most
12 baseload projects especially hydro are very long-term projects and have little
13 locational flexibility. These QFs have been and will continue to contribute to the
14 utilities' capacity needs, which justifies paying existing QFs a capacity payment.
15 This will recognize the capacity value they provide when they renew their
16 contracts regardless of the utilities' resource position. The Idaho Commission
17 requires capacity payments to existing QFs during the resource sufficiency period
18 because they provide capacity value to the utilities during all years and are
19 expected to continue to sell power to the utilities.

20 **Q. Are small and existing projects contributing to the utilities' alleged problems?**

21 **A.** No. Assuming that all of PacifiCorp's alleged problems are true, these problems
22 are not being caused by existing and small QFs. Nearly all the new QF contracts
23 are new wind and solar generation resources. The Commission's final order in

1 this proceeding should be careful not to harm those QFs that are not contributing
2 to the problems faced by PacifiCorp.

3 **Q. Would changing PURPA policy to include a three-year or another short**
4 **contract term harm these existing and small projects?**

5 **A.** Yes. Currently, small QFs can enter into a twenty-year contract term but typically
6 enter into terms which align with fixed prices, such as 15-years in Oregon.

7 New projects certainly need the longer term in order to meet debt requirements.

8 Even existing projects require long term agreements for system improvement

9 projects, planning and financing. This is especially true for QFs that are part large

10 water conveyance systems, such as irrigation districts. There are other reasons

11 why longer-term agreements are necessary, one of which is the avoidance of

12 market based or lower energy prices during periods of resource sufficiency. A

13 three-year (or other short) term limit on existing projects is problematic in terms

14 of continuous renewal of contracts and exposes the QFs much lower prices (total

15 value) than would result from a single long-term contract.

16 Renegotiating contracts can be time consuming and costly, especially for

17 small and existing QFs, and could be expected to be very burdensome if required

18 every three years. Small existing facilities rarely have the option of selling their

19 power to other entities, and typically only have the choice of continuing to sell

20 their power to their interconnected utility or shutting down. Also, since existing

21 QFs, especially small hydro projects that are Federal Energy Regulatory

22 Commission licensed or exempted are not going mobile, there is no need to place

23 a significant burden and the cost of constantly entering into new short-term

24 contracts. These projects were planned for and can be expected to continually

1 operate and deliver power to their interconnected utility, provided the price
2 warrants continued operation.

3 Slashing the contract term for small QFs is unnecessary, would also harm
4 the utilities and ratepayers, and is unproven as the proper response. Requiring the
5 utilities to renegotiate all small QF contracts every three years, for example,
6 would be costly for the utilities. These unnecessary costs would be passed on to
7 ratepayers.

8 **Q. Would the practical result of PacifiCorp's short contract terms result in QFs**
9 **never or almost never being paid for capacity?**

10 **A.** Yes. PacifiCorp's proposal for short contract terms means that there will always
11 be a period of resource sufficiency, which would likely result in QFs never being
12 paid for their capacity. If the resource sufficiency period is short and the contract
13 term is limited to a few years, then projects will no longer receive capacity
14 payments because the next capacity deficit will normally be more outside the
15 period of the contract term.

16 **Q. Can you provide an example?**

17 **A.** Yes. If there are short contract terms, QFs will not be paid for capacity if they
18 enter into a contract term that expires prior to the time when the next thermal
19 resource acquisition is planned.

20 For example, assume that PacifiCorp is planning its next thermal resource
21 acquisition in four years (2019). Under PacifiCorp's proposal, a QF that enters
22 into a new three-year contract in 2015 will not be paid for capacity during the
23 entire contract term. In 2019, PacifiCorp would have a new IRP, and the next
24 new thermal resource would be at least more than three years away; therefore,
25
26

1 avoided costs would not have any capacity payments during this “sufficiency”
2 period. And since a new thermal resource usually cannot be avoided in less than
3 three years, resource sufficiency could be expected to be at least four to five years,
4 as demonstrated by previous avoided cost filings.

5 If the QF renews its contract and enters into a new three-year contract in
6 2019, then the QF will again not be paid for capacity. The QF could continue
7 entering into renewing contracts for the rest of its useful life, but never be paid for
8 capacity. The QF will have caused PacifiCorp to reduce both its energy and
9 capacity needs (including the capacity related to the next planned thermal
10 resource), however, the QF will not be paid for capacity under the company’s
11 approach.

12 This example highlights the extreme unfairness of PacifiCorp’s proposed
13 three-year contract term. If contract terms are shortened to five or ten years, then
14 similar problems could continue to exist. As long as the contract term is shorter
15 than the resource sufficiency period and resource sufficiency period prices do not
16 include capacity payments, then the QFs will not be paid for capacity.

17 Even when the contract term is a few years longer than the sufficiency
18 period, QFs would not be fairly treated. For example, with a nine-year
19 “sufficiency” period, and ten-year contract term, then the QF would be paid only
20 one year of capacity in the last year of its contract. When the QF entered into its
21 new contract, it would suddenly stop being paid capacity in at least the first years
22 of its new contract. Assuming another nine-year sufficiency period and ten year
23 contract, then the QF would only be paid only one year of capacity in this second

1 contact, and only two years of capacity over a twenty year period. The unfairness
2 and unevenness of capacity payments can be resolved if avoided cost rates would
3 recognize, that once a project is on-line providing capacity, then it does so
4 continuously just like a utility's own resources. Short-term contracts make the
5 payment and recognition of capacity value very problematic.

6 **IV. EXISTING QFS SHOULD BE PAID CAPACITY**

7

8 **Q. If the Commission shortens the contract term, do you have any**
9 **recommendations?**

10 **A.** Yes. All existing projects seeking a replacement of a firm contract should
11 continue to receive capacity payments or value for capacity. The continuum of
12 payment for capacity should remain uninterrupted once a project comes on line
13 and delivers during a resource deficiency period.

14 **Q. Does PacifiCorp rely upon renewing QFs capacity?**

15 **A.** As part of the IRP process, PacifiCorp assumes that small QFs renew their
16 contracts, which provides capacity value to the company and its ratepayers. This
17 assumption is reasonable because nearly all of these QFs do not have other
18 alternatives to sell their power, and they reliably renew their contracts,
19 particularly hydroelectric projects. Existing QFs help defer new capacity
20 resources since the utilities plan on them selling power after the expiration of their
21 contracts. PacifiCorp agrees that existing QFs help defer its next capacity
22 resource because the "capacity contribution of all signed QF contracts executed
23 subsequent to the development of the IRP preferred portfolio reduce the
24 deferrable capacity of the next avoidable resource" Re Investigation into QF
25 Contracting and Pricing, Oregon PUC Docket No. UM 1610, PAC/100,

1 Dickman/15.

2 Existing QFs are essentially providing this capacity, effectively for free,
3 through their assumed contract renewals when avoided cost rates are based on
4 market prices. If PacifiCorp's proposal is adopted, then existing QFs will
5 provide this capacity for free during the entire life of their project.

6 Avoided cost rates should reflect that existing QFs provide capacity value
7 by helping to defer the utilities' need to buy or build new capacity resources.
8 Existing QFs have also not caused any projected short-term surplus and should
9 not be penalized in the form of reduced capacity value in a subsequent follow-on
10 contract.

11 The solution is that existing QFs entering into follow-on contract
12 extensions should be provided full avoided cost pricing based on the avoided
13 resource cost each and every year. To not provide full avoided resource cost
14 payments to QFs in follow-on contracts would be inequitable as compared to the
15 treatment afforded utility-owned resources.

16 **Q. Are you aware of how capacity payments are addressed in other jurisdictions?**

17 **A.** Yes. The Idaho Commission provides that renewing QFs are not subject to a
18 sufficiency period. The decision states:

19 By including a capacity payment only when the utility
20 becomes capacity deficient, the utilities are paying rates
21 that are a more accurate reflection of a true avoided cost for
22 the QF power. However, we find merit in the argument
23 made by the Canal Companies that contract extensions
24 and/or renewals present an exception to the capacity deficit
25 rule that we adopt today. It is logical that, if a QF project is
26 being paid for capacity at the end of the contract term and
27 the parties are seeking renewal/extension of the contract,
28 the renewal/extension would include immediate payment of

1 capacity. An existing QF's capacity would have already
2 been included in the utility's load resource balance and
3 could not be considered surplus power. Therefore, we find
4 it reasonable to allow QFs entering into contract extensions
5 or renewals to be paid capacity for the full term of the
6 extension or renewal.

7 Re the Commission's Review of PURPA QF Contract Provisions, IPUC Case No.
8 GNR-E-11-03, Order No. 32697 at 21-22 (emphasis added) (Dec. 18, 2012)
9 clarified in Order No. 32871 (Aug. 9, 2013).

10 The Idaho Commission specifically reaffirmed that policy in its most
11 recent order in Docket GNR-E-15-01 lowering the contract term. Re Idaho Power
12 Company's Petition to Modify Terms and Conditions of PURPA Purchase
13 Agreements, IPUC Case Nos. IPC-E-15-01, AVU-E-15-01, PAC-E-15-03, Order
14 No. 33357 at 25-26 (Aug. 20, 2015). The Idaho Commission explained that if it
15 lowered the contract term without paying QFs for capacity during the sufficiency
16 period, then QFs would never be paid for capacity due to the fact that the
17 sufficiency period exceeds the contract term. Existing QFs that renew their
18 contracts would continue to be paid capacity during the sufficiency period, and
19 new QFs that signed contract would be paid capacity in most of the years for
20 renewal contracts. The Idaho Commission explained that:

21 We recognize that a new two-year contract would be
22 unlikely to reach a capacity deficiency date. Therefore, we
23 find it reasonable for utilities to establish capacity
24 deficiency at the time the initial IRP-based contract is
25 signed. As long as the QF renews its contract and
26 continuously sells power to the utility, the QF is entitled to
27 capacity based on the capacity deficiency date established
28 at the time of its initial contract. For example, if the QF
29 comes on-line in 2017 and the utility is capacity deficient in
30 2020, the QF would be eligible for capacity payments in
31 the second year of its second contract and thereafter if in

1 continuous operation. This adjustment recognizes that in
2 ensuing contract periods, the QF is considered part of the
3 utility's resource stack and will be contributing to reducing
4 the utility's need for capacity. This mitigates the concern
5 that short-term contracts will not contribute to the
6 avoidance of utility capacity/generation.

7
8 Id.

9 This Commission should make the same determination regarding capacity
10 or fixed payments for renewing QF. Existing QFs entering into follow-on
11 contracts should be provided avoided costs prices with no sufficiency period.

12 **VI. CONCLUSION**

13 **Q. Does this conclude your testimony?**

14 **A.** Yes

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**EXHIBIT COALITION/101
QUALIFICATIONS OF JOHN LOWE**

October 15, 2015

Overview

Director, Renewable Energy Coalition

Relevant Work Experience

2007-Present: Renewable Energy Coalition

Represent the Coalition and individual members in five regional states; power purchase agreement and interconnection consulting.

1975-2006: PacifiCorp, left as Manager of Qualifying Facility contracts, Portland, OR
Lead roles in company implementation of Public Utility Regulatory Policies Act, including, but not limited to power purchase agreements and interconnection contracting, staff supervision and management, and high level coordination of company's distribution interconnections for qualifying facilities.

1975: Graduate Oregon State, BS

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**RESPONSE TESTIMONY OF
JEREMIAH CAMARATA AND EDSON PUGH
ON BEHALF OF
THE RENEWABLE ENERGY COALITION**

October 15, 2015

1 **Q. Please state your name and business address.**

2 **A.** My name is Jeremiah Camarata. I am the District Manager at Farmers Irrigation District
3 (“FID”), which is a member of the Renewable Energy Coalition (the “Coalition”). My
4 business address is Farmers Irrigation District, 1985 Country Club Road, Hood River,
5 OR 97031.

6 My name is Edson Pugh. I am the General Manager at Deschutes Valley Water
7 District (“DVWD”), which is a member of the Coalition. My business address is
8 Deschutes Valley Water District, 881 S.W. Culver Highway, Madras, OR 97741.

9 **Q. Mr. Camarata, please describe your background and experience.**

10 **A.** I have worked for private, non-profit, and public water resource-based entities since
11 2003. Before that, I grew up on farmland, earned degrees from prominent universities,
12 and travelled some of the world. For over the last twelve years, I have served farmers,
13 ranchers, and urban water users alike, and have worked diligently towards water and
14 power efficiencies that create jobs, benefit the environment, and serve the common good.
15 I have a Masters degree in Landscape Architecture, serve as the Chair of the Oregon
16 Water Resource Congress Hydropower Caucus, and am currently responsible for
17 delivering water to ~5,900 acres of high value agricultural land. My district’s mission is
18 to support this important economy by promoting ecologically, socially, and financially
19 sustainable agriculture by providing energy and irrigation service for the common good.
20 A further description of my educational background and work experience can be found in
21 Exhibit Coalition/201 in this proceeding.

1 **Q. Mr. Pugh, please describe your background and experience.**

2 **A.** I have worked for Deschutes Valley Water District for about 30 years as the district's
3 engineer, the last 11 years as the general manager and engineer. I have been a registered
4 professional engineer since 1990. Our district's mission is to provide safe and good
5 tasting drinking water at a reasonable cost to existing and future DVWD patrons while
6 continuing a high level of customer service.

7 A further description of my educational background and work experience can be
8 found in Exhibit Coalition/202 in this proceeding.

9 **Q. On whose behalf are you appearing in this proceeding?**

10 **A.** We are testifying on behalf of the Coalition in this Oregon Public Utility Commission
11 (the "Commission" or "OPUC") proceeding.

12 **Q. Have you previously testified before the Commission?**

13 **A.** Yes, we submitted similar testimony in Phase I of Docket No. UM 1610.

14 **Q. What topics will your testimony address?**

15 **A.** Our testimony will provide background information about FID and DVWD (jointly, the
16 "Districts"), our hydroelectric projects which sell power to PacifiCorp as qualifying
17 facilities ("QF"), as well as address PacifiCorp's proposal to lower the size threshold for
18 wind and solar contracts from 10 megawatts ("MW") to 100 kilowatts ("kW"), and
19 shorten the contract term for all QFs from twenty years to three years.

20 **FARMERS IRRIGATION DISTRICT PROJECT AND CONTRACT SPECIFICS**

21 **Q. MR. CAMARATA, PLEASE DESCRIBE FID.**

22 **A.** FID, a nonprofit government agency founded in 1874, is located in Hood River, Oregon,
23 in the beautiful, culturally rich Columbia River Gorge. Water is provided to ~5,900 acres

1 of land and 1,860 customers, both residential and agricultural. Hood River County is
2 known for its orchards and depends heavily on their production of pears, apples, and
3 cherries for economic vitality. The county produces more winter pears than any county
4 in the United States and the annual economic footprint of agriculture in Hood River
5 County was estimated at \$306 million in 2009. FID's mission is to support this economy
6 by promoting ecologically, socially, and financially sustainable agriculture by providing
7 energy and irrigation service for the common good.

8 FID has nine primary water diversions, all of which are run-of-the river (no dams
9 on free flowing rivers and creeks) and protected by state of the art head works and our
10 patented fish friendly Farmers Screens approved by National Oceanic and Atmospheric
11 Administration ("NOAA") fisheries. Having received state and federal agency approval
12 for The Farmers Screen, we patented the technology and now license it to the Farmers
13 Conservation Alliance with the condition that profits be used for the united benefit of
14 fish, farms, families, and the environment. The screen investments have dramatically
15 stabilized and increased our hydro production while saving farmers hundreds of
16 thousands of dollars per year. These technologies and concepts extend to many other
17 water districts in the state and beyond. We are proud of our century-long efforts in
18 innovative efficiencies and environmental protection and plan on continuing to be the
19 leaders in irrigation management by aggressively raising the bar in sustainable
20 agriculture, power production, fish screening standards, and water conservation measures
21 into the foreseeable future.

22 Since implementation of hydropower production capabilities in the mid-eighties,
23 our district has made over \$40 million in capital improvement projects that create and

1 maintain jobs, and support the community and environment. None of this would be
2 possible without dependable, fair, long-term power-sales agreements. Continuation of
3 power-sales agreements that are dependable, fair, and long-term in nature are absolutely
4 critical to our operational budgets, commitments to agriculture, long-term debt service
5 owed to private, state and federal entities, necessary investments in critical water
6 conveyance infrastructure, and the entire fabric of community and commerce that have
7 come to depend on us as a public entity.

8 **Q. Mr. Camarata, please describe your QF project.**

9 **A.** FID owns, operates, and maintains a hydroelectric facility for the generation of electric
10 power, including interconnection facilities, located in Hood River Oregon (within the
11 region covered by the Western Electricity Coordinating Council) with a Facility Capacity
12 Rating of 4.8 MW. FID sells its net output directly to PacifiCorp and the associated,
13 unbundled renewable energy credits (“RECs”) to various other public and private entities
14 under renewable portfolio standard (“RPS”) mandates or to those generally concerned
15 about their carbon footprint and or climate change. Generating renewable electricity
16 from local water systems has been a critical component of FID daily operations since the
17 mid-eighties. FID has two turbine and generator sets. FID power plants are modern and
18 utilize sophisticated equipment and technology. In fact, in 2015 FID made ~\$4.96 million
19 in hydropower upgrades. FID generators produce an approximate average of 26,000
20 MWh per year. With our many capital improvement projects, infrastructure
21 rehabilitation efforts, innovation, and water conservation measures implemented over
22 time, our production is stable year-round.

23 **Q. Mr. Camarata, please describe your current QF contract with PacifiCorp.**

1 **A.** FID’s current contract term became effective on January 1, 2011, and shall terminate on
2 December 31, 2025. Contract prices are paid for on-peak and off-peak production. This
3 contract replaces the original contract of 25 years which expired on December 31, 2010.
4 The original contract contained both energy and specific capacity payments. The current
5 contract applies limited levelization of prices to help FID in minimizing severe cash
6 flows mainly caused by resource sufficiency year avoided cost pricing under Schedule 37
7 and the non-payment for capacity during such sufficiency years. Had FID continued to
8 receive capacity payments for the sufficiency years 2011 through 2013, the levelization
9 of prices under our 2010 power purchase agreement would have been unnecessary.

10 FID also has a separate interconnection agreement that was just recently executed
11 in 2015.

12 **Q. Mr. Camarata, did FID recently make significant upgrades at its facility?**

13 **A.** Yes. As stated above, FID made ~\$4.96 million in hydropower upgrades in 2015.

14 **DESCHUTES VALLEY WATER DISTRICT PROJECT AND CONTRACT SPECIFICS**

15 **Q. Mr. Pugh, please describe DVWD.**

16 **A.** DVWD is a government agency and special district as defined by ORS § 264. DVWD is
17 a public water supplier to approximately 5,000 service connections to residential,
18 commercial, and industrial customers in the communities of Culver, Metolius, Madras,
19 and their surrounding areas in Jefferson County, Oregon.

20 DVWD’s hydro-electric plant is integral to the District’s mission in keeping water
21 rates reasonable and funding capital improvement projects for the water system
22 infrastructure. DVWD’s service area is over 23 miles long and is served by over 400
23 miles of pipelines.

1 **Q. Mr. Pugh, please describe your QF project.**

2 **A.** DVWD owns, operates, and maintains the Opal Springs hydroelectric facility for the
3 generation of electric power, including interconnection facilities, located in Jefferson
4 County, Oregon (within the region covered by the Western Electricity Coordinating
5 Council) with a Facility Capacity Rating of 4,300 kW. DVWD sells its net output
6 directly to PacifiCorp and the associated, unbundled RECs to various other public and
7 private entities under RPS mandate who are voluntarily concerned about carbon footprint
8 and climate change. Opal Springs Hydro is a “run of the river” low head hydro-electric
9 facility with a single generator driven by a Kaplan turbine. Power production is
10 consistent on a monthly basis with extra production during spring run-off. The plant
11 usually produces over 360 days per year.

12 **Q. Mr. Pugh, please describe your current QF contract with PacifiCorp.**

13 DVWD’s current thirty-five-year term contract was executed in 1982 with power
14 deliveries to begin January 1, 1985 and it shall terminate December 31, 2020. This
15 original contract contains both energy and specific capacity payments based upon
16 demonstrated capacity, and further is the original type of non-bifurcated power purchase
17 and interconnection agreement. We will likely need to negotiate a new interconnection
18 agreement before our current contract expires.

19 **THE 10 MW SIZE THRESHOLD SHOULD NOT BE REDUCED**

20 **Q. Do you support keeping the Commission’s current 10 MW size threshold for all**
21 **QFs?**

22 **A.** Yes.

23 **Q. Why are you testifying about the size threshold for wind and solar when your**
24 **projects are hydro-electric?**

1 A. We are concerned that PacifiCorp may request to lower the size threshold for other
2 resoruces like hydro-electric in the future. We are providing information that may be
3 helpful in understanding why the size threshold is important for all QFs. In addition, we
4 are concerned that the Commission may lower the size threshold for all QFs, even though
5 PacifiCorp has only requested a lower size threshold for wind and solar QFs. In no
6 circumstance should the Commission lower the size threshold for baseload QFs like
7 hydro-electric projects.

8 **Q. What is the importance of being under the size threshold?**

9 A. The primary reason is to avoid being subject to extremely costly negotiation of
10 replacement power purchase agreements (that are not based upon known published
11 prices), including highly variable prices and short contract terms. The Districts do not
12 have the expertise nor resources to negotiate such prices and terms without significant
13 third-party assistance and expense. Further, it has been experienced, and is expected that
14 such agreements can not be reasonably met without significant time delays, cost,
15 controversy, and risks associated with fluctuating prices and terms.

16 **Q. Arguments have been made that many QFs are large, sophisticated energy**
17 **developers. Does this apply to your facilities?**

18 A. Absolutely not. Although the Districts may be relatively large in terms of acreage and
19 end-users of water and other delivered resources, our primary business is not the
20 development of energy producing projects. Our primary focus is the continued operation
21 of the critical water systems needed to serve our communities. Maintaining the safe and
22 reliable nature of our current hydroelectric projects is extremely important, but we are in
23 the water delivery service sector.

1 **Q. How important is it to avoided delays and have an expeditious contract completion**
2 **process?**

3 **A.** Extremely important, for several reasons.

4 Under the current Schedule 37 process, in PacifiCorp's case, little negotiation
5 should be necessary to complete the power purchase agreement since it is essentially a
6 "fill-in-the-blanks" form agreement. Then current published prices are added to the
7 agreement as an exhibit. Provided that avoided cost prices are not in the process of
8 changing and there are not other obstacles, the agreement should be able to be executed
9 within a couple of months. We have been informed that the negotiation process even for
10 standard contracts can take much longer. In any event, the successful completion of the
11 agreement is more assured in the standard contract process than if all terms and prices
12 must be negotiated. This is not the case with negotiated contracts which include
13 negotiated prices whose basis or beginning point is subject to constant change. We are
14 not large, sophisticated energy developers, nor can we afford to waste or justify taxpayer
15 dollars on non-expeditious process in which we have very little expertise.

16 **THE COMMISSION SHOULD MAINTAIN THE CURRENT CONTRACT DURATION**
17 **AND CAPACITY PAYMENTS**

18 **Q. What are the Commisison's current requiriemetns regarding contract terms?**

19 **A.** QFs should have the option to select contracts of up to 20 years, with fixed prices for the
20 first 15 years.

21 **Q. Do you support the Commission's current policy?**

22 **A.** We support the Commission's policy regarding a twenty (20) year contract term. The
23 fixed price period of 15 years is adequate, and necessary to facilitate the long-term
24 planning of the hydro operations in context with other planning associated with the water

1 systems that we operate. This includes financing needed to make system improvements,
2 repairs, and meet or exceed environmental requirements. We do not support the
3 Commission's current policy which does not allow existing QFs that enter into renewal
4 contracts to be paid for the capacity value they provide to PacifiCorp. Given the long
5 resource sufficiency periods, this policy has the practical impact of causing existing QFs
6 to not be paid for capacity during the majority of their contract years, even if they enter
7 into a fifteen year contract.

8 **Q. What has PacifiCorp proposed?**

9 **A.** Three year contract terms for all QFs.

10 **Q. Do you support PacifiCorp's proposal?**

11 **A.** No. Three (3) year contracts would put us out of business and jeopardize decades worth
12 of conservation effort and threaten future reliability of critical water delivery systems to
13 the public. Existing QFs such as our water districts would be required to enter into short
14 term three-year contracts likely entirely based on resource sufficiency based prices with
15 low market rates, without capacity payments. Even if a QF is willing to obligate itself for
16 a longer period of time and provide needed capacity to the utility, the QF would not
17 receive fixed prices or capacity payments. Under existing policy, an existing QF can at
18 least enter into a 15-year contract and obtain fixed payments, including capacity during
19 the resource deficiency years.

20 **Q. Do existing QFs need long term contracts in order to obtain project financing?**

21 **A.** Absolutely. Our existing projects are part of a large complex of integrated facilities that
22 deliver critical irrigation and drinking water to citizens, businesses, and animals. In order
23 to financially plan, engineer, build and operate these systems, including the hydro

1 projects, it is necessary to incorporate long-term financing. Even with a 15-year power
2 contract term, it is absolutely necessary to have long-term financing in place that exceeds
3 such term. Short-term contracts of three years would make long-term planning nearly
4 impossible, and very risky for District finances. Short-term contracts would also
5 handicap our ability to provide and maintain safe infrastructure and reliable water supply
6 to citizens, including but not limited to large and small agri-business. We have a hard
7 enough time getting projects financed with the current contract criteria. A contract term
8 of 3 years is not long enough for a project to pay for itself. Imagine the size of your
9 monthly payment if you had to buy a house or a car with a 3 year note and then imagine
10 how many banks would be interested in making a loan with those payments—I am sure
11 you realize that the answer is: next to none.

12 **Q. Do existing QFs needs to make capital improvements?**

13 **A.** Yes, and in most cases capital improvement projects are going on continuously.
14 Responsible water districts and suppliers typically have a substantial annual ongoing
15 capital improvement and safety program that relies on long-term debt. District water
16 systems are expensive to maintain and large piping and other capital improvement
17 projects are critical to supporting the needs of a growing society dependent on water and
18 agriculture. Capital improvements rely on long-term debt financing and our ability to
19 meet debt service. Long-term financing necessary to maintain safe and aging
20 infrastructure is not only critical to saving and protecting lives, but simply the responsible
21 thing to do.

1 **Q. Do existing QFs need pricing stability?**

2 **A.** Price stability and certainty for current and potential new power purchase agreements is
3 of utmost importance. Pricing stability and certainty are essential for reliable water
4 service. For districts with existing contracts, reliability on power purchase agreement
5 pricing is commensurate with water being available out of the faucet at your home, or
6 not.

7 **Q. Why is it important for a QF to not renegotiate a contract every three years?**

8 **A.** In addition to the reasons above, frequent renegotiations would harm our ability to make
9 long-term plans that rely upon stable prices. Entering into a standard power purchase
10 agreement every three years would be beyond challenging, and subject Districts and their
11 patrons to unnecessary costs, risks, harm, and even the re-opening of interconnection
12 agreements (which are also extremely difficult and costly to execute). Changing the
13 standard price and contract threshold to a lower level, thereby requiring the Districts to
14 negotiate pricing and contracts every three years would be draconian, and a complete
15 waste of taxpayer dollars. The Districts should not be subjected to perpetual and wasteful
16 negotiation that would ultimately harm the public whom depends upon reliable water
17 service.

18 **Q. Does a three-year term harm a QF's ability to sell its RECs?**

19 **A.** Yes. In addition to generating power, the electrical generation output of our projects also
20 produces non-energy environmental, economic and social benefits. Some of these
21 separate non-energy benefits are called "green tags," "tradable renewable certificates,"
22 and "RECs," which can be sold on the market to third parties or the utilities themselves.
23 Purchasers of these non-energy attributes often wish to enter into long-term contracts in

1 excess of ten years. Based on our personal experience, we believe that we can procure
2 greater sales opportunities and obtain much higher and more stable prices if we can enter
3 into contracts for periods greater than three years. However, we may not be able to agree
4 to sell the non-energy benefits under a long-term contract if we can only enter into a
5 three-year contract to sell our electricity to the utility. Therefore, a short three-year
6 contract can cause significant and unnecessary harm to a QF's ability to sell the non-
7 energy attributes. We are more than willing to develop our own innovative ways to
8 realize a premium on our power production, but allowing sufficient and fair rates over a
9 reasonably long time period to support and plan our projects with base production
10 revenue is absolutely paramount.

11 **Q. Does this conclude your testimony?**

12 **A.** Yes.

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

UM 1734

In the Matter of)
)
PACIFICORP, dba PACIFIC POWER's)
Application to Reduce the Qualifying Facility)
Contract Term and Lower the Qualifying)
Facility Standard Contract Eligibility Cap)
)
_____)

**EXHIBIT COALITION/201
QUALIFICATIONS OF JEREMIAH CAMARATA**

October 15, 2015

Overview

As General Manager of Farmers Irrigation District (FID), I oversee many operational areas within irrigation and hydropower management. Specifics include basic site architecture, water deliveries, pump station management, project development and construction, GIS/Telemetry/SCADA/water accounting implementation, asset protection and enhancement, environmental compliance, small hydroelectric generation, office and field personnel management, budgeting, contracts and finance administration. I have been fortunate enough to play roles on award winning teams for various governments, businesses, and non-profits. Most recently, EPA has selected our large piping, pump station, and hydro-repowering work at FID for a National Sustainability Award. I have experience designing, balancing, and managing operational budgets up to ~\$6.5M and overseeing individual projects of equal value. I am currently responsible for ~\$46M in irrigation and hydropower assets, and manage 9 full time employees at FID. FID infrastructure spans ~12,000 acres and delivers water to ~5,800 irrigable acres consisting of ~1,900 customers -- 49% urbanized and 51% agricultural.

I have worked in the professional fields of GIS, landscape architecture and planning, all within the context of water resource management. I tend to focus on business strategy, customer and agency relations, operational efficiencies, budgets and contracts, policy, personnel management, and infrastructure development. As a board member for Oregon Water Resources Congress (OWRC), I am generally charged with promoting the protection and use of water rights through wise stewardship of water resources. More specifically, I voluntarily serve as the OWRC Hydropower Caucus Chairman and focus on hydroelectric policy protection and enhancement.

Over my career, I have enjoyed serving farmers and ranchers by designing operational efficiencies that work to beneficially use land and water in balanced ways. I enjoy working on complex problems and attempting to solve them with very simple, systemic-based solutions.

Relevant Work Experience

2011-Present: General Manager, Farmers Irrigation District, Hood River, OR

2015-Present: Oregon Water Resources Congress, Board Member & Hydropower Caucus Chairman (volunteer)

2010-2011: Assistant Manager, Farmers Irrigation District, Hood River, OR

2009-2011: Project Management, Farmers Conservation Alliance (FCA), Hood River, OR

2002 -2009: Business Development Manager for Irrigation District Solutions, Geo-Spatial Solutions Inc. (GSS), Bend, OR

2002: Graduate Research Fellow; Conservation and Restoration Analysis, Internet Mapping Systems, ISE Research Lab, University of Oregon, Eugene, OR

2001-2002: Graduate Teaching Fellow (Advanced GIS), University of Oregon, Eugene, OR; Spent summers working for GSS on water district mapping projects.

2000 - 2001: Travelling GIS Application Development/Internet Mapping Systems Consulting/Statistics Interpretation/Technical Marketing Internship for ESRI-Sweden and LandFocus AB; Gävle, Sweden, - Informi GIS A/S; Lyngby/Copenhagen, Denmark, - ESRI-Germany Geoinformatik GmbH, Kranzberg, Germany.

1999-2000: GIS Application Specialist/PR Assistant/Intern, InGeo Systems LLC; North Logan, UT

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

UM 1734

In the Matter of)
)
PACIFICORP, dba PACIFIC POWER's)
Application to Reduce the Qualifying Facility)
Contract Term and Lower the Qualifying)
Facility Standard Contract Eligibility Cap)
)
_____)

**EXHIBIT COALITION/202
QUALIFICATIONS OF EDSON PUGH**

October 15, 2015

EDSON R. PUGH, P.E. General Manager / District Engineer
Deschutes Valley Water District
881 SW Culver Hwy.
Madras, OR 97741 Phone: (541) 475-3849
Email: edson@dvwd.org

EDUCATION

OREGON STATE UNIVERSITY (1979-1982) Corvallis, Oregon
Graduated with a Bachelor of Science in Civil Engineering in June of 1982.
Emphasis on Water Resources Engineering.

CENTRAL OREGON COMMUNITY COLLEGE (1977-1979) Bend, Oregon
Accumulated credits toward Bachelor's Degree.

CERTIFICATION

PE Registration (July 1990)
Registered by the Oregon State Board of Engineering Examiners as a Professional Engineer, especially qualified in Civil Engineering.

Water Distribution System Operator II (1988)
Water Treatment Plant Operator I (1988)
Certified by the Oregon Health Authority

EIT Examination (1982)
Certified by the Oregon State Board of Engineering Examiners as an Engineer-in-Training.

EMPLOYMENT

Deschutes Valley Water District (1986 to present)
Currently General Manager / District Engineer with overall responsibilities for a domestic water system and hydro-electric plant. Oversee a \$29.7 million biennial budget.

Recent major projects include a 3,000,000 gallon water tank, a 4,000,000 gallon water tank, and 17.75 miles of 24" & 20" diameter waterline.

PROFESSIONAL ORGANIZATIONS

OAWU Board Member, American Society of Civil Engineers