

CASE: UW 172
WITNESS: JOAN GRINDELAND

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 100

Opening Testimony

January 4, 2018

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

A. My name is Joan Grindeland. I am a Utility Analyst employed in the Telecommunications and Water Division of the Public Utility Commission of Oregon (OPUC). My business address is 201 High Street SE. Suite 100, Salem, Oregon 97301.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.

A. My witness qualification statement is found in exhibit Staff/101.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to describe the Public Utility Commission of Oregon Staff's (Staff) recommendations regarding Mountain Home Water District's (Mt. Home or Company) retail rates in Docket UW 172. In my testimony I will address the following issues:

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Q. WHO IS TESTIFYING IN THIS DOCKET?

A. I am testifying as the primary Staff witness in Docket No. UW 172. Mr. Matt Muldoon will provide additional testimony in Staff/200 regarding cost of equity.

Q. DID YOU PREPARE EXHIBITS FOR THIS DOCKET?

A. Yes. I prepared Exhibit Staff/101, consisting of one page, Exhibit Staff/102, consisting of 9 pages, and Exhibit Staff/103, consisting of 35 pages.

ISSUE 1: STAFF'S SUMMARY RECOMMENDATION

Q. WHAT IS STAFF'S SUMMARY RECOMMENDATION?

A. Staff's primary recommendation is a revenue requirement of \$42,263, as compared to Mt. Home's request of \$20,100, resulting in an annual revenue increase of \$40,023 or 1,787 percent above the Company's 2016 Test Year revenues, with an 8.6 percent rate of return (ROR) on a rate base of \$82,591. The calculation of Staff's revenue requirement is shown in Exhibit Staff/102. As discussed more fully below, Staff's recommendation is based on the inclusion of the entire plant in service in rate base, which renders an assessment for capital costs related to the replacement well unnecessary.

Staff's alternative recommendation is a revenue requirement of \$32,883 as compared to Mt. Home's request of \$20,100, resulting in an annual revenue increase of \$30,643 or 1,368 percent above the Company's 2016 Test Year revenues, with an 8.6 percent rate of return on a rate base of \$14,889. The calculation of Staff's revenue requirement is shown in Exhibit Staff/102. Staff's alternative recommendation assumes a \$23,239 one-time assessment for the new well, which would be treated for ratemaking purposes as Contributions in Aid of

1 Construction (CIAC). This has the effect of recovering replacement well related
2 capital costs up-front, rather than over time in rate base. There are no other
3 differences between Staff's primary and secondary recommendations.

4 Due to the complexity of this case and lack of records, Staff recommends
5 that the Company file a new rate case no later than three years from the date of
6 the order in this case.

7 **ISSUE 2: MT. HOME'S BACKGROUND AND REGULATORY HISTORY**

8 **Q. PLEASE DESCRIBE MT. HOME.**

9 A. Mountain Home Water District is a corporation providing drinking water service to
10 residential customers and is located in the rural area of West Linn, Oregon. It is
11 currently owned by Dr. Keith Ironside.¹ The system was originally constructed in
12 the early 1970s and was known as the Belridge Water System. At the time of the
13 filing, the Company provided water service to two neighbors, as well as two
14 households owned by Dr. Ironside.² One neighbor, Nate Seymour, has drilled his
15 own well and the Company estimates that Mr. Seymour will terminate service by
16 January 31, 2018.³ As a result, Staff's recommendation in this case assumes the
17 Company will be providing service to three households: the Intervenors (Mel and
18 Connie Kroker) and the two homes owned by Dr. Ironside and Valerie Meyer.

¹ Staff notes that some assets used to provide service are located on a tax lot now owned by Dr. Ironside's daughter, Valerie Meyer, which was conveyed to her on April 18, 2013 by a Bargain and Sale Deed recorded in Clackamas County Records under Document No. 2013-027244. *In re Mountain Home Water District*, OPUC Docket No. UM 1769, Order No. 17-164 at 1 (May 16, 2017).

² UM 1769 - Staff/103, Hari/5 (Company response to Kroker DR 10).

³ Staff/103, Grindeland/1 (Company's Response to Staff DR 24).

1 Staff will revise its recommendation in a future round of testimony if Mr. Seymour
2 has not disconnected from the system at that time.

3 **Q. PLEASE PROVIDE A SUMMARY OF MT. HOME'S REGULATORY**
4 **HISTORY.**

5 A. Mt. Home was a service-only regulated utility under the jurisdiction of the
6 Commission until July 2017. As a consequence of the events described more
7 fully below, Mt. Home is now a rate and service regulated water utility.

8 On April 1, 2016, Mt. Home filed an application for authority to terminate
9 water service and abandon its water utility under OAR 860-036-2110, effective
10 June 30, 2016 (Docket UM 1769). That application was denied in Order
11 No. 17-164. Following that denial, on May 31, 2017, Mt. Home notified its
12 customers it proposed to 1) increase its rates from \$80 per month to \$200 per
13 month, effective August 1, 2017, 2) restrict water used for landscape irrigation,
14 effective June 1, 2017, and 3) levy an assessment of \$17,500 due and payable by
15 June 30, 2017.⁴

16 On June 26, 2017, the Commission received a petition requesting rate
17 regulation under ORS 757.061(3)(d) from one customer, intervenors Mel and
18 Connie Kroker, which met the statutory requirement of more than 20 percent of
19 customers of the water utility filing a petition requesting rate regulation.⁵ As a
20 result, Docket No. WJ 33 was opened and on July 12, 2017, and in Order 17-249,
21 the Commission asserted regulatory jurisdiction over Mt. Home as a rate and

⁴ Staff/103, Grindeland/2-7 (Mountain Home Water District Customer Notices).

⁵ Staff/103, Grindeland/8 (Mel and Connie Kroker petition requesting rate regulation).

1 service regulated water utility under ORS 757.005, 757.020, and 757.061, and
2 ordered the Company to file appropriate tariffs within 60 days of the date of the
3 order.⁶

4 In response to Order 17-249, Mt. Home filed compliance tariffs and a
5 request for an increase in rates, which was docketed as UW 172.

6 **ISSUE 3: SUMMARY OF MT. HOME'S GENERAL RATE FILING**

7 **Q. PLEASE DESCRIBE MT. HOME'S REQUEST FOR A GENERAL RATE**
8 **REVISION.**

9 A. The Company filed its request for a general rate increase on August 11, 2017.

10 Mt. Home proposed to raise monthly rates from \$80 to \$1,675, an increase of over
11 2,000 percent. In addition, the Company proposed a one-time assessment of
12 \$23,333 per user, representing a one-third share of the approximately \$70,000 the
13 Company had spent for a replacement well.

14 In arriving at the \$1,675 monthly rate, the Company requested recovery
15 of only the following expenses:

16	1. Regular monthly expenses	\$150
17	2. Reserves for non-routine repairs	\$250
18	3. System Operator	\$450
19	4. Legal Costs	<u>\$825</u>
20	5. Total	\$1,675

21 The Company's Application assumed the departure of Nate Seymour,
22 and therefore, the Company assumed for the purpose of the filing that only one
23 customer, the Krokors, would be affected by its proposed monthly rate changes.

⁶ *In re Mountain Home Water District*, OPUC Docket No. WJ 33, Order No. 17-249 at 2 (Jul. 12, 2017).

1 The Company proposed to spread the assessment over the remaining three users
2 of water from the system. According to the Company's definition,⁷ the three users
3 include the Krokers, a house owned by Dr. Ironside, and a house owned by
4 Valerie Meyer. Finally, as shown above, the Company requested neither return of
5 nor return on its rate base, excluding the replacement well which would be
6 recovered through the one-time assessment.

7 The Company modified its request through the discovery process and
8 laid out an additional option for the development of its rates. Under that option,
9 the Company indicated it expects to earn a rate of return (ROR) in the range of at
10 least ten percent on its rate base if the Commission did not approve the one-time
11 assessment of \$23,333 per customer.⁸ The Company did not quantify the
12 impacts of its alternate proposal on customer rates. Because the Company's
13 alternate recommendation would result in placing the approximately \$70,000
14 related to the replacement well in rate base and recovering that entire amount
15 (rather than one-third) from one customer – the Krokers – the Company's
16 alternative would result in higher rates for its customer than the rates proposed in
17 its Application.

18 Staff's primary recommendation is based on the Company's alternate
19 proposal to include the new well in rate base. Unlike the Company's alternate
20 proposal, Staff's primary recommendation incorporates the collection of all costs,
21 including the rate based amounts, from all three of the Company's customers.

⁷ Staff/103, Grindeland/9 (Company's Response to Staff DR 12).

⁸ Staff/103, Grindeland/10 (Company's Response to Staff DR 16).

1 Finally, the Company proposes that the water delivered by the Company
2 may not be used for irrigation, including lawn, garden, and landscape irrigation,
3 due to concerns with Oregon Water Resources Department (OWRD) regulations.

4 **Q. WHY IS THE COMPANY REQUESTING A GENERAL RATE INCREASE?**

5 A. In its Application, filed in compliance with the Commission's order asserting rate
6 regulation, the Company stated that there were three reasons it was seeking a
7 permanent increase in the monthly charge, as well as a one-time assessment of
8 costs for replacement of the well completed in 2016.⁹ First, two customers left the
9 system in September 2016, which reduced total revenue by 50 percent but did not
10 reduce the costs of operation; a third customer is expected to leave the system in
11 the fall of 2017. Second, the Company intends to hire a contractor to operate the
12 Company, following the Commission's suggestion in Order No. 17-164. (Order
13 No. 17-164 at 6, 8.) Third, the Company states that it has historically operated at
14 a loss, with no reserves for unexpected repairs and with the owner frequently
15 paying for non-routine system repairs from his personal funds, rather than seeking
16 contributions from customers.

17 In its Application, the Company also cited Order No. 17-164, in which the
18 Commission criticized the Company's accounting and management as "casual,"
19 implying that the Company was to blame for the fact that the owner had to
20 subsidize the system to keep it operational.¹⁰ As such, the Company states it is
21 seeking to increase its revenue to a level that (1) is adequate to meet its ongoing

⁹ Mountain Home Water District Advice Letter at 2 (filed Aug. 11, 2017).

¹⁰ Order No. 17-164 at 8 ("There is evidence that Mountain Home has been able to pass through extraordinary costs to its customers when it has chosen to do so.").

1 expenses, including electricity charges, quarterly water quality testing,
2 compensation for an operator for the system, legal fees for the Company's
3 compliance with rate as well as service regulation, and normal maintenance
4 expenses; and (2) allows for reserves to meet non-routine repair and
5 rehabilitation costs for the water system, which is near the end of its useful life.

6 **Q. WHAT TEST YEAR PERIOD DID THE COMPANY USE IN ITS FILING?**

7 A. The Company used the test year period of January 1, 2016 through
8 December 31, 2016.

9 **Q. WHAT ARE MT. HOME'S CURRENT RATES AND WHAT RATE INCREASE**
10 **HAS MT. HOME PROPOSED IN THIS CASE?**

11 A. A summary of rates is included in Table 1:

12 **Table 1: Monthly Rates**

Company Current Rates	Company Proposed Rates	Staff Primary Recommendation	Staff Alternative Recommendation
\$80/month	\$1,675/month*	\$1,200.05/month	\$918.13/month*

13 * Company Proposed Rates also include a \$23,333 one-time assessment.
14 Staff's Alternative recommendation includes a one-time assessment of
15 \$23,239.¹¹

16 **ISSUE 4: STAFF'S REVIEW OF MT HOME'S FILING**

17 **Q. WHAT ISSUES DID STAFF INVESTIGATE?**

18 A. Staff's investigation and analysis of Mt. Home's general rate filing included a
19 comprehensive examination of the Company's revenues, expenses, proposed
20 adjustments, rate spread and rate design, rate base, capital improvements, and
21 cost of capital.

¹¹ As explained more fully below, Staff's assessment is based on amounts reflected on invoices provided by the Company.

Q. WHAT ASSUMPTIONS DID STAFF MAKE IN DETERMINING HOW TO SET RATES IN THIS CASE?

A. For the purpose of this testimony, Staff assumed the following:

1. There are three customers on the system: Dr. Ironside (owner of system and rental property), Valerie Meyer (Dr. Ironside's daughter), and Mel and Connie Kroker (Intervenors).¹²
2. That rate recovery for the new well could be achieved either through its inclusion in rate base, or through a one-time assessment:
 - a) Primary Recommendation: the entire plant in service is placed in rate base, and therefore an assessment for capital costs related to the replacement well is not necessary.
 - b) Alternative Recommendation: an assessment is allowed and that assessment is treated as CIAC for future ratemaking purposes, as described below. This has the effect of recovering capital costs up-front, rather than over time in rates.
3. The Commission has no jurisdiction to adjudicate property rights.

Q. DID STAFF RECOMMEND ADJUSTMENTS TO MT. HOME'S 2016 TEST YEAR EXPENSES AS PROPOSED BY MT. HOME IN ITS APPLICATION?

A. Yes. Staff examined expenses for reasonableness in accordance with the Commission's statutes and rules that apply to rate-regulated water utilities.

¹² Staff notes that the Company's Application drew a distinction between users of the system (Dr. Ironside and Valerie Meyer) and customers (Mel and Connie Kroker, and Nate Seymour). Staff's testimony assumes that customers and users of the system are the same for ratemaking purposes.

**Q. PLEASE PROVIDE A SUMMARY EXPLANATION OF ALL ADJUSTMENTS
RECOMMENDED BY STAFF.**

A. A summary of all of the adjustments made to the Revenue Requirement can be found in Exhibit Staff/102, Grindeland/3-4. Below is a summary explanation of the primary adjustments to the Revenue Requirement.

**Q. PLEASE PROVIDE A BRIEF EXPLANATION OF STAFF'S ADJUSTMENTS TO
MT. HOME'S EXPENSE AND RATE BASE ITEMS.**

Contract Services-Legal

The Company proposed an annual legal expense of \$9,900 based on two to four hours per month of legal fees.¹³ Staff requested the Company's legal fees to date and the Company responded with costs through October 31, 2017, which included expenses associated with this rate case.¹⁴ Staff's proposal is to separate on-going anticipated legal expenses from rate case expense, as described more fully in the Amortization of Rate Case section below.

For on-going legal expenses, Staff proposes an annual expense of \$2,500 based on approximately one hour per month of legal fees. The Company plans to hire a certified operator who will conduct on-site visits, take lab samples, check system operation and verify usage compliance as well as do billing and bookkeeping.¹⁵ Because there will be separate operator for the system, Staff believes the ongoing expenses attributed to legal costs will be minimal going forward.

¹³ Staff/103, Grindeland/11 (Company's Response to Staff DR 6).

¹⁴ Staff/103, Grindeland/12 (Company's Response to Staff DR 22).

¹⁵ Staff/103, Grindeland/13 (Company's Response to Staff DR 5).

Repairs to Water Plant

The Company did not request any expense related to repairs to the water plant. Instead, it requested a contingency fund of \$3,000 per year roughly based on the average of repair expenses for a four year period from 2006-2009.¹⁶

Staff requested a more recent estimate of expenses, for the years 2010 through 2015, in DR 21.¹⁷ The Company was only able provide documents for four of the six years requested. The average of those four more recent years of expense is \$1,339. While some of the infrastructure (e.g., the replacement well) is relatively new, the remainder of the system is relatively old. In addition, the Company stated expense records are incomplete, which means the average expenses recorded are, if anything, understated. Considering all of these factors Staff finds the \$1,339 average to be a reasonable approximation of the expense amount. Therefore, Staff recommends including \$1,339 for repairs to water plant.

PUC Fee

The Company did not request any expenses related to the OPUC fee. Staff has adjusted these items consistent with applicable rates, adding \$99 to gross revenue fees.

Amortization of Rate Case

As discussed above, in DR 22, Staff requested the legal costs to date (associated with the current rate case), as well as a forecast of future legal expenses. The Company responded "Legal expenses for the rate case are approximately

¹⁶ Staff/103, Grindeland/14 (Company's Response to Staff DR 13).

¹⁷ Staff/103, Grindeland/15 (Company's Response to Staff DR 21).

1 \$16,000 through October 31, 2017. If the rate case proceeds as contemplated in
2 the current schedule, with four rounds of written testimony, an evidentiary
3 hearing, and briefing, the Company anticipates another \$35,000 to \$45,000 in
4 legal costs.”¹⁸ Based on this response, Staff approximated rate case expense at
5 \$56,000 and spread those costs over three years, to coincide with the
6 requirement to file a new rate case in three years, for amortization of rate case
7 costs at \$18,667 each year for three years.

8 **Contingency Account**

9 Staff notes that contingency funds are generally utilized by not-for-profit utilities,
10 as rates for those types of corporations do not include an authorized ROR which
11 may provide necessary reserves for unanticipated contingencies. Conversely,
12 for-profit utilities can rely on their authorized ROR to provide funds necessary for
13 unanticipated contingencies. Mt. Home is a for-profit utility, and therefore can
14 rely, at least in part, on its ROR if funds are needed to address unanticipated
15 contingencies. As described in the Cost of Capital section of my testimony, Staff
16 is proposing an 8.6 percent rate of return.

17 **Property Tax**

18 The Company did not request any expenses related to property taxes. Staff
19 included property taxes of \$901 based on applying the millage rate for Clackamas
20 County to net plant.

¹⁸ Staff/103, Grindeland/12 (Company’s Response to Staff DR 22).

State and Federal Taxes

The Company did not request any expenses related to state or federal income taxes.¹⁹ Staff has adjusted these items consistent with applicable rates adding \$250 for Federal and \$118 for State Income Taxes.

Plant in Service

Staff determined plant in service at \$85,309 based on reported plant,²⁰ which includes \$69,714 in replacement well invoices provided by the Company.²¹

Accumulated Depreciation

Staff included Accumulated Depreciation consistent with the plant lives and in-service dates provided by the Company, which results in the addition of \$5,206 to Accumulated Depreciation of Plant.

Contribution in Aid of Construction (CIAC)

Under Staff's primary recommendation in this case regarding the treatment of well replacement costs, there is no customer assessment and therefore, no CIAC.

Should the Commission adopt Staff's alternative recommendation, cost recovery for the replacement well would be paid for by customers through one-time assessments. These assessments would be treated as CIAC for ratemaking purposes. Because Dr. Ironside has to date paid for all costs associated with the replacement well, Staff's alternative recommendation assumes Mr. and Mrs. Kroker would pay a \$23,239 assessment for their 1/3 of the replacement well costs. The terms of the assessment are described below.

¹⁹ Staff/103, Grindeland/16-17 (Company's Response to Staff DR 14).

²⁰ Staff/103, Grindeland/18-19 (Company's Response to Staff DR 15).

²¹ Staff/103, Grindeland/20-34 (Company's response to Staff's DR 9).

Staff recommends that the assessment required be paid in full by September 3, 2018, or in agreed upon monthly installments, with an interest rate equal to 8.6 percent which represents the Company's ROR.

Q. DID STAFF ANALYZE MT. HOME'S PLANT SCHEDULE AND DEPRECIATION EXPENSE?

A. Yes. Review of Plant and Depreciation Expense was part of Staff's comprehensive examination of the Company's case. Staff examined the plant schedules provided by the Company and issued numerous data requests regarding additions to the plant. Adjustments were made to bring the useful lives in line with NARUC standards and corresponding adjustments were made to depreciation calculations.

Q. PLEASE DESCRIBE THE ADJUSTMENTS MADE TO MT. HOME'S PLANT.

A. As discussed more fully below, Staff included the full costs for the well replacement as well as adding corrected plant lives and depreciation.

Q. PLEASE DESCRIBE THE HISTORY OF THE REPLACEMENT WELL.

A. At the prehearing conference for this proceeding, Administrative Law Judge Power took official notice of the record in Docket UM 1769, which includes a robust history and discussion of the water system used to serve customers.²² Here, Staff provides a brief discussion of the relevant history and facts.

The water system currently provides natural spring water from a drilled well, which was financed by Dr. Ironside ("permanent replacement well").²³ Water was

²² UW 172 – Prehearing Conference Memorandum (Oct. 30, 2017).

²³ Order 17-164 at 2.

1 previously provided by a well drilled by Dale Belford, Dr. Ironside's predecessor in
2 interest, in 1973 ("original well").²⁴ The original well was drilled to a depth of
3 600 feet, with 90 feet of casing and a pump located at 397 feet.²⁵

4 In the March 2016, the system suffered loss of water pressure, which
5 prompted the Company to retain the services of Steve's Pump Service to identify
6 the cause of the problem.²⁶ After investigating and testing, Steve's Pump Service
7 determined that the issue was not related to the pump, and recommended that
8 Dr. Ironside contact Olsen Pulliam Well Drilling to investigate the well.²⁷

9 Following its own testing and investigation, Olsen Pulliam Well Drilling determined
10 that the original well was crooked,²⁸ had caved in,²⁹ and could not be lined and
11 cased to the appropriate depth.³⁰ Accordingly, Olsen Pulliam Well Drilling
12 recommended that Dr. Ironside drill a new well, as it would be more cost-effective
13 than attempting to repair, case and line the original well consistent with industry
14 best practices such that the well would not cave in at some future point.³¹

15 Construction of the new well began drilling the replacement well in the spring of
16 2016.

17 In March 2016, the Company temporarily connected its distribution system to
18 a second well ("interim well"), owned personally by Dr. Ironside, in order to

²⁴ Order 17-164 at 2.

²⁵ UM 1769 - Mountain Home Application at 2 in UM 1769.

²⁶ Order 17-164 at 2.

²⁷ UM 1769 – Company/300, Hougak/1; See *also* Order 17-164 at 2.

²⁸ UM 1769 – Hearing Tr. at 76.

²⁹ UM 1769 – Hearing Tr. at 59, 63.

³⁰ UM 1769 – Hearing Tr. at 63, 65-67, 70, 88.

³¹ UM 1769 – Company/400, Wagner/1.

1 maintain service to customers while the replacement well was being drilled.³²

2 The interim well is located on Dr. Ironside's property and was intended to provide
3 service to a single home also located on Dr. Ironside's property. The interim well
4 does not have a separate identification number on file with the Drinking Water
5 Program, nor does the Oregon Water Resources Department (OWRD) have well
6 logs for it.³³ The Company has no information regarding when it was drilled or
7 who constructed it.³⁴

8 When the permanent replacement well was completed, the Company
9 disconnected its system from the interim well and connected to the permanent
10 replacement well financed by Dr. Ironside.³⁵

11 **Q. HOW DID STAFF DETERMINE WHETHER THE COST OF THE**
12 **REPLACEMENT WELL SHOULD BE INCLUDED IN RATE BASE?**

13 A. As described above, due to the condition of the original well, Olsen Well Drilling
14 ultimately recommended that the original well be abandoned. Dr. Ironside drilled
15 a replacement well on Parcel 2, which was then connected to the Mountain Home
16 distribution system in spring 2016.

17 The recommendation to abandon the original well was provided by Vance
18 Wagner of Olsen Pulliam Well Drilling. As he described in his testimony in
19 UM 1769, Mr. Wagner is a licensed well driller with over 20 years of experience

³² Order 17-164 at 2.

³³ UM 1769 - Staff/103, Hari/4 (Company response to Kroker DR 14); Staff/102, Hari/1-2 (Company response to Staff DR 2).

³⁴ UM 1769 -Staff/103, Hari/1-2 (Company response to Kroker DR 3).

³⁵ UM 1769 - Staff/102, Hari/2 (Company response to Staff DR 4).

1 and has drilled around 350 wells.³⁶ Based on Mr. Wagner's advice, Staff believes
2 Dr. Ironside's decision to abandon the well and drill a new replacement well was
3 prudent.

4 Given all of the above, Staff believes it is reasonable to include the entire
5 cost of the replacement well in rate base.

6 **ISSUE 5: RESTRICTIONS ON USAGE FOR LAWNS AND NON-**
7 **COMMERCIAL GARDENS**

8 **Q. PLEASE DESCRIBE THE COMPANY'S PROPOSAL TO RESTRICT WATER**
9 **USAGE FOR LAWNS AND NON-COMMERCIAL GARDENS.**

10 A. The Company's initial tariff filing at Schedule No. 1 Flat Rates includes the
11 following language:

12 Water use is restricted to indoor residential use only. Water delivered by
13 the Utility may not be used for irrigation, including lawn, garden, and
14 landscape irrigation. The Utility may inspect customer's premises to
15 verify compliance with this restriction.

16 The Company's primary concern is its compliance with OWRD statutes and
17 regulations relating to the use of water from an exempt well.³⁷ The Company
18 further explains that exempt wells may be used for group domestic purposes up to
19 15,000 gallons per day, shared amongst all users, but that the total use of water
20 for any lawn or non-commercial garden ("landscape irrigation") is limited to one-
21 half acre per well. The Company goes on to state that securing a water permit in
22 order to allow for additional usage, including landscape irrigation, is not possible

³⁶ UM 1769 - Company/400, Wagner/1.

³⁷ Staff/103, Grindeland/35 (Company response to Staff DR 11).

1 because the well is located in the Sherwood-Dammasch-Wilsonville watershed,
2 which the OWRD has classified as a Ground Water Limited Area.³⁸ The
3 Company argues that this classification designates water use in the region for
4 exempt purposes only under OAR 690-502-0190, and that under this rule, it is not
5 possible to obtain a water right for the use of groundwater from the basalt aquifers
6 in this region.

7 The Company received a letter from the OWRD dated July 7, 2015,
8 reminding the Company of the OWRD usage restrictions.³⁹ The Company was
9 not aware of the restriction until it received the above noted letter.⁴⁰ Customers'
10 properties range in size from approximately one and one-half acres to over four
11 acres in size. The Company does not currently monitor customers' landscape
12 irrigation. The Company further states that it does not believe it would be possible
13 to monitor and enforce restrictions on its customers' landscape irrigation.⁴¹

14 **Q. PLEASE DESCRIBE OWRD RULES RELATED TO THE ONE-HALF ACRE**
15 **LIMIT ON WATER USED FOR LAWNS AND NON-COMMERCIAL GARDENS.**

16 A. ORS 537.545 provides that exempt wells may be used for watering lawns and
17 non-commercial gardens up to one-half acre in area. OWRD administrative rule
18 OAR 690-340-0010 mirrors this statutory requirement. Though not related to the
19 area of land that may be watered, Staff notes that there is also a 15,000 gallon
20 per day limit on the amount of water from the well. The Company has not

³⁸ Staff/103, Grindeland/35 (Company response to Staff DR 11).

³⁹ UM 1769 - Staff/102, Hari/17 (Company response to Staff DR 11, Exhibit 7).

⁴⁰ UM 1769 - Staff/102, Hari/4 (Company response to Staff DR 11).

⁴¹ Staff/103, Grindeland/35 (Company response to Staff DR 11).

1 asserted a concern that the volume limitation for exempt wells is the driver for its
2 request to restrict water for lawns and non-commercial gardens, but rather, a
3 concern that it is not feasible to enforce the area limitation associated with the
4 exemption.

5 **Q. PLEASE DESCRIBE STAFF'S PROPOSAL FOR WATER USED FOR LAWN**
6 **AND NON-COMMERCIAL GARDENS.**

7 A. Staff recommends that the Company be required to share equally the one-half
8 acre area permitted for lawn and non-commercial garden watering among
9 customers. Though Staff agrees that OWRD compliance is necessary and that
10 the Commission should not order water usage that would call into question the
11 Company's compliance with Oregon law and another administrative agency's
12 regulations, the Company has not presented facts or evidence that compels
13 Staff to conclude that sharing the allotted acreage would not be possible.
14 Furthermore, Staff agrees with the discussion in Order 17-164 that whatever
15 concerns there might be regarding enforcement of OWRD regulations, the
16 customers together have an overarching interest in keeping their irrigation water
17 use within the limits permitted for exempt wells.

18 **ISSUE 6: COST OF CAPITAL**

19 **Q. WHAT COST OF CAPITAL DID THE COMPANY REQUEST IN ITS**
20 **APPLICATION?**

21 A. As discussed earlier, in its Application, the Company requested neither return of
22 nor return on its rate base, excluding the replacement well which would be
23 recovered through the one-time assessment.

1 As also described earlier, the Company modified its request through the
2 discovery process and laid out an additional option for the development of its
3 rates. Under that option, the Company indicated it expects to earn a ROR in the
4 range of at least ten percent on its rate base, if the Commission does not approve
5 the one-time assessment of \$23,333 per customer.

6 **Q. WHAT COST OF CAPITAL STRUCTURE DOES STAFF RECOMMEND?**

7 A. Staff proposes a capital structure comprised of 100 percent equity for two
8 reasons. First, this is the company's actual capital structure, and second, given
9 the Company's current size, it seems very likely that they would have difficulty
10 securing bank debt. Staff also proposes a return on equity of 8.6 percent based
11 on Mr. Muldoon's testimony. In combination, those factors result in an overall rate
12 of return of 8.6 percent.

13 **Q. DO YOU HAVE ANY OTHER RECOMMENDATIONS WITH RESPECT TO**
14 **CAPITAL STRUCTURE?**

15 A. Yes, I recommend that the Company provide evidence of its efforts to secure
16 bank financing in a future rate case.

17 **ISSUE 7: RATE SPREAD AND RATE DESIGN**

18 **Q. WHAT ARE THE COMPONENTS OF STAFF'S RECOMMENDED RATES?**

19 A. Under Staff's primary recommendation, rates are comprised of a monthly rate that
20 is the same for each of the Company's three customers. At this point, a monthly
21 rate is the only available option as the Company has stated that there are no

1 functioning meters to allow usage based billing.⁴² Staff believes its primary
2 recommendation mitigates some of the extraordinary rate impacts which will be
3 felt by customers as a result of this rate case. While this results in a 1787 percent
4 increase compared to current rates, it eliminates the further rate impacts that
5 would result from levying the \$23,239 assessment present in Staff's alternative
6 recommendation. Essentially, through inclusion of the entire replacement well in
7 rate base, customers will be allowed to pay for the replacement well over its
8 useful life rather than upfront through the one-time assessment.

9 Under Staff's alternative recommendation, each of the Company's three
10 customers would also pay a monthly rate. In addition, they would also be
11 assessed a one-time assessment of \$23,239.

12 **Q. HOW DID STAFF ADDRESS ORS 757.315 REGARDING PROVIDING WATER**
13 **FOR OWNERS AND THEIR FAMILIES?**

14 A. Staff acknowledges that ORS 757.315 allow a utility to give free service to its
15 officers, directors, employees and members of their families. It is therefore
16 possible that the statute could be applied such that Dr. Ironside and Ms. Meyer
17 could be provided free service. For the purpose of this case, Staff is
18 recommending that rates be designed assuming three customers are paying
19 equally under both its primary and alternative recommendations. Staff
20 recommends this approach to avoid the even more extreme rate impacts that
21 would result from the Company's proposal to provide free service to Dr. Ironside
22 and Ms. Meyer.

⁴² UM 1769 – Hearing Tr. at 97.

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

2 A. Yes.

CASE: UW 172
WITNESS: JOAN GRINDELAND

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 101

Witness Qualifications Statement

January 4, 2018

WITNESS QUALIFICATION STATEMENT

NAME: Joan Grindeland

EMPLOYER: Public Utility Commission of Oregon (OPUC)

TITLE: Utility Analyst
Retail Telecom & Water Regulation

ADDRESS: 201 High Street SE. Suite 100
Salem, OR 97301

EDUCATION: Bachelor of Science, Environmental Studies, Huxley
College, Western Washington University

EXPERIENCE: Employed with the OPUC since 2014; currently a Utility
Analyst for Retail Telecom & Water Regulation

Prior to employment with the OPUC, I held various positions, including: Manager at Lake Forest Park Water District; Resource Management Supervisor at Franklin County PUD; Officer Manager/Supervisor at In-Gas, Inc. propane distribution subsidiary for Inland Power and Light; Office Administrator for EA Engineering, Science and Technology; Administrative Manager at Summit Cablevision; and Administrative Support Specialist for Salem Keizer School District.

CASE: UW 172
WITNESS: JOAN GRINDELAND

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 102

Exhibits in Support of Testimony

January 4, 2018

Revenue Requirement

Company Proposed Increase
797.32%

Staff Proposed Increase
1786.73%

	Test Year	Company Adjustments	Company Proposed Totals	Staff Adjustments to Company Totals	Staff Proposed Totals
REVENUES					
460 Unmetered	2,240	17,860	\$ 20,100	\$ 22,163	\$ 42,263
461.1 Residential			\$ -	\$ -	\$ -
461.2 Commercial			\$ -	\$ -	\$ -
462 Fire Protection Sales			\$ -	\$ -	\$ -
465 Irrigation Water Sales			\$ -	\$ -	\$ -
466 Water Sales for Resale			\$ -	\$ -	\$ -
471 Miscellaneous Services			\$ -	\$ -	\$ -
475 Cross Connection Control			\$ -	\$ -	\$ -
Other			\$ -	\$ -	\$ -
Total Revenue	\$ 2,240	\$ 17,860	\$ 20,100	\$ 22,163	\$ 42,263

Acct. OPERATING EXPENSES					
601 Salaries and Wages - Employees			\$ -	\$ -	\$ -
603 Salaries and Wages - Officers			\$ -	\$ -	\$ -
604 Employee Pension & Benefits			\$ -	\$ -	\$ -
610 Purchased Water			\$ -	\$ -	\$ -
611 Telephone/Communications			\$ -	\$ -	\$ -
615 Purchased Power	1,673	7	\$ 1,680	\$ -	\$ 1,680
616 Fuel for Power Production			\$ -	\$ -	\$ -
617 Other Utilities			\$ -	\$ -	\$ -
618 Chemical / Treatment Expense			\$ -	\$ -	\$ -
619 Office Supplies			\$ -	\$ -	\$ -
619.1 Postage	7	(7)	\$ -	\$ -	\$ -
620 O&M Materials/Supplies			\$ -	\$ -	\$ -
621 Repairs to Water Plant	69,717	(69,717)	\$ -	\$ 1,339	\$ 1,339
631 Contract Svcs - Engineering			\$ -	\$ -	\$ -
632 Contract Svcs - Accounting			\$ -	\$ -	\$ -
633 Contract Svcs - Legal	66,275	(56,375)	\$ 9,900	\$ (7,400)	\$ 2,500
634 Contract Svcs - Management Fees			\$ -	\$ -	\$ -
635 Contract Svcs - Testing	120		\$ 120	\$ 30	\$ 150
636 Contract Svcs - Labor	300	(300)	\$ -	\$ -	\$ -
637 Contract Svcs - Billing/Collection			\$ -	\$ -	\$ -
638 Contract Svcs - Meter Reading			\$ -	\$ -	\$ -
639 Contract Svcs - Other		5,400	\$ 5,400	\$ -	\$ 5,400
641 Rental of Building/Real Property			\$ -	\$ -	\$ -
642 Rental of Equipment			\$ -	\$ -	\$ -
643 Small Tools			\$ -	\$ -	\$ -
648 Computer/Electronic Expenses			\$ -	\$ -	\$ -
650 Transportation			\$ -	\$ -	\$ -
656 Vehicle Insurance			\$ -	\$ -	\$ -
657 General Liability Insurance			\$ -	\$ -	\$ -
658 Workers' Comp Insurance			\$ -	\$ -	\$ -
659 Insurance - Other			\$ -	\$ -	\$ -
666 Amortz. of Rate Case			\$ -	\$ 18,667	\$ 18,667
667 Gross Revenue Fee (PUC)			\$ -	\$ 127	\$ 127
670 Bad Debt Expense			\$ -	\$ -	\$ -
671 Cross Connection Control Program			\$ -	\$ -	\$ -
673 Training and Certification			\$ -	\$ -	\$ -
674 Consumer Confidence Report			\$ -	\$ -	\$ -
675 Miscellaneous Expense			\$ -	\$ -	\$ -
OE1 Contingency Account		3,000	\$ 3,000	\$ (3,000)	\$ -
OE2 Other Expense 2			\$ -	\$ -	\$ -
OE3 Other Expense 3			\$ -	\$ -	\$ -
OE4 Other Expense 4			\$ -	\$ -	\$ -
OE5 Other Expense 5			\$ -	\$ -	\$ -
TOTAL OPERATING EXPENSE	\$ 138,092	\$ (117,992)	\$ 20,100	\$ 9,762	\$ 29,862

OTHER REVENUE DEDUCTIONS					
403 Depreciation Expense			\$ -	\$ 2,552	\$ 2,552
406 Amort of Plant Acquisition Adjustment			\$ -	\$ -	\$ -
407 Amortization Expense			\$ -	\$ -	\$ -
408.11 Property Tax			\$ -	\$ 901	\$ 901
408.12 Payroll Tax			\$ -	\$ -	\$ -
408.13 Other			\$ -	\$ -	\$ -
409.10 Federal Income Tax			\$ -	\$ 1,253	\$ 1,253
409.11 Oregon Income Tax			\$ -	\$ 590	\$ 590
409.13 Extraordinary Items Income Tax			\$ -	\$ -	\$ -
TOTAL REVENUE DEDUCTIONS	\$ 138,092	\$ (117,992)	\$ 20,100	\$ 15,060	\$ 35,160
Net Operating Income	\$ (135,852)	\$ 135,852	\$ -	\$ 7,103	\$ 7,103

UTILITY RATE BASE					
101 Utility Plant in Service			\$ -	\$ 85,309	\$ 85,309
105 Construction Work in Progress			\$ -	\$ -	\$ -
108 - Accumulated Depreciation of Plant			\$ -	\$ 5,206	\$ 5,206
271 - Contributions in Aid of Construction			\$ -	\$ -	\$ -
272 + Accumulated Amortization of CIAC			\$ -	\$ -	\$ -
281 - Accumulated Deferred Income Tax			\$ -	\$ -	\$ -
- Excess Capacity			\$ -	\$ -	\$ -
= NET RATE BASE INVESTMENT	\$ -	\$ -	\$ -	\$ 80,103	\$ 80,103
Plus: (working capital)					
151 Materials and Supplies Inventory			\$ -	\$ -	\$ -
Working Cash (Total Op Exp /12)			\$ -	\$ 2,489	\$ 2,489
TOTAL RATE BASE	\$ -	\$ -	\$ -	\$ 82,591	\$ 82,591
Rate of Return	0.00%		0.00%		8.60%

Revenue Requirement

Company Proposed Increase
797.32%

Staff Proposed Increase
1368.00%

REVENUES	Test Year	Company Adjustments	Company Proposed Totals	Staff Adjustments to Company Totals	Staff Proposed Totals
460 Unmetered	2,240	17,860	\$ 20,100	\$ 12,783	\$ 32,883
461.1 Residential			\$ -	\$ -	\$ -
461.2 Commercial			\$ -	\$ -	\$ -
462 Fire Protection Sales			\$ -	\$ -	\$ -
465 Irrigation Water Sales			\$ -	\$ -	\$ -
466 Water Sales for Resale			\$ -	\$ -	\$ -
471 Miscellaneous Services			\$ -	\$ -	\$ -
475 Cross Connection Control			\$ -	\$ -	\$ -
Other			\$ -	\$ -	\$ -
			\$ -	\$ -	\$ -
Total Revenue	\$ 2,240	\$ 17,860	\$ 20,100	\$ 12,783	\$ 32,883

Acct . OPERATING EXPENSES

601 Salaries and Wages - Employees			\$ -	\$ -	\$ -
603 Salaries and Wages - Officers			\$ -	\$ -	\$ -
604 Employee Pension & Benefits			\$ -	\$ -	\$ -
610 Purchased Water			\$ -	\$ -	\$ -
611 Telephone/Communications			\$ -	\$ -	\$ -
615 Purchased Power	1,673	7	\$ 1,680	\$ -	\$ 1,680
616 Fuel for Power Production			\$ -	\$ -	\$ -
617 Other Utilities			\$ -	\$ -	\$ -
618 Chemical / Treatment Expense			\$ -	\$ -	\$ -
619 Office Supplies			\$ -	\$ -	\$ -
619.1 Postage	7	(7)	\$ -	\$ -	\$ -
620 O&M Materials/Supplies	-	-	\$ -	\$ -	\$ -
621 Repairs to Water Plant	69,717	(69,717)	\$ -	\$ 1,339	\$ 1,339
631 Contract Svcs - Engineering			\$ -	\$ -	\$ -
632 Contract Svcs - Accounting			\$ -	\$ -	\$ -
633 Contract Svcs - Legal	66,275	(56,375)	\$ 9,900	\$ (7,400)	\$ 2,500
634 Contract Svcs - Management Fees			\$ -	\$ -	\$ -
635 Contract Svcs - Testing	120		\$ 120	\$ 30	\$ 150
636 Contract Svcs - Labor	300	(300)	\$ -	\$ -	\$ -
637 Contract Svcs - Billing/Collection			\$ -	\$ -	\$ -
638 Contract Svcs - Meter Reading			\$ -	\$ -	\$ -
639 Contract Svcs - Other		5,400	\$ 5,400	\$ -	\$ 5,400
641 Rental of Building/Real Property			\$ -	\$ -	\$ -
642 Rental of Equipment			\$ -	\$ -	\$ -
643 Small Tools			\$ -	\$ -	\$ -
648 Computer/Electronic Expenses			\$ -	\$ -	\$ -
650 Transportation			\$ -	\$ -	\$ -
656 Vehicle Insurance			\$ -	\$ -	\$ -
657 General Liability Insurance			\$ -	\$ -	\$ -
658 Workers' Comp Insurance			\$ -	\$ -	\$ -
659 Insurance - Other			\$ -	\$ -	\$ -
666 Amortz. of Rate Case			\$ -	\$ 18,667	\$ 18,667
667 Gross Revenue Fee (PUC)			\$ -	\$ 99	\$ 99
670 Bad Debt Expense			\$ -	\$ -	\$ -
671 Cross Connection Control Program			\$ -	\$ -	\$ -
673 Training and Certification			\$ -	\$ -	\$ -
674 Consumer Confidence Report			\$ -	\$ -	\$ -
675 Miscellaneous Expense			\$ -	\$ -	\$ -
OE1 Contingency Account		3,000	\$ 3,000	\$ (3,000)	\$ -
OE2 Other Expense 2			\$ -	\$ -	\$ -
OE3 Other Expense 3			\$ -	\$ -	\$ -
OE4 Other Expense 4			\$ -	\$ -	\$ -
OE5 Other Expense 5			\$ -	\$ -	\$ -
TOTAL OPERATING EXPENSE	\$ 138,092	\$ (117,992)	\$ 20,100	\$ 9,734	\$ 29,834

OTHER REVENUE DEDUCTIONS

403 Depreciation Expense			\$ -	\$ 535	\$ 535
406 Amort of Plant Acquisition Adjustment			\$ -	\$ -	\$ -
407 Amortization Expense			\$ -	\$ -	\$ -
408.11 Property Tax			\$ -	\$ 901	\$ 901
408.12 Payroll Tax			\$ -	\$ -	\$ -
408.13 Other			\$ -	\$ -	\$ -
409.10 Federal Income Tax			\$ -	\$ 226	\$ 226
409.11 Oregon Income Tax			\$ -	\$ 106	\$ 106
409.13 Extraordinary Items Income Tax			\$ -	\$ -	\$ -
TOTAL REVENUE DEDUCTIONS	\$ 138,092	\$ (117,992)	\$ 20,100	\$ 11,503	\$ 31,603
Net Operating Income	\$ (135,852)	\$ 135,852	\$ -	\$ 1,280	\$ 1,280

UTILITY RATE BASE

101 Utility Plant in Service			\$ -	\$ 85,309	\$ 85,309
105 Construction Work in Progress			\$ -	\$ -	\$ -
108 - Accumulated Depreciation of Plant			\$ -	\$ 5,206	\$ 5,206
271 - Contributions in Aid of Construction			\$ -	\$ 69,717	\$ 69,717
272 + Accumulated Amortization of CIAC			\$ -	\$ 2,017	\$ 2,017
281 - Accumulated Deferred Income Tax			\$ -	\$ -	\$ -
- Excess Capacity			\$ -	\$ -	\$ -
= NET RATE BASE INVESTMENT	\$ -	\$ -	\$ -	\$ 12,403	\$ 12,403
Plus: (working capital)					
151 Materials and Supplies Inventory			\$ -	\$ -	\$ -
Working Cash (Total Op Exp /12)			\$ -	\$ 2,486	\$ 2,486
TOTAL RATE BASE	\$ -	\$ -	\$ -	\$ 14,889	\$ 14,889
Rate of Return	0.00%		0.00%		8.60%

Option A

Adjustment Summary

	REVENUES	Company Proposed Totals	Staff Adjustments to Company Totals	Staff Proposed Totals	Explanation of Adjustment
	Unmetered	\$ 20,100	\$ 22,163	\$ 42,263	
	Residential	\$ -	\$ -	\$ -	
	Commercial	\$ -	\$ -	\$ -	
	Fire Protection Sales	\$ -	\$ -	\$ -	
	Irrigation Water Sales	\$ -	\$ -	\$ -	
	Water Sales for Resale	\$ -	\$ -	\$ -	
	Miscellaneous Services	\$ -	\$ -	\$ -	
	Cross Connection Control	\$ -	\$ -	\$ -	
	Other	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	
	Total Revenue	\$ 20,100	\$ 22,163	\$ 42,263	
Acct.	OPERATING EXPENSES				
601	Salaries and Wages - Employees	\$ -	\$ -	\$ -	
603	Salaries and Wages - Officers	\$ -	\$ -	\$ -	
604	Employee Pension & Benefits	\$ -	\$ -	\$ -	
610	Purchased Water	\$ -	\$ -	\$ -	
611	Telephone/Communications	\$ -	\$ -	\$ -	
615	Purchased Power	\$ 1,680	\$ -	\$ 1,680	Actual numbers
616	Fuel for Power Production	\$ -	\$ -	\$ -	
617	Other Utilities	\$ -	\$ -	\$ -	
618	Chemical / Treatment Expense	\$ -	\$ -	\$ -	
619	Office Supplies	\$ -	\$ -	\$ -	
619.1	Postage	\$ -	\$ -	\$ -	
620	O&M Materials/Supplies	\$ -	\$ -	\$ -	
621	Repairs to Water Plant	\$ -	\$ 1,339	\$ 1,339	Based on average repair receipts for 2010-2015
631	Contract Svcs - Engineering	\$ -	\$ -	\$ -	
632	Contract Svcs - Accounting	\$ -	\$ -	\$ -	
633	Contract Svcs - Legal	\$ 9,900	\$ (7,400)	\$ 2,500	Non-rate case related numbers
634	Contract Svcs - Management Fees	\$ -	\$ -	\$ -	
635	Contract Svcs - Testing	\$ 120	\$ 30	\$ 150	Actual numbers
636	Contract Svcs - Labor	\$ -	\$ -	\$ -	
637	Contract Svcs - Billing/Collection	\$ -	\$ -	\$ -	
638	Contract Svcs - Meter Reading	\$ -	\$ -	\$ -	
639	Contract Svcs - Other	\$ 5,400	\$ -	\$ 5,400	New Operator to run water system.
641	Rental of Building/Real Property	\$ -	\$ -	\$ -	
642	Rental of Equipment	\$ -	\$ -	\$ -	
643	Small Tools	\$ -	\$ -	\$ -	
648	Computer/Electronic Expenses	\$ -	\$ -	\$ -	
650	Transportation	\$ -	\$ -	\$ -	
656	Vehicle Insurance	\$ -	\$ -	\$ -	
657	General Liability Insurance	\$ -	\$ -	\$ -	
658	Workers' Comp Insurance	\$ -	\$ -	\$ -	
659	Insurance - Other	\$ -	\$ -	\$ -	
666	Amortz. of Rate Case	\$ -	\$ 18,667	\$ 18,667	Amortization of \$56,000 rate case costs over 3 years
667	Gross Revenue Fee (PUC)	\$ -	\$ 127	\$ 127	Automatic calculation
670	Bad Debt Expense	\$ -	\$ -	\$ -	
671	Cross Connection Control Program	\$ -	\$ -	\$ -	
673	Training and Certification	\$ -	\$ -	\$ -	
674	Consumer Confidence Report	\$ -	\$ -	\$ -	
675	Miscellaneous Expense	\$ -	\$ -	\$ -	
OE1	Contingency Account	\$ 3,000	\$ (3,000)	\$ -	Removed due to 9.5 ROR
OE2	Other Expense 2	\$ -	\$ -	\$ -	
OE3	Other Expense 3	\$ -	\$ -	\$ -	
OE4	Other Expense 4	\$ -	\$ -	\$ -	
OE5	Other Expense 5	\$ -	\$ -	\$ -	
	TOTAL OPERATING EXPENSE	\$ 20,100	\$ 9,762	\$ 29,862	
	OTHER REVENUE DEDUCTIONS				
403	Depreciation Expense	\$ -	\$ 2,552	\$ 2,552	Plant worksheet received 10-6-17
406	Amort of Plant Acquisition Adjustment	\$ -	\$ -	\$ -	
407	Amortization Expense	\$ -	\$ -	\$ -	
408.11	Property Tax	\$ -	\$ 901	\$ 901	1.13 percent of invested plant
408.12	Payroll Tax	\$ -	\$ -	\$ -	
408.13	Other	\$ -	\$ -	\$ -	
409.10	Federal Income Tax	\$ -	\$ 1,253	\$ 1,253	Automatic calculation
409.11	Oregon Income Tax	\$ -	\$ 590	\$ 590	Automatic calculation
409.13	Extraordinary Items Income Tax	\$ -	\$ -	\$ -	
	TOTAL REVENUE DEDUCTIONS	\$ 20,100	\$ 15,060	\$ 35,160	
	Net Operating Income	\$ -	\$ 7,103	\$ 7,103	
	UTILITY RATE BASE				
101	Utility Plant in Service	\$ -	\$ 85,309	\$ 85,309	Plant worksheet received 10-6-17
105	Construction Work in Progress	\$ -	\$ -	\$ -	
108	- Accumulated Depreciation of Plant	\$ -	\$ 5,206	\$ 5,206	Plant worksheet received 10-6-17
271	- Contributions in Aid of Construction	\$ -	\$ -	\$ -	
272	+ Accumulated Amortization of CIAC	\$ -	\$ -	\$ -	
281	- Accumulated Deferred Income Tax	\$ -	\$ -	\$ -	
	- Excess Capacity	\$ -	\$ -	\$ -	
	= NET RATE BASE INVESTMENT	\$ -	\$ 80,103	\$ 80,103	
	Plus: (working capital)				
151	Materials and Supplies Inventory	\$ -	\$ -	\$ -	
	Working Cash (Total Op Exp /12)	\$ -	\$ 2,489	\$ 2,489	
	TOTAL RATE BASE	\$ -	\$ 82,591	\$ 82,591	
	Rate of Return	0.00%	0.00%	8.60%	

Option B

Adjustment Summary

	REVENUES	Company Proposed Totals	Staff Adjustments to Company Totals	Staff Proposed Totals	Explanation of Adjustment
	Unmetered	\$ 20,100	\$ 12,783	\$ 32,883	
	Residential	\$ -	\$ -	\$ -	
	Commercial	\$ -	\$ -	\$ -	
	Fire Protection Sales	\$ -	\$ -	\$ -	
	Irrigation Water Sales	\$ -	\$ -	\$ -	
	Water Sales for Resale	\$ -	\$ -	\$ -	
	Miscellaneous Services	\$ -	\$ -	\$ -	
	Cross Connection Control	\$ -	\$ -	\$ -	
	Other	\$ -	\$ -	\$ -	
	0	\$ -	\$ -	\$ -	
	Total Revenue	\$ 20,100	\$ 12,783	\$ 32,883	
Acct .	OPERATING EXPENSES				
601	Salaries and Wages - Employees	\$ -	\$ -	\$ -	
603	Salaries and Wages - Officers	\$ -	\$ -	\$ -	
604	Employee Pension & Benefits	\$ -	\$ -	\$ -	
610	Purchased Water	\$ -	\$ -	\$ -	
611	Telephone/Communications	\$ -	\$ -	\$ -	
615	Purchased Power	\$ 1,680	\$ -	\$ 1,680	Actual numbers
616	Fuel for Power Production	\$ -	\$ -	\$ -	
617	Other Utilities	\$ -	\$ -	\$ -	
618	Chemical / Treatment Expense	\$ -	\$ -	\$ -	
619	Office Supplies	\$ -	\$ -	\$ -	
619.1	Postage	\$ -	\$ -	\$ -	
620	O&M Materials/Supplies	\$ -	\$ -	\$ -	
621	Repairs to Water Plant	\$ -	\$ 1,339	\$ 1,339	Based on average repair receipts for 2010-2015
631	Contract Svcs - Engineering	\$ -	\$ -	\$ -	
632	Contract Svcs - Accounting	\$ -	\$ -	\$ -	
633	Contract Svcs - Legal	\$ 9,900	\$ (7,400)	\$ 2,500	Non-rate case related numbers
634	Contract Svcs - Management Fees	\$ -	\$ -	\$ -	
635	Contract Svcs - Testing	\$ 120	\$ 30	\$ 150	Actual numbers
636	Contract Svcs - Labor	\$ -	\$ -	\$ -	
637	Contract Svcs - Billing/Collection	\$ -	\$ -	\$ -	
638	Contract Svcs - Meter Reading	\$ -	\$ -	\$ -	
639	Contract Svcs - Other	\$ 5,400	\$ -	\$ 5,400	New Operator to run water system
641	Rental of Building/Real Property	\$ -	\$ -	\$ -	
642	Rental of Equipment	\$ -	\$ -	\$ -	
643	Small Tools	\$ -	\$ -	\$ -	
648	Computer/Electronic Expenses	\$ -	\$ -	\$ -	
650	Transportation	\$ -	\$ -	\$ -	
656	Vehicle Insurance	\$ -	\$ -	\$ -	
657	General Liability Insurance	\$ -	\$ -	\$ -	
658	Workers' Comp Insurance	\$ -	\$ -	\$ -	
659	Insurance - Other	\$ -	\$ -	\$ -	
666	Amortz. of Rate Case	\$ -	\$ 18,667	\$ 18,667	Amortization of \$56,000 rate case costs over 3 years
667	Gross Revenue Fee (PUC)	\$ -	\$ 99	\$ 99	Automatic calculation
670	Bad Debt Expense	\$ -	\$ -	\$ -	
671	Cross Connection Control Program	\$ -	\$ -	\$ -	
673	Training and Certification	\$ -	\$ -	\$ -	
674	Consumer Confidence Report	\$ -	\$ -	\$ -	
675	Miscellaneous Expense	\$ -	\$ -	\$ -	
OE1	Contingency Account	\$ 3,000	\$ (3,000)	\$ -	Removed due to ROR
OE2	Other Expense 2	\$ -	\$ -	\$ -	
OE3	Other Expense 3	\$ -	\$ -	\$ -	
OE4	Other Expense 4	\$ -	\$ -	\$ -	
OE5	Other Expense 5	\$ -	\$ -	\$ -	
	TOTAL OPERATING EXPENSE	\$ 20,100	\$ 9,734	\$ 29,834	
	OTHER REVENUE DEDUCTIONS				
403	Depreciation Expense	\$ -	\$ 535	\$ 535	Plant worksheet received 10-6-17
406	Amort of Plant Acquisition Adjustment	\$ -	\$ -	\$ -	
407	Amortization Expense	\$ -	\$ -	\$ -	
408.11	Property Tax	\$ -	\$ 901	\$ 901	1.13 percent of invested plant
408.12	Payroll Tax	\$ -	\$ -	\$ -	
408.13	Other	\$ -	\$ -	\$ -	
409.10	Federal Income Tax	\$ -	\$ 226	\$ 226	Automatic calculation
409.11	Oregon Income Tax	\$ -	\$ 106	\$ 106	Automatic calculation
409.13	Extraordinary Items Income Tax	\$ -	\$ -	\$ -	
	TOTAL REVENUE DEDUCTIONS	\$ 20,100	\$ 11,503	\$ 31,603	
	Net Operating Income	\$ -	\$ 1,280	\$ 1,280	
	UTILITY RATE BASE				
101	Utility Plant in Service	\$ -	\$ 85,309	\$ 85,309	Plant worksheet received 10-6-17
105	Construction Work in Progress	\$ -	\$ -	\$ -	
108	- Accumulated Depreciation of Plant	\$ -	\$ 5,206	\$ 5,206	Plant worksheet received 10-6-17
271	- Contributions in Aid of Construction	\$ -	\$ 69,717	\$ 69,717	Added all well to CIAC contingent on \$23,333 assessment of well costs
272	+ Accumulated Amortization of CIAC	\$ -	\$ 2,017	\$ 2,017	
281	- Accumulated Deferred Income Tax	\$ -	\$ -	\$ -	
	- Excess Capacity	\$ -	\$ -	\$ -	
	= NET RATE BASE INVESTMENT	\$ -	\$ 12,403	\$ 12,403	
	Plus: (working capital)				
151	Materials and Supplies Inventory	\$ -	\$ -	\$ -	
	Working Cash (Total Op Exp /12)	\$ -	\$ 2,486	\$ 2,486	
	TOTAL RATE BASE	\$ -	\$ 14,889	\$ 14,889	
	Rate of Return	0.00%	0.00%	8.60%	

Option A

Staff/102
Grindeland/5**Rate Design**

Unmetered				Revenue Allocation:		42,263
Allocated to Base Rates: 100.00% Allocated to Commodity Rates: 0.00%						
Base Rates				Revenue Allocation:		42,263
Meter Size	Customers	Factors	Customer Equivalency	% of Total	Revenue Allocation	Base Rate
Unmetered	3	1.0	3	100.00%	\$ 42,263	\$ 1,173.96
TOTAL	3		3	100.00%	\$ 42,263	
Commodity Rate				Revenue Allocation:		-
Annual Consumption		Cubic Feet				
Unit of Measurement	100	Cubic Feet				
Annual Units of Consumption	-	Units				
Commodity Rate:	\$ -	per unit				

Option B

Staff/102
Grindeland/6

Rate Design

Unmetered				Revenue Allocation:		32,883
Allocated to Base Rates: 100.00% Allocated to Commodity Rates: 0.00%						
Base Rates				Revenue Allocation:		32,883
Meter Size	Customers	Factors	Customer Equivalency	% of Total	Revenue Allocation	Base Rate
Unmetered	3	1.0	3	100.00%	\$ 32,883	\$ 913.42
TOTAL	3		3	100.00%	\$ 32,883	
Commodity Rate				Revenue Allocation:		-
Annual Consumption		Cubic Feet				
Unit of Measurement	100	Cubic Feet				
Annual Units of Consumption	-	Units				
Commodity Rate:	\$ -	per unit				

Option A

Invested Plant

Acct No.	Account Description	Date Acquired	Utility Plant Orig Cost	Less Excess Capacity Adj to Plant	Total Adj Plant	NARUC Asset Life	Annual Deprec	Final Month of Deprec	2016	Accum. Deprec. Ending 2016	Remaining Plant
301	Organization	Various	-	-	-	-	-	Various	-	-	-
302	Franchises	Various	-	-	-	-	-	Various	-	-	-
303	Land and Land Rights	Various	-	-	-	-	-	Various	-	-	-
304	Structures and Improvements	Various	9,145	-	9,145	35	261	Various	174	174	8,971
	Pump House Rebuild	May 2016	9,145	-	9,145	35	261	Apr 2051	174	174	8,971
					-	35	-		-	-	-
					-	35	-		-	-	-
305	Collecting and Impounding Reservoirs	Various	-	-	-	50	-	Various	-	-	-
306	Lake, River and Other Intakes	Various	-	-	-	35	-	Various	-	-	-
307	Wells and Springs	Various	45,496	-	45,496	25	1,820	Various	1,365	1,365	44,131
	New Well	Apr 2016	45,496	-	45,496	25	1,820	Mar 2041	1,365	1,365	44,131
					-	25	-		-	-	-
					-	25	-		-	-	-
					-	25	-		-	-	-
308	Infiltration Galleries and Tunnels	Various	-	-	-	25	-	Various	-	-	-
309	Supply Main	Various	9,099	-	9,099	50	182	Various	163	1,061	8,038
	New lines to pump house	Apr 2016	3,866	-	3,866	50	77	Mar 2066	58	58	3,808
	Pressure tanks	Jun 2007	5,233	-	5,233	50	105	May 2057	105	1,003	4,230
					-	50	-		-	-	-
					-	50	-		-	-	-
310	Power Generation Equipment	Various	3,049	-	3,049	30	102	Various	102	296	2,753
	New drive	Feb 2014	3,049	-	3,049	30	102	Jan 2044	102	296	2,753
					-	30	-		-	-	-
					-	30	-		-	-	-
					-	30	-		-	-	-
311	Pumping Equipment	Various	16,307	-	16,307	20	815	Various	675	1,738	14,569
	New Pump	Apr 2016	11,210	-	11,210	20	561	Mar 2036	420	420	10,790
	Pump controller	Jun 2012	3,935	-	3,935	20	197	Jun 2032	197	902	3,033
	Booster pump	Jul 2010	649	-	649	20	32	Jun 2030	32	211	438
	Clamp supports	Jan 2009	513	-	513	20	26	Dec 2028	26	205	308
Option A											
320	Water Treatment Equipment	Various	-	-	-	20	-	Various	-	-	-
330	Distribution Reservoir and Standpipes	Various	-	-	-	50	-	Various	-	-	-
331	Transmission and Distribution Mains	Various	-	-	-	50	-	Various	-	-	-
333	Services	Various	-	-	-	30	-	Various	-	-	-
334	Meters and Meter Installations	Various	-	-	-	20	-	Various	-	-	-
335	Hydrants	Various	-	-	-	40	-	Various	-	-	-
336	Cross Connection Control	Various	-	-	-	15	-	Various	-	-	-
339	Other Plant	Various	2,213	-	2,213	30	74	Various	74	572	1,641
	Sounding tube	Apr 2009	2,213	-	2,213	30	74	Mar 2039	74	572	1,641
					-	30	-		-	-	-
					-	30	-		-	-	-
					-	30	-		-	-	-
340	Office Furniture and Equipment	Various	-	-	-	20	-	Various	-	-	-
341	Transportation Equipment	Various	-	-	-	7	-	Various	-	-	-
343	Tools, Shop, and Garage Equipment	Various	-	-	-	15	-	Various	-	-	-
344	Laboratory Equipment	Various	-	-	-	15	-	Various	-	-	-
345	Power Operated Equipment	Various	-	-	-	10	-	Various	-	-	-
346	Communication Equipment	Various	-	-	-	10	-	Various	-	-	-
347	Electronic/Computer Equipment	Various	-	-	-	5	-	Various	-	-	-
348	Miscellaneous Equipment	Various	-	-	-	10	-	Various	-	-	-
TOTALS			85,309	-	85,309	Various	3,254	Various	2,552	5,206	80,103

Page 8

Original Plant In Service Cost	85,309
Less: Excess Capacity	-
"Used & Useful" Plant	85,309
Less Accum Depreciation	5,206
NET PLANT	80,103

Depreciation Expense	2,552
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Option B

Invested Plant

Acct No.	Account Description	Date Acquired	Utility Plant Orig Cost	Less Excess Capacity Adj to Plant	Total Adj Plant	NARUC Asset Life	Annual Deprec	Final Month of Deprec	2016	Accum. Deprec. Ending 2016	Remaining Plant
301	Organization	Various	-	-	-	-	-	Various	-	-	-
302	Franchises	Various	-	-	-	-	-	Various	-	-	-
303	Land and Land Rights	Various	-	-	-	-	-	Various	-	-	-
304	Structures and Improvements	Various	-	-	-	35	-	Various	-	-	-
					-	35	-		-	-	-
					-	35	-		-	-	-
					-	35	-		-	-	-
					-	35	-		-	-	-
305	Collecting and Impounding Reservoirs	Various	-	-	-	50	-	Various	-	-	-
306	Lake, River and Other Intakes	Various	-	-	-	35	-	Various	-	-	-
307	Wells and Springs	Various	-	-	-	25	-	Various	-	-	-
					-	25	-		-	-	-
					-	25	-		-	-	-
					-	25	-		-	-	-
					-	25	-		-	-	-
308	Infiltration Galleries and Tunnels	Various	-	-	-	25	-	Various	-	-	-
309	Supply Main	Various	5,233	-	5,233	50	105	Various	105	1,003	4,230
	Pressure tanks	Jun 2007	5,233		5,233	50	105	May 2057	105	1,003	4,230
					-	50	-		-	-	-
					-	50	-		-	-	-
310	Power Generation Equipment	Various	3,049	-	3,049	30	102	Various	102	296	2,753
	New drive	Feb 2014	3,049		3,049	30	102	Jan 2044	102	296	2,753
					-	30	-		-	-	-
					-	30	-		-	-	-
					-	30	-		-	-	-
311	Pumping Equipment	Various	5,097	-	5,097	20	255	Various	255	1,318	3,779
					-	20	-		-	-	-
	Pump controller	Jun 2012	3,935		3,935	20	197	Jun 2032	197	902	3,033
	Booster pump	Jul 2010	649		649	20	32	Jun 2030	32	211	438
	Clamp supports	Jan 2009	513		513	20	26	Dec 2028	26	205	308
Option B										Page 10	
320	Water Treatment Equipment	Various	-	-	-	20	-	Various	-	-	-
330	Distribution Reservoir and Standpipes	Various	-	-	-	50	-	Various	-	-	-
331	Transmission and Distribution Mains	Various	-	-	-	50	-	Various	-	-	-
333	Services	Various	-	-	-	30	-	Various	-	-	-
334	Meters and Meter Installations	Various	-	-	-	20	-	Various	-	-	-
335	Hydrants	Various	-	-	-	40	-	Various	-	-	-
336	Cross Connection Control	Various	-	-	-	15	-	Various	-	-	-
339	Other Plant	Various	2,213	-	2,213	30	74	Various	74	572	1,641
	Sounding tube	Apr 2009	2,213		2,213	30	74	Mar 2039	74	572	1,641
					-	30	-		-	-	-
					-	30	-		-	-	-
					-	30	-		-	-	-
340	Office Furniture and Equipment	Various	-	-	-	20	-	Various	-	-	-
341	Transportation Equipment	Various	-	-	-	7	-	Various	-	-	-
343	Tools, Shop, and Garage Equipment	Various	-	-	-	15	-	Various	-	-	-
344	Laboratory Equipment	Various	-	-	-	15	-	Various	-	-	-
345	Power Operated Equipment	Various	-	-	-	10	-	Various	-	-	-
346	Communication Equipment	Various	-	-	-	10	-	Various	-	-	-
347	Electronic/Computer Equipment	Various	-	-	-	5	-	Various	-	-	-
348	Miscellaneous Equipment	Various	-	-	-	10	-	Various	-	-	-
TOTALS		Various	15,592	-	15,592	Various	535	Various	535	3,189	12,403

Original Plant In Service Cost	15,592
Less: Excess Capacity	-
"Used & Useful" Plant	15,592
Less Accum Depreciation	3,189
NET PLANT	12,403

Depreciation Expense	535
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Option B

CIAC Plant

Acct No.	Account Description	Date Acquired	Utility Plant Orig Cost	Less Excess Capacity Adj to Plant	Total Adj Plant	NARUC Asset Life	Annual Deprec	Final Month of Deprec	2016	Accum. Deprec. Ending 2016	Remaining Plant
301	Organization	Various	-	-	-	-	-	Various	-	-	-
302	Franchises	Various	-	-	-	-	-	Various	-	-	-
303	Land and Land Rights	Various	-	-	-	-	-	Various	-	-	-
304	Structures and Improvements	Various	9,145	-	9,145	35	261	Various	174	174	8,971
	Pump House Rebuild	May 2016	9,145	-	9,145	35	261	Apr 2051	174	174	8,971
					-	35	-		-	-	-
					-	35	-		-	-	-
					-	35	-		-	-	-
305	Collecting and Impounding Reservoirs	Various	-	-	-	50	-	Various	-	-	-
306	Lake, River and Other Intakes	Various	-	-	-	35	-	Various	-	-	-
307	Wells and Springs	Various	45,496	-	45,496	25	1,820	Various	1,365	1,365	44,131
	New Well	Apr 2016	45,496	-	45,496	25	1,820	Mar 2041	1,365	1,365	44,131
					-	25	-		-	-	-
					-	25	-		-	-	-
					-	25	-		-	-	-
308	Infiltration Galleries and Tunnels	Various	-	-	-	25	-	Various	-	-	-
309	Supply Main	Various	3,866	-	3,866	50	77	Various	58	58	3,808
	New lines to pump house	Apr 2016	3,866	-	3,866	50	77	Mar 2066	58	58	3,808
					-	50	-		-	-	-
					-	50	-		-	-	-
					-	50	-		-	-	-
					-	50	-		-	-	-
310	Power Generation Equipment	Various	-	-	-	30	-	Various	-	-	-
311	Pumping Equipment	Various	11,210	-	11,210	20	561	Various	420	420	10,790
	New Pump	Apr 2016	11,210	-	11,210	20	561	Mar 2036	420	420	10,790
					-	20	-		-	-	-
					-	20	-		-	-	-
					-	20	-		-	-	-
					-	20	-		-	-	-
					-	20	-		-	-	-

Option B

Page 12

320	Water Treatment Equipment	Various	-	-	-	20	-	Various	-	-	-
330	Distribution Reservoir and Standpipes	Various	-	-	-	50	-	Various	-	-	-
331	Transmission and Distribution Mains	Various	-	-	-	50	-	Various	-	-	-
333	Services	Various	-	-	-	30	-	Various	-	-	-
334	Meters and Meter Installations	Various	-	-	-	20	-	Various	-	-	-
335	Hydrants	Various	-	-	-	40	-	Various	-	-	-
336	Cross Connection Control	Various	-	-	-	15	-	Various	-	-	-
339	Other Plant	Various	-	-	-	30	-	Various	-	-	-
340	Office Furniture and Equipment	Various	-	-	-	20	-	Various	-	-	-
341	Transportation Equipment	Various	-	-	-	7	-	Various	-	-	-
343	Tools, Shop, and Garage Equipment	Various	-	-	-	15	-	Various	-	-	-
344	Laboratory Equipment	Various	-	-	-	15	-	Various	-	-	-
345	Power Operated Equipment	Various	-	-	-	10	-	Various	-	-	-
346	Communication Equipment	Various	-	-	-	10	-	Various	-	-	-
347	Electronic/Computer Equipment	Various	-	-	-	5	-	Various	-	-	-
348	Miscellaneous Equipment	Various	-	-	-	10	-	Various	-	-	-
TOTALS		Various	69,717	-	69,717	Various	2,719	Various	2,017	2,017	67,700

Original Plant In Service Cost	69,717
Less: Excess Capacity	-
"Used & Useful" Plant	69,717
Less Accum Amort of CIAC	2,017
NET PLANT	67,700

Depreciation Expense	2,017
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CASE: UW 172
WITNESS: JOAN GRINDELAND

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 103

Exhibits in Support of Testimony

January 4, 2018

**Jennie Bricker
Land & Water Law**

818 SW Third Avenue, PMB 1517
Portland, Oregon 97204

Email: jennie@jbrickerlaw.com
Telephone: 503-928-0976

December 30, 2017

Public Utility Company of Oregon
Filing Center
PO Box 1088
Salem, OR 97308-1088

Re: UW 172 — Response to Data Request No. 24

Following is the response by the Mountain Home Water District (the "Company") to Staff Data Request No. 24, dated December 19, 2017.

24. Please verify, in writing, that Nate Seymour has terminated service with the District. If he has not disconnected his service please provide an estimate of when that will occur. Please notify Staff, in writing, of the actual date of termination if he is still receiving service.

Company Response: Nate Seymour has not yet terminated his water service. The new well on his property was completed September 21, 2017; the Water Supply Well Report filed with the Oregon Water Resources Department is attached as Exhibit 19. On December 28, 2017, Mr. Seymour provided the following update on completion of his water system: "I spoke with my plumber/electrician and he will be starting the project on January 8. As long as everything goes well my hope is to have the pump contractor come in the following week January 15 to finish their portion of the work." Therefore the Company estimates that Mr. Seymour will terminate service by January 31, 2018.

Respectfully submitted,

/s/ Jennie L. Bricker
Jennie L. Bricker, OSB No. 975240
Attorney for Mountain Home Water District

Direct Telephone: 503-928-0976
E-Mail: jennie@jbrickerlaw.com

818 SW Third Avenue, PMB 1517
Portland, OR 97204

cc: UW 172 Service List (electronic only)

PAGE 1 – UW 172: MOUNTAIN HOME WATER DISTRICT RESPONSE TO STAFF DR NO. 24

Jennie Bricker Land & Water Law
818 SW Third Avenue, No. 1517, Portland, OR 97204
(503) 928-0976 | jennie@jbrickerlaw.com

Mountain Home Water District

RECEIVED

JUN 01 2017

P.U.C.

May 31, 2017

Mel Kroker
2333 SW Turner Road
West Linn, OR 97068

Nate Seymour
2385 SW Buckman Road
West Linn, OR 97068

Via Certified Priority Mail, Return Receipt Requested

On April 1, 2016, Mountain Home Water District applied to the Oregon Public Utility Commission to terminate service and abandon its public water utility. The OPUC denied the application on May 16, 2017. We believe you are both aware of the circumstances, but please let us know if you have questions.

As a result of the OPUC order, there will be several changes to your water service going forward:

1. Water delivered by the District may no longer be used for any landscape irrigation. Please refer to the attached "**Notice to Restrict Water Use.**" This change takes effect immediately, as of June 1, 2017.
2. The base charge for water service is increased to \$200 per month. Please refer to the attached "**Notice of Proposed Water Rate Increase.**" This change takes effect August 1, 2017. Please note that we are looking for a contractor to manage the District. When we hire a contractor, the monthly rate will likely increase again to cover the manager's compensation.
3. We made nonroutine repairs to the water system in 2016 but did not bill customers for a share of the costs, which totaled more than \$70,000. With two customers left on the system, we require reimbursement of \$17,500. If only one customer remains on the system, we will require reimbursement of \$35,000. The amount of \$17,500 is due and payable by June 30, 2017. Please refer to the attached "**Notice of Under-Billing and Right to Enter Time-Payment Agreement.**"

Sincerely,

/s/ Keith Ironside

Keith Ironside

NOTICE TO RESTRICT WATER USE

OAR 860-036-1670

June 1, 2017

Legal Name of Water Utility:	Mountain Home Water District (ID #5299)
Name of Water System if Different:	N/A
Name of Owner or Officer:	Keith Ironside
Mailing Address:	2323 SW Buckman Road
City, State, Zip:	West Linn, OR 97068
Location Address if Different:	2351 SW Buckman Road
City, State, Zip:	West Linn, OR 97068
Utility Telephone Number:	503-638-7006
Emergency Phone Number:	503-475-8463
Email Address:	kironside@gmail.com
Website if Available:	N/A

1. The purpose of this notice is to inform you that, effective immediately, the Mountain Home Water District will restrict its customers' water use to indoor residential use only. Water delivered by the District may not be used for irrigation, including lawn, garden, and landscape irrigation.

The restriction is necessary because the District's water source is an exempt-use well under rules enforced by the Oregon Water Resources Department. The restriction prohibiting irrigation will allow us to comply with OWRD limitations on lawn and garden irrigation.

2. The District provides water service on a flat-fee, unmetered basis. This restriction is based on the type, not the amount, of water used. Customers may not use District water for any irrigation.
3. The effective date of this restriction is June 1, 2017.
4. This restriction will be lifted only if the OWRD changes its regulation of exempt-use wells to allow more lenient lawn and garden irrigation.
5. Failure to comply with this restriction is grounds for service disconnection.

cc: PUC Consumer Services Section, PO Box 1088, Salem OR 97308-1088

NOTICE OF PROPOSED WATER RATE INCREASE AND CUSTOMER'S RIGHT TO PETITION FOR RATE REGULATION

OAR 860-036-1920

June 1, 2017

Legal Name of Water Utility:	Mountain Home Water District (ID #5299)
Name of Water System if Different:	N/A
Name of Owner or Officer:	Keith Ironside
Mailing Address:	2323 SW Buckman Road
City, State, Zip:	West Linn, OR 97068
Location Address if Different:	2351 SW Buckman Road
City, State, Zip:	West Linn, OR 97068
Utility Telephone Number:	503-638-7006
Emergency Phone Number:	503-475-8463
Email Address:	kironside@gmail.com
Website if Available:	N/A

1. The purpose of this notice is to inform you that Mountain Home Water District is proposing to increase your water service rates. The rates will go into effect 60 days from the date of this notice unless the Public Utility Commission of Oregon receives petitions from at least 20 percent of the customers requesting rate regulation.

The District is increasing its rates because (1) two of the District's four customers have left the system, but the monthly costs of service (such as electricity and water quality testing) are expected to remain the same; (2) the age of the water system, and the increasing incidence of leaks in the system, indicate that major repairs are likely in the near term, and the District does not have reserves to pay those costs; (3) the District has historically operated at a loss, with subsidization by the owner, but the District is seeking to correct that situation.

2. The table below shows the District's current rates and proposed new rates:

SERVICE	CURRENT RATES	PROPOSED RATES
Residential Service	\$80 per month	\$200 per month

3. The effective date of this rate change is August 1, 2017.

NOTICE OF UNDER-BILLING AND RIGHT TO ENTER TIME-PAYMENT AGREEMENT

OAR 860-036-1420

June 1, 2017

Legal Name of Water Utility:	Mountain Home Water District (ID #5299)
Name of Water System if Different:	N/A
Name of Owner or Officer:	Keith Ironside
Mailing Address:	2323 SW Buckman Road
City, State, Zip:	West Linn, OR 97068
Location Address if Different:	2351 SW Buckman Road
City, State, Zip:	West Linn, OR 97068
Utility Telephone Number:	503-638-7006
Emergency Phone Number:	503-475-8463
Email Address:	kironside@gmail.com
Website if Available:	N/A

1. This notice is directed to:
Mel Kroker
2333 SW Turner Road
West Linn, OR 97068
2. The purpose of this notice is to inform you that we have under-billed you for infrastructure repair and replacement costs incurred in 2016. Specifically, we experienced a failure of the original well serving the water system in March 2016. We made repairs to the water system, including a new water supply well. We did not request reimbursement of these costs from customers because we had decided to apply for termination and abandonment. The Public Utility Commission denied our application on May 16, 2017. Accordingly, water service will continue, and we are requiring a contribution from each customer of one-quarter of the total costs borne by the District in 2016, \$70,000.00.
3. The under-billing took place in April 2016.
4. The amount you owe is \$17,500.00, assuming that the other customer elects to continue receiving water service. If he does not, you will owe \$35,000.00, and we will reissue this notice.
5. This amount is due and payable. You have the right to enter into a time-payment agreement with the District. You have three options:

4. The District is required to provide a complete customer list (including names and addresses) within 10 days of receiving a request from any customer. Since the District has only two customers, we will provide the list here:

- a. Mel Kroker
2333 SW Turner Road
West Linn, OR 97068
- b. Nate Seymour
2385 SW Buckman Road
West Linn, OR 97068

NOTICE FROM THE PUBLIC UTILITY COMMISSION OF OREGON

Customers have the opportunity to file a petition to have the water utility's rates regulated by the Commission. The water utility is proposing rates in excess of the threshold levels set by the Commission. If the Commission receives valid petitions from at least 20 percent of the customers, the Commission will assert jurisdiction over your water utility. Rate regulation requires that all rates and rate changes be approved by the Commission. If the Commission does not receive the sufficient number of valid customer petitions, the water utility's proposed rates will take effect on the date indicated.

Petition forms are available on the Commission's website at <http://www.puc.state.or.us/Pages/Information-for-Customers.aspx>. The petitions must be completed and signed by the customer and must be received by the Commission within 45 days of this notice. Copies of petitions or petitions without an original signature will not be accepted.

Completed petitions must be mailed to the Consumer Services Section, PO Box 1088, Salem, Oregon 97308-1088 or delivered to 201 High Street SE, Suite 100, Salem, Oregon 97301. Petitions may not be filed electronically. Petitions may not be withdrawn or rescinded. Customers with questions may contact the Consumer Services Section at 1-800-522-2404.

cc: PUC Consumer Services Section, PO Box 1088, Salem OR 97308-1088

- a. Pay the entire amount owing, \$17,500.00, by June 30, 2017.
 - b. Enter into a levelized-pay arrearage plan. If you choose this option, you must make an initial payment equal to one-twelfth of the sum of the average annual bill and past-due balance. The initial payment, \$1658.33, is due within one business day of the date you agree to enter into a levelized-pay arrearage plan. You will be required to make a like payment of \$1658.33 each month for the next 11 months. The District will review the levelized-pay arrearage plan within four to six months of the agreement and modify payments if there is a change in rates or significant variation in the amount of water you consume.
 - c. Enter into an equal-pay arrearage plan. If you choose this option, you must make an initial payment equal to one-twelfth the account amount, \$1458.33, and a like payment for each of the next 11 months, plus pay monthly amounts billed for current usage.
6. You may dispute this under-billing through the Oregon Public Utility Commission's Consumer Services Section's dispute resolution process. The Consumer Services Section can be reached by telephone at 503-378-6600, or 1-800-522-2404, or TTY 711; by email at puc.consumer@state.or.us; through the OPUC website at <http://apps.puc.state.or.us/consumer/complaint.asp>; or at the following addresses:

Street Address

Public Utility Commission of Oregon
Consumer Services Section
201 High Street NE, Suite 100
Salem, Oregon 97301-3398

Mailing Address

Public Utility Commission of Oregon
Consumer Services Section
PO Box 1088
Salem OR 97308-1088

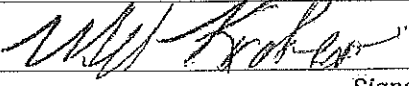
PETITION REQUESTING RATE REGULATION

AS PROVIDED IN ORS 757.061(6)(b) & 757.063, THE UNDERSIGNED REQUEST THE PUBLIC UTILITY COMMISSION OF OREGON ASSERT RATE REGULATION OVER

Mountain Home Water District (ID #5299)

FOR ASSOCIATIONS	FOR WATER UTILITIES
<ul style="list-style-type: none"> • Petitioners must be current members. • Petitions may be submitted to the Commission at any time. • Petitions will not be accepted by electronic mail. • Petitions are in effect for six months from the date PUC receives the petition. • Petitions may not be withdrawn or rescinded. • Individual member letters may be submitted in lieu of a petition. 	<ul style="list-style-type: none"> • Petitioners must be current customers. • Petitions may be submitted to the Commission when utility raises or proposes to raise rates above thresholds in OAR 860-036-1910. • Petitions will not be accepted by electronic mail. • The Commission must receive petitions within 45 days from the date PUC receives utility notice of rate increase or proposed rate increase. • Petitions may not be withdrawn or rescinded. • Individual customer letters may be submitted in lieu of a petition.

PETITION (Please Print & Sign, One Per Household)

Name: Mel and Connie Kroker	Phone Number: (503) 860-4078
Service Address: 2333 SW Turner Road, West Linn, OR 97068	
Billing Address (if different):	
E-Mail Address: mkarch@frontier.com	
	JUNE 14, 2017
Signature	Date
~ Check here if you want your information as a petitioner kept confidential. PUC will keep your information confidential unless required by law to disclose your information.	

Name:	Phone Number:
Service Address:	
Billing Address (if different):	
E-Mail Address:	
Signature	Date
~ Check here if you want your information as a petitioner kept confidential. PUC will keep your information confidential unless required by law to disclose your information.	

Mail signed petitions to:
Oregon Public Utility Commission, Consumer Services Section,
PO Box 1088, Salem OR 97308-1088

12. Please explain the difference between users and customers, and how the Company proposes to allocate both one-time and on-going costs between the two groups.

Company Response:

Keith Ironside (and his wife, Gladys Beddoe, who died in 2004) purchased the 18-acre property at 2323 SW Buckman Road in 1979, together with the water system, then known as the "Bel-Ridge Water Utility." In 2013, Keith Ironside relocated to Kennewick, Washington. He subdivided his property, and his daughter and her family moved to the main house at 2323 SW Buckman Road. Keith Ironside rents the smaller house at 2351 SW Buckman Road, where the well, pump, well house, pressure tanks, and shut-off valves are all located.

The well, replaced in 2016, now provides water service to the two Ironside households (2323 SW Buckman Road and 2351 SW Buckman Road) and to two remaining customers: Nate Seymour, purchaser of the property at 2385 SW Buckman Road; and Mel and Connie Kroker at 2333 SW Turner Road. The Company refers to the Ironside family as "users" of the water system, and to Seymour and Kroker as "customers." Under ORS 757.315, water service to the Ironside households is provided without charge. The Company proposes to continue this arrangement for the monthly water service fee. For special assessments of additional costs, such as the well replacement in 2016, the Company proposes that all users and customers share such costs in equal portions.

16. Please confirm that the company is seeking a zero percent rate of return.

Company Response: The Company is *not* seeking a zero percent rate of return. To the contrary, the Company will seek a rate of return if the OPUC does not accept its cost-sharing proposal — an assessment of \$23,333, which is one-third of the costs of the 2016 well replacement. The Company proposed cost-sharing as an alternative to earning a rate of return on rate base. If cost-sharing is disallowed, the Company expects to earn a rate of return in the range of at least 10 percent.

6. Please provide a narrative description of legal services anticipated on an on-going basis to support the proposed fee of \$825 per month to cover legal costs associated with the companies' obligations as a rate regulated utility.

Company Response: The proposed amount represents an *average* monthly amount to cover two to four hours of attorney time. That time would be spent, for example, on the following: (a) advising the client generally about compliance with OPUC statutes and administrative rules to ensure adequate, nondiscriminatory service; (b) providing specific advice about recordkeeping and the preservation and destruction of records, enforcement of the rules and regulations, access to customer premises, customer notice requirements, and disconnection and reconnection procedures; (c) assisting the Company in filing annual reports with the OPUC; (d) drafting or reviewing contracts with independent contractors, such as the system operator; and (e) preparing a general rate case filing.

22. Please provide an estimate of the legal costs to date, and a forecast of future costs associated with the current rate case.

Company Response: Legal expenses for the rate case are approximately \$16,000 through October 31, 2017. If the rate case proceeds as contemplated in the current schedule, with four rounds of written testimony, an evidentiary hearing, and briefing, the Company anticipates another \$35,000 to \$45,000 in legal costs.

5. Page 2 of the Advice Letter states that Mountain Home intends to hire a contractor to operate its system to comply with the Commission's suggestion in Order No. 17-164 at 6,8. Please provide all supporting documentation related to this position listed at \$450 per month.
- a) Description of services to be provided and hours per month anticipated;
 - b) Amount of contract;
 - c) Licenses and/or certification required; and
 - d) Other considerations.

Company Response: The "Professional Qualifications" document from Merrill Water Systems LLC is attached as Exhibit 8.

- a) Merrill will conduct four onsite visits per month, one hour each, at \$95 per hour, to take lab samples, check system operation, and verify compliance with the restriction on irrigation. Merrill will also spend approximately 45 minutes each month on billing and bookkeeping, at the same hourly rate.
- b) The contract for Merrill's services is \$450 per month.
- c) System operation does not require any licensure or certification; however, Merrill's qualifications are listed in Exhibit 8.
- d) Merrill would normally include travel time of one hour per site visit (30 minutes each way to West Linn), at an increased cost of \$380 per month. Merrill discounted this amount because it will be operating another water system in the same area.

13. Page 2 of the Advice Letter states “(2) allows for reserves to meet non-routine repair and rehabilitation costs for water system which is near the end of its useful life.”

- a) Please describe the Company’s methodology for determining the amount of reserves it considers necessary.
- b) Please provide a narrative description, with documentation as appropriate, to support the conclusion that the system is at the end of its useful life.

Company Response:

a) To calculate the appropriate contingency for reserves, the Company used expenditures for non-routine system repairs from 2006, 2007, 2008, and 2009. These were years that, in the Company’s estimation, were representative of typical levels of extraordinary expenses — unlike, for example, the test year expenses of \$69,717, which we assumed were unusual. Repair expenses for these years were \$1854 in 2006, \$7833 in 2007, \$505 in 2008, and \$2976 in 2009, for an average annual expense of \$3292. We took this figure and rounded down to \$3000 per year to determine the amount of necessary reserves for non-routine repairs.

b) Steve Hougack is the owner and president of Steve’s Pump Service, Inc., which has worked with the Company’s water system since 1994 and was involved in the 2016 well replacement. In his rebuttal testimony in UM 1769, the Company’s 2016 application for abandonment, Mr. Hougack gave his opinion about the condition of the water system, including distribution lines: “The District’s water system is about 43 years old. The lines are a combination of galvanized pipe and black poly pipe. The life expectancy of either material is approximately 50 years. The pipes in the District’s water system have broken or had leaks at least five to seven times in recent years, which indicates to me that they are showing signs of failure. If the pipes were to be replaced it would be very expensive” (UM 1769, Company Ex. 300 at 2).

Don Rushmer, a former customer of the Company, also offered rebuttal testimony in UM 1769. He explained why he and another customer replaced the existing distribution lines when they constructed a new, shared well: “[The pipes] are about 40 years old and were considered to be at the end of their lifespan. Also, we didn’t know where those lines were, which could make repairs very expensive. When we were putting in the new lines, we used drawings from Mel Kroker to estimate where the District water lines were located, so we could avoid them. The drawings showed the pipe located along the driveway across the Wiests’ property, but we hit the line about 30 feet north of the driveway. We had to cap the line off, and I got a good look at the old pipe: It was really, really thin PVC, quite brittle. I’m amazed it’s lasted as long as it has. And I’m very happy that we decided to replace it” (UM 1769, Company Ex. 200 at 2).

21. Please provide the repair expenses for the system for the years 2010, 2011, 2012, 2013, 2014, and 2015.

Company Response: The Company's record keeping and accounting have been largely informal since 2004, when co-owner Gladys Beddoe died. Many repair expenses have been paid personally by the system's remaining owner, Keith Ironside, without precise documentation. The Company's records are incomplete for the years 2010 through 2015. We can document the following repair expenses:

2015	\$ 300
2014	\$ 3049
2013	(no records)
2012	\$ 3935
2011	(no records)
2010	\$ 748

14. Regarding the Revenue Requirement spreadsheet from DR 1 please verify the following items had no expenses during 2016 and no projected expenses going forward:

a. Telephone/Communications

i. For example were any telephone expenses incurred by the company?

Company Response: Telephone and communications expenses were not segregated for the Company in 2016. The Company does not intend to segregate Company-specific telephone/communications expenses going forward.

b. Chemical/Treatment Expense

i. For example, is the water treated with any chemicals?

Company Response: The water is not treated.

c. Office Supplies

i. For example, are there bills produced or supplies needed such as pencils, paper, pens, or any other general office products?

Company Response: Expenses for office supplies were not segregated for the Company in 2016. The Company does not intend to segregate Company-specific office supplies expenses going forward.

d. O&M Materials/Supplies

i. For example, is there any inventory of tools used or parts kept on hand for minor repairs?

Company Response: Expenses for O&M materials and supplies were not segregated for the Company in 2016. The Company does not intend to segregate Company-specific O&M materials and supplies expenses going forward.

e. Computer/Electron Expenses

i. For example, are bills printed or hand written?

Company Response: Computer expenses were not segregated for the Company in 2016. The Company does not intend to segregate Company-specific computer/electron expenses going forward.

f. Insurance

i. For example, is there any insurance costs incurred for infrastructure such as the well, pump house or distribution lines?

Company Response: Insurance expenses were not segregated for the Company in 2016. The Company does not intend to segregate Company-specific insurance expenses going forward.

g. Property Tax

Company Response: Property tax expenses were not segregated for the Company in 2016. The Company does not intend to segregate Company-specific property tax expenses going forward.

h. Income Taxes

Company Response: Income tax expenses were not segregated for the Company in 2016. The Company does not intend to segregate Company-specific income tax expenses going forward.

i. Miscellaneous expenses

- i. For example, were there any Bank Charges, Corporate Division charges, OWRD fees or other fees incurred by the business?**

Company Response: "Mountain Home Water District" is the Company's assumed business name, registered with the Oregon Secretary of State. The Company did not renew its ABN in 2016 or 2017. Depending in part on the outcome of this proceeding, the Company may renew its ABN in 2018 and going forward. The annual cost of renewal is \$50.

In July 2016, the Company paid \$300 to OWRD to register the new well as an exempt-use water supply well. This was a one-time fee and should have been included under "Miscellaneous Expenses" for the 2016 test year.

The Company pays the minimum annual charge of \$10 to the OPUC. This annual charge should have been included under "Miscellaneous Expenses" both for the test year and as an on-going expense.

15. There was no Utility Plant in Service listed on the Revenue Requirement spreadsheet. Please provide the plant information on the attached spreadsheet; include a brief description, purchase date and purchase amount. Leave the sections blank that do not apply to the utility.

Company Response: The Company makes the following adjustments to Utility Plant in Service, as shown on the revised spreadsheet:

307 Wells and Springs: We have revised this figure to include only the costs associated with construction of the new well in April 2016, totaling \$45,496. These costs are shown on the Company's Exhibits 1, 2, 3, and 4, submitted with the responses to Staff DR Nos. 1-13.

309 Supply Main: We have inserted additional costs under this account category, including \$3866 from April 2016. These costs are shown on the Company's Exhibit 5, submitted with the responses to Staff DR Nos. 1-13, and specifically the items listed from page 2, line 3 of the invoice to the end. We have also inserted \$5233 from June 2007, shown on Exhibit 10.

310 Power Generation Equipment: As additional costs, we have inserted \$3049 from February 2014, shown on Exhibit 11.

311 Pumping Equipment: We have inserted costs of \$11,210, which are shown on the Company's Exhibit 5, submitted with the responses to Staff DR Nos. 1-13, and specifically the items listed from the beginning of the invoice through line 2 on page 2. We have also inserted costs of \$3935 from June 2012, shown on Exhibit 12; \$649 from July 2010, shown on Exhibit 13; and \$513 from January 2009, shown on Exhibit 14.

339 Other Plant: Here, we have inserted costs of \$2213 from April 2009, for installation of a state-required sounding tube. These costs are shown on Exhibit 15.

Invested Plant

Acct No.	Account Description	Date Acquired	Utility Plant Orig Cost	NARUC Asset Life
301	Organization			0
302	Franchises			0
303	Land and Land Rights			0
304	Structures and Improvements			
	Pump House Rebuild	May 2016	9,145	35
				35
				35
307	Wells and Springs			
	New Well	Apr 2016	45,496	25
				25
				25
				25
309	Supply Main			
	New lines to pump house	Apr 2016	3,866	50
	Pressure tanks	Jun 2007	5,233	50
				50
				50
310	Power Generation Equipment			
	New drive	Feb 2014	3,049	30
311	Pumping Equipment			
	New pump	Apr 2016	11,210	20
	Pump controller	Jun 2012	3,935	20
	Booster pump	Jul 2010	649	20
	Clamp supports	Jan 2009	513	20
320	Water Treatment Equipment			20
330	Distribution Reservoir and Standpipes			50
331	Transmission and Distribution Mains			50
				50
				50
				50
333	Services			30
334	Meters and Meter Installations			20
				20
				20
				20
339	Other Plant			
	Sounding tube	Apr 2009	2,213	30
				30
340	Office Furniture and Equipment			20
341	Transportation Equipment			7
343	Tools, Shop, and Garage Equipment			15
				15
346	Communication Equipment			10
347	Electronic/Computer Equipment			5
348	Miscellaneous Equipment			10
				10
TOTALS				

9. Please provide detailed backup for the well repair and replacement costs.

Company Response: Please refer to Exhibits 1, 2, 3, 4, 5, and 6.

Exhibit 1

Ted Pulliam Well Drilling Statement (1 page)

Statement

TED PULLIAM WELL DRILLING INC
PO BOX 505
GRESHAM OR 97030

DATE
4/4/2016

TO:
KEITH IRONSIDE 2323 SW BUCKMAN ROAD TUALATIN OR 97062

AMOUNT DUE
\$32,896.00

DATE	TRANSACTION	AMOUNT	BALANCE		
02/29/2016	Balance forward		0.00		
03/09/2016	PMT #2258.	-4,000.00	-4,000.00		
03/22/2016	PMT #2261.	-8,000.00	-12,000.00		
04/04/2016	INV #828. Due 04/04/2016.	7,340.00	-4,660.00		
04/04/2016	INV #829. Due 04/04/2016.	37,556.00	32,896.00		
<p>paid in full ck# 2263 \$17,896.⁰⁰ and ck# 026 \$15,000.⁰⁰ on 4/13/16</p> <p>Vince Wagner</p>					
CURRENT	1-30 DAYS PAST DUE	31-60 DAYS PAST DUE	61-90 DAYS PAST DUE	OVER 90 DAYS PAST DUE	AMOUNT DUE
32,896.00	0.00	0.00	0.00	0.00	\$32,896.00

pd. 04/13/16 CK #2263 / \$17,896.00
pd 04/13/16 CK # 026 / \$15,000.00

Exhibit 2

Ted Pulliam Well Drilling Invoice No. 829 (1 page)

EXHIBIT 2 – UW 172: MOUNTAIN HOME WATER DISTRICT RESPONSE TO STAFF DR NOS. 1-13

Jennie Bricker Land & Water Law
818 SW Third Avenue, No. 1517, Portland, OR 97204
(503) 928-0976 | jennie@jbrickerlaw.com

Invoice



TED PULLIAM WELL DRILLING, INC.
9480 SE 172ND PO Box 525
BORING, OREGON 97009 Gresham OR 97030
PHONE 665-3353 FAX 665-5285
MOBILE 789-5764

DATE	INVOICE #
4/4/2016	829

BILL TO:

KEITH IRONSIDE
2323 SW BUCKMAN ROAD
TUALATIN OR 97062

P.O. NUMBER	TERMS	PROJECT
7475-8463	Due on receipt	

QUANTITY	DESCRIPTION	RATE	AMOUNT
593	10" DRILLED HOLE	44.00	26,092.00
593	6" .250 STEEL WALL CASING	16.00	9,488.00
96	SACKS CEMENT AND BENTONITE FOR SURFACE SEAL INCLUDING LABOR TO INSTALL SEAL	16.00	1,536.00
1	6" SANDVICK TUBEX DRIVE SHOE	215.00	215.00
1	STATE START CARD PERMIT	225.00	225.00
	WELL TOTAL		37,556.00

DUE ON COMPLETION. 1 1.5% FINANCE CHARGE.

TOTAL \$37,556.00

Exhibit 3

Ted Pulliam Well Drilling Invoice No. 828 (1 page)

EXHIBIT 3 – UW 172: MOUNTAIN HOME WATER DISTRICT RESPONSE TO STAFF DR NOS. 1-13

Jennie Bricker Land & Water Law
818 SW Third Avenue, No. 1517, Portland, OR 97204
(503) 928-0976 | jennie@jbrickerlaw.com

Invoice



TED PULLIAM WELL DRILLING, INC.

9480 SE 172ND PO Box 505
BORING, OREGON 97009 Gresham OR 97030
PHONE 665-3353 FAX 665-5285
MOBILE 789-5764

DATE	INVOICE #
4/4/2016	828

BILL TO:

KEITH IRONSIDE
2323 SW BUCKMAN ROAD
TUALATIN OR 97062

P.O. NUMBER	TERMS	PROJECT
7475-8463	Due on receipt	

QUANTITY	DESCRIPTION	RATE	AMOUNT
EXISTING WELL WORK:			
10	HOURS LABOR	350.00	3,500.00
240	FEET 6" .250 STEEL WALL CASING	16.00	3,840.00
			7,340.00

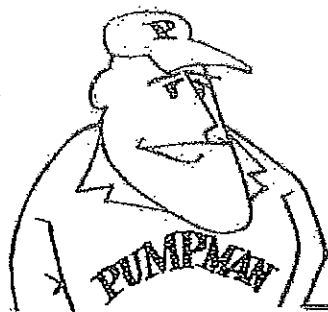
TOTAL \$7,340.00

Exhibit 4

Steve's Pump Service Invoice No. 160388 (1 page)

EXHIBIT 4 – UW 172: MOUNTAIN HOME WATER DISTRICT RESPONSE TO STAFF DR NOS. 1-13

Jennie Bricker Land & Water Law
818 SW Third Avenue, No. 1517, Portland, OR 97204
(503) 928-0976 | jennie@jbrickerlaw.com



STEVE'S PUMP SERVICE INC. INVOICE

PO BOX 547
BORING, OR 97009
503-658-3051 FAX 503-658-6854
CCB#38208
email: stevespumpservice@comcast.net

Invoice Number: 160388

Invoice Date: Mar 24, 2016

Page: 1

Due upon receipt

Bill To:

County: C

Sales Rep: BCC DN

MR. KEITH IRONSIDE
MTN. HOME WATER DISTRICT
2323 SW BUCKMAN ROAD
WEST LINN, OR 97068

Phone 1: 475-8463

Phone 2:

email:

Quantity	Description	Unit Price	Amount
	MOB TO JOBSITE. SET UP ON WELL AND REMOVE PUMP AND RELATED EQUIPMENT IN WELL FOR DRILLER TO WORK ON WELL. SET UP TEMPORARY WATER LINE.		
4.00	LABOR	150.00	600.00

pd. ck. 7262
04/06/16

We gladly accept VISA, MC, & Discover. A 2% convenience fee will be charged.

It was a pleasure to be of service. Please call if you have any further questions.

TOTAL INVOICE:

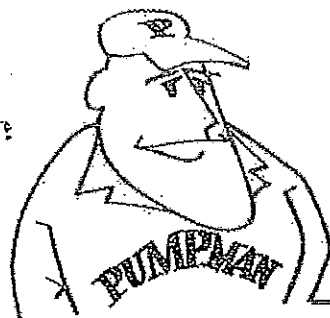
600.00

Exhibit 5

Steve's Pump Service Invoice No. 16049929 (3 pages)

EXHIBIT 5 – UW 172: MOUNTAIN HOME WATER DISTRICT RESPONSE TO STAFF DR NOS. 1-13

Jennie Bricker Land & Water Law
818 SW Third Avenue, No. 1517, Portland, OR 97204
(503) 928-0976 | jennie@jbrickerlaw.com



STEVE'S PUMP SERVICE INC. INVOICE

PO BOX 547
BORING, OR 97009
503-658-3051 FAX 503-658-6854
CCB#38208
email: stevespumpservice@comcast.net

Invoice Number: 16049929

Invoice Date: Apr 28, 2016
Page: 1

Due upon receipt

County: C

Sales Rep: JHH

Bill To:

MR. KEITH IRONSIDE
MTN. HOME WATER DISTRICT
2323 SW BUCKMAN ROAD
WEST LINN, OR 97068

Phone 1: 475-8463 Keith
Phone 2: 503.505.0553 Valerie
email: meyer.valerie@gmail.com

Quantity	Line Item ID	Description	Unit Price	Amount
		Site: 2323 SW Buckman Road, West Linn, OR 97068		
		4/20/16 - Install pump in new well.		
		4/25/16 - Travel, excavate under pump house. Cut 4 concrete holes through floor in pump house. Plumb 2" wirsbo line from well head into pump house. Run PVC conduit from well to drive. Pull wire from well and into drive.		
		4/27/16 - Travel. Plumb lines into pump house to tank manifold. Plumb 2 ball valves and run 2 lines back out of pump house and plug. Turn on power to drive and program. Run water from house which was very dirty. Water was so dirty that we hooked up 2" pvc line and ran water at about 40 gpm for a couple hours while we loaded up old materials. Water got a lot better so we opened lines to house before we left job.		
		MATERIALS USED ON 4/20/16		
1.00	PU G 45S100-25	10 HP. 45 GPM GRUNDFOS SUBMERSIBLE PUMP END, MODEL 45S1000-25	3,313.45	3,313.45
1.00	MISC	HITACHI 10 HP 230 VOLT 3 PHASE MOTOR	1,945.25	1,945.25
1.00	AC 7171380	8 GA K8C SPLICE KIT	7.00	7.00
1.00	AC 7171340	4 GA K4 SPLICE KIT	13.00	13.00
535.00	WI 7171304	4-4 FLAT SUBMERSIBLE CABLE	3.41	1,824.35
525.00	PI 4024020	2 " GALVANIZED PIPE T&C	3.40	1,785.00
3.00	MISC	2" VFD CHECK VALVES	70.30	210.90
540.00	PI 2016007	3/4 S40 PVC PIPE	0.30	162.00
5.00	EL CABLE WRAP	2X100' 2 CABLE WRAP GREEN TAPE	8.00	40.00
1.00	MISC	MAASS 6" X 2" WELD PITLESS	237.23	237.23
1.00	AC 7341060	WTCC-6/1 1/4 WELL CAP W/1" CONDUIT TOP	45.15	45.15
21.00	MISC	2" HEAVY DUTY COUPLING	6.04	126.84

We gladly accept VISA, MC, & Discover. A 2% convenience fee will be charged.

TOTAL INVOICE:

Continued

It was a pleasure to be of service. Please call if you have any further questions.



STEVE'S PUMP SERVICE INC. INVOICE

Invoice Number: 16049929

PO BOX 547
BORING, OR 97009
503-658-3051 FAX 503-658-6854
CCB#38208

Invoice Date: Apr 28, 2016
Page: 2

email: stevespumpservice@comcast.net

Due upon receipt

County: C

Sales Rep: JHH

Bill To:

MR. KEITH IRONSIDE
MTN. HOME WATER DISTRICT
2323 SW BUCKMAN ROAD
WEST LINN, OR 97068

Phone 1: 475-8463 Keith
Phone 2: 503.505.0553 Valerie
email: meyer.valerie@gmail.com

pd. ck. # 2266 05/27/16

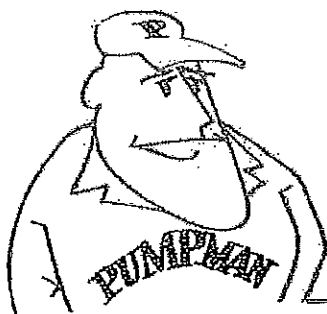
Quantity	Line Item ID	Description	Unit Price	Amount
8.00	LABOR	LABOR on 4/20/16	150.00	1,200.00
1.00	LABOR	INSTALLATION OF WELD ON PITLESS	300.00	300.00
		MATERIALS USED ON 4/25/16 AND 4/27/16		
7.00	LABOR	LABOR on 4/25/16	150.00	1,050.00
8.00	LABOR	LABOR on 4/27/16	150.00	1,200.00
1.00	RENTAL SMALL	CONCRETE CORE DRILL	50.00	50.00
20.00	PI W F1922000	2" WIRSBO PIPE - CHARGED OUR COST ON THIS ITEM	4.86	97.20
3.00	PI W Q4572020	2" WIRSBO BRASS FEMALE ADAPTOR - CHARGED OUR COST ON THIS ITEM	106.40	319.20
3.00	PI W Q4522020	2" WIRSBO BRASS MALE ADAPTOR - CHARGED OUR COST ON THIS ITEM	86.26	258.78
6.00	PI W Q4692000	2" WIRSBO PEX RING - CHARGED OUR COST ON THIS ITEM	1.65	9.90
1.00	FI SS4407020	2" SS 90	21.50	21.50
1.00	FI SS4687060	2 X 6 SS NIPPLE	14.50	14.50
1.00	FI SS4430020	2 SS COUPLINGS	14.50	14.50
30.00	PI EPVC 1 1/4	1 1/4 EPVC CONDUIT #069136	0.70	21.00
3.00	PL E2406012	1 1/4 EPVC 90	3.50	10.50
1.00	PL E069143	1 1/4 EPVC 90 LB	8.09	8.09
1.00	PL 2885030	1 1/4 X 3 S80 NIPPLE	3.25	3.25
4.00	PL E2429012	1 1/4 EPVC COUPLING	1.25	5.00
3.00	PL E2436012	1 1/4 EPVC MALE ADAPTOR	1.50	4.50
35.00	WI 7151304	4-4 PVC TWISTED SUB CABLE	3.94	137.90
2.00	MISC	GROUND LUG	3.00	6.00
4.00	MISC	SPLIT BOLTS	6.50	26.00
3.00	MISC	POLARIS CONNECTORS 4/14 AWG	24.30	72.90
1.00	EL BOX051628	6 X 6 X 4 JUNCTION BOX WITH COVER	18.34	18.34
2.00	MISC	2 X 36" GALV NIPPLE	37.17	74.34
1.00	FI 4687240	2 X 24 GALV NIPPLE	27.44	27.44
1.00	FI 4430020	2 GALV COUPLING	6.60	6.60
7.00	FI 4407020	2 GALV 90	8.15	57.05
2.00	FI 4405020	2 GALV STRAIGHT TEE	11.75	23.50

We gladly accept VISA, MC, & Discover. A 2% convenience fee will be charged.

TOTAL INVOICE:

Continued

It was a pleasure to be of service. Please call if you have any further questions.



STEVE'S PUMP SERVICE INC. INVOICE

PO BOX 547
BORING, OR 97009
503-658-3051 FAX 503-658-6854
CCB#38208
email: stevespumpservice@comcast.net

Invoice Number: 16049929

Invoice Date: Apr 28, 2016
Page: 3

Due upon receipt

County: C

Sales Rep: JHH

Bill To:

MR. KEITH IRONSIDE
MTN. HOME WATER DISTRICT
2323 SW BUCKMAN ROAD
WEST LINN, OR 97068

Phone 1: 475-8463 Keith
Phone 2: 503.505.0553 Valerie
email: meyer.valerie@gmail.com

Quantity	Line Item ID	Description	Unit Price	Amount
2.00	MISC	2 BRS 600#2 PC THREADED BALL VALVE	68.00	136.00
1.00	FI 4687060	2 X 6 GALV NIPPLE	5.35	5.35
1.00	FI 4687050	2 X 5 GALV NIPPLE	7.30	7.30
1.00	FI 4687120	2 X 12 GALV NIPPLE	23.44	23.44
1.00	FI 4687045	2 X 4 1/2 GALV NIPPLE	7.30	7.30
1.00	FI 4687080	2 X 8 GALVANIZED NIPPLE	9.65	9.65
1.00	FI 4687100	2 X 10 GALVANIZED NIPPLE	20.43	20.43
2.00	FI 4687030	2 X 3 GALV NIPPLE	4.70	9.40
3.00	FI 4687000	2 X CLOSE GALV NIPPLE	3.25	9.75
2.00	FI 4458020	2 GALVANIZED UNION	18.75	37.50
18.00	WI 062527	BLUE TRACER WIRE, 18 GAUGE	0.20	3.60
2.00	FI 4450020	2 GALV PLUG	5.00	10.00
2.00	EL 0166575	1 CARLON L/T STRAIGHT CONNECTOR	4.85	9.70
1.00	MISC	2" RIGID PIPE STRUT CLAMP	5.00	5.00
1.00	FREIGHT	FREIGHT FOR SPECIAL ORDER PUMP	33.56	33.56

We gladly accept VISA, MC, & Discover. A 2% convenience fee will be charged.

TOTAL INVOICE: 15,076.14

It was a pleasure to be of service. Please call if you have any further questions.

Exhibit 6

Copy of Check No. 2265 to Terry Serdy (1 page)

EXHIBIT 6 – UW 172: MOUNTAIN HOME WATER DISTRICT RESPONSE TO STAFF DR NOS. 1-13

Jennie Bricker Land & Water Law
818 SW Third Avenue, No. 1517, Portland, OR 97204
(503) 928-0976 | jennie@jbrickerlaw.com

Account Details

View Cleared Check

Water	374801002626
Check Number	2265
Check Amount	9,145.00
Date Check Cleared	05/13/2016

Note: You may print a copy of this check by selecting the "Printer Friendly Version" link or order a copy of the check by selecting the "Request Copy" button below.

[Printer Friendly Version](#)

KEITH L. IRONSIDE JR MD
2323 SW BUCKMAN RD.
WEST LINN, OR 97068-9605

2265

24-201/1238
57480

May 10, 2016
Date

Pay to the

Order of

Terry Serdy

\$ 9,145.00

Nine thousand one hundred forty five and 00/100 Dollars



KeyBank National Association
Tulsa, Oregon 97234
1-800-MY2YOU Key.com

For

[Signature]

⑆12300201⑆ 374801002626 2265

Seq: 55

Batch: 571573

Date: 05/12/16

Seq: 00055 05/12/16
BAT: 571573 CC: 3420002117
WT: 01 LTPS: Atlanta PJ
HC: Lombard-Grocery HC DBI-158

*Pump
House
rebuild*

- 11. Please explain why the Company is proposing that water delivered under Tariff Schedule 1: Flat Rates be restricted to indoor residential use only and may not be used for irrigation, including lawn, garden and landscape irrigation.**

Company Response:

The Company's water system is located within the Sherwood-Damascus-Wilsonville Groundwater Limited Area, which is closed to new water rights. *See* OAR 690-502-0190. Without a water right, the Company's water supply well can be authorized only as an "exempt use," which means that water from the well may not be used for more than a half-acre of landscape irrigation, "as aggregated among all users." *See* Order No. 17-164 at 3; ORS 537.545. The Company received a letter from the Oregon Department of Water Resources in July 2015 explaining the restrictions on exempt use wells and stating that the OWRD is considering measures to enforce the acreage limitation.

Three parcels will be served by the water system after the Seymours leave the system; together those parcels comprise about 8.5 acres. (Once complete, the Seymours' new well will be permitted to irrigate a separate half-acre on the Seymour parcel.) The Company believes that compliance with the half-acre limitation will be extremely difficult, and perhaps impossible, to enforce. The Company respectfully disagrees with the Commission that its customers have "an overarching interest" in complying with the acreage limitation. *See* Order No. 17-164 at 8. On the contrary, it is the well owner who will be most affected, if users exceed the limitation and OWRD institutes enforcement measures, such as the requirement to install a flow meter at the well, with monitoring obligations and monthly water use reports to OWRD.

Under Oregon law, exceeding the half-acre limitation on exempt well use is an "unlawful use" of groundwater. ORS 537.535. Such use is a Class B Misdemeanor and carries criminal penalties, including fines of as much as \$5000 per day of violation and liability for OWRD's enforcement costs. *See* ORS 537.990(3); OAR 690-260-0040(1)(a); OAR 690-260-0070(2)(b)(E); OAR 690-260-0100.

Thus, the Company regards the half-acre limitation as an extremely serious matter and believes that only one option will allow compliance with OWRD rules. Because the acreage limitation is based on the type of water use, not on water volume, installing meters to measure water will not help the Company with enforcement. Instead, the Company intends to enforce the limitation through a ban on all landscape irrigation, coupled with a right to inspect the customers' premises. In dry weather, if the customer has no independent source of irrigation water and the ground has been irrigated, the Company may reasonably conclude that the customer has violated the irrigation restriction. Pursuant to OAR 860-036-1670, the Company can ensure compliance with OWRD rules by disconnecting water service to that customer.

CASE: UW 172
WITNESS: MATT MULDOON

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 200

Opening Testimony

January 4, 2018

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

2 A. My name is Matt Muldoon. I am a Senior Economist for the Public Utility
3 Commission of Oregon (Commission or OPUC). My business address is:
4 201 High Street SE, Suite 100, Salem, OR 97301.

5 **Q. Please describe your educational background and work experience.**

6 A. My educational background and work experience are set forth in my Witness
7 Qualification Statement, which is provided as Exhibit Staff/201.

8 **Q. What is the purpose of your testimony?**

9 A. My testimony is in support of Staff analyst Joan Grindeland's **Issue 6**
10 regarding Cost of Capital: My testimony is limited in scope to:
11 Cost of Common Equity, also known as Return on Equity (ROE)

12 Ms. Grindeland addresses appropriate capital structure for the unique
13 character of this proceeding and makes summary recommendations to the
14 Commission in **Exhibit Staff/100**. Ms. Grindeland explains how my
15 recommended ROE translates to Staff recommended overall Rate of Return
16 (ROR).

17 **Q. What are your findings?**

18 A. I recommend a mid-point ROE of 8.6 percent representing the top end of a
19 range of reasonable ROEs of 7.50 percent to 8.64 percent. My 8.6 percent
20 point recommendation is a rounding to the number of digits usual in a
21 Commission Order addressing Cost of Capital, such as one observes in
22 Commission Order No. 17-511 in Portland General Electric Company (PGE)
23 general rate case Docket No. UE 319.

1 **Q. What factors narrowed your range of reasonable ROE's?**

2 A. My initial modeling results shown in Exhibit No. Staff/200 Muldoon/1 yield a
3 broad 7.50 to 8.64 percent range of reasonable ROE's. This range is
4 narrowed sharply in two primary ways. First, I considered growth rates. At
5 this time, I favored the higher 5.46 percent growth derived from the US
6 Bureau (BEA) of economic analysis extrapolated historical growth rate
7 developed from BEA data in Exhibit No. Staff/204 Muldoon/1. This higher
8 growth rate is more reflective of recent strong U.S. economic growth from July
9 through September of 2017.¹

10 **Q. Was utility size the second key factor you examined?**

11 A. Yes, I considered the small size of the utility in question. Interestingly, as
12 shown in Exhibit No. Staff/202 Muldoon/1, a 15 basis point adder fully
13 explains current market capitalization differences between large-cap and
14 small-cap, or a difference of about 14 billion dollars in capitalization size from
15 small to quite large as shown on Exhibit No. Staff/202 Muldoon/2.

16 **Q. Please explain further.**

17 A. Prior to consideration of growth rate and capitalization size, the floor of my
18 range of reasonable ROE's was 7.50 percent. After narrowing for growth
19 rate, capitalization size, and factors developed in Exhibit Staff/202, my range
20 tightens sharply to the rounded point recommendation of 8.6 percent. A key

¹ This economic growth is reported on by Martin Crutsinger in the Oregonian article, "Twice in a Row, Strong Growth" published December 22, 2017.

1 factor that normally drives a larger range of reasonable ROEs is distinctly
2 muted at this time for water utilities.

3 **Q. What is this factor?**

4 **A.** There is a conversion between water utilities toward little stock price
5 appreciation for holding these stocks long-term and then selling them. The
6 difference between holding the stocks indefinitely for their quarterly dividend
7 income as captured in Exhibit Staff/201 Muldoon/5, on the one hand, and also
8 selling the shares at a future date as captured in Exhibit Staff/200 Muldoon/6
9 is less than one might historically expect.

10 **Q. What is causing this compression of returns?**

11 **A.** The water utilities are an extremely hot sector. Stock prices now more than
12 incorporate positive news. This depresses the difference between a future
13 sale price and the current price which already prices in fabulous investor
14 expectations in terms of price per expected future earnings.

15 **Q. Do investors want to buy low and sell high in terms of stock prices?**

16 **A.** Yes. Buying extremely high and selling at about the same price as one
17 bought the stock depresses expected total returns from the sum of A) growing
18 quarterly dividends and B) proceeds from the sale of the stock in the future.
19 This doesn't mean that the water utilities are not great companies, just that
20 investors are paying a high premium over future expected cash flows to own
21 these stocks.

1 **Q. Are there good reasons for global investors to be satisfied with water**
2 **utility stocks even if the investors are paying a very steep price to**
3 **buy the stocks now?**

4 A. Yes. One of the comparators for investors to the dividends from these water
5 utility stocks are fixed income securities like government bonds in the U.S.
6 and Europe as posted by the Wall Street Journal on December 22, 2017. US
7 Treasury yields such as 2.479 percent on 10 year bonds are very low by
8 historical standards. German 10-year yields on government bonds are just
9 0.420 percent. In comparison, the 2.0 percent dividend yield for Aqua
10 America as shown in Exhibit Staff/202 Muldoon/4 is still a very attractive
11 substitute for the German 10-year bond. Further, there is a chance, but no
12 guarantee, that a larger company will pay a market premium over the current
13 stock market price for one of these water utilities to acquire it.

14 **Q. Did you prepare exhibits in support of your opening testimony?**

15 A. Yes. I prepared the following exhibits:
16 Staff/201 Witness Qualification Statement
17 Staff/202 Staff ROE Modeling
18 Staff/203 Treasury Inflation Protected Securities (TIPS) Analysis
19 Staff/204 . GDP Analysis with U.S. Bureau of Economic Analysis (BEA) Data
20 Staff/205 Value Line (VL) Water Utility Profiles
21

COST OF COMMON EQUITY (ROE)

Q. Does your recommended ROE meet appropriate standards?

A. Yes. The 8.6 percent ROE I recommend meets the *Hope* and *Bluefield* standards, as well as the requirements of Oregon Revised Statute (ORS) 756.040. My recommendations are consistent with establishing “fair and reasonable rates” that are both “commensurate with the return on investments in other enterprises having corresponding risks” and “sufficient to ensure confidence in the financial integrity of the utility, allowing the utility to establish and maintain credit ratings and attract capital.”²

Q. Does your analysis and methodology mirror that used by Staff over the past 20 years in other general rate cases?

A. Yes. For example, you see this same analytical tool set applied to PGE, Avista Corporation and Sunriver general rate cases before the Commission in 2017.³ I also footnote in this testimony examples of where Staff has historically used these same methodologies.

² See ORS 756.040(1) (a) and (b).

³ Portland General Electric Company (PGE) general rate case Docket No. UE 319; Avista Corporation (AVA) general rate case Docket No. UG 325; and Sunriver Water, LLC general rate case Docket No. UW 169.

1 **Q. Describe the analysis underlying Staff's ROE recommendation.**

2 A. I rely on two different three-stage "discounted cash flow" (DCF) models,⁴
3 applied using a cohort group of peer utilities, to estimate the expected return
4 on common equity required by investors.

5 **Q. Describe the two DCF models that you used.**

6 A. My first model is a conventional three-stage Discounted Dividend Model,
7 which Staff denotes as a "30-year Three-stage Discounted Dividend Model
8 with Terminal Valuation based on Growing Perpetuity" (referred to as
9 "Model X").

10 My second model is the "30-year Three-stage Discounted Dividend
11 Model with Terminal Valuation Based on P/E Ratio" (referred to as
12 "Model Y").

13 The three stages of the models are: 1) 2017-2021, where I use Value
14 Line's (VL) forecasts of dividends per share for each company; 2) 2022-2026,
15 where the rate of dividend growth converges from the average rate over the
16 2017-2021 period to the growth rate in of the third stage; and 3) 2027-2046.
17 This is the third "long-term" stage, for which growth rates are discussed.

18 Model X includes a terminal value calculation, in which I assume
19 dividends per share grow indefinitely at the rate of growth in Stage 3
20 ("growing perpetuity"). In contrast, Model Y terminates in a sale of stock
21 where the price is determined by my escalated price/earnings (P/E) ratio.

⁴ See *also* the Commission's discussion of multistage versus single-stage DCF models in Order No. 01-777 at page 27.

1 **Q. How do you address dividend timing?**

2 A. Each model uses two sets of calculations that differ in the assumed timing of
3 dividend receipt. One set of calculations is based on the standard
4 assumption that the investor receives dividends at the end of each period.

5 The second set of calculations assumes the investor receives dividends
6 at the beginning of each period. Each model averages the unadjusted ROE
7 values to generate an Internal Rate of Return (IRR) produced with each set
8 of calculations for each peer utility. This approach accounts for the time value
9 of money, closely replicating actual quarterly receipt of dividends by investors.

10 **Q. How do you account for differences in peer utility capital structures?**

11 A. Each model employs the Hamada equation⁵ to calculate an adjustment for
12 differences in capital structure between utilities.

13 **Q. What price do you use for each peer utility's stock?**

14 A. I use the average of closing prices for each utility from a trading day near the
15 start of each month of October, November, and December 2017 to represent
16 a reasonable snapshot of prevailing investor owned water utility common
17 stock prices.

18 **Q. How do Staff's two DCF models differ?**

19 A. Model X uses the calculation of a growing perpetuity as part of the terminal
20 valuation in 2046.

⁵ Dr. Robert Hamada's Equation as used in Staff/202, Muldoon/4 separates the financial risk of a levered firm, represented by its mix of common stock, preferred stock, and debt, from its fundamental business risk. Staff corrects its ROE modeling for divergent amounts of debt, also referred to as leverage, between the Company and its peers.

Model Y uses the current price-earnings (P/E) ratio multiplied by the estimated “earnings per share” (EPS) in 2047, which establishes the stock’s “selling price” in 2046 for terminal valuation. I estimate the 2047 EPS analogously with methods used to estimate the 2046 dividend in both models; i.e., based on VL estimates to which multiple growth rates are sequentially applied.

This modeling difference corroborates Value Line analysts’ opinions that investors are paying a high price now which reduces likely total returns from holding the water utility stocks.

PEER SCREEN

Q. How did you select comparable companies (peers) to estimate ROE?

A. I used companies that met the following criteria as peer utilities:

1. Covered by VL as an U.S. Water Utility;
2. Forecasted by VL to have Positive Dividend Growth;
3. No Decline in Annual Dividend in Last Five Years per SNL and VL;
- and
4. Primarily Domestic US Water Utility Sourced Cash Flows.

Q. What cohort of companies resulted from your screens?

A. Please see Exhibit Staff/202, Muldoon/2 for detailed Staff screens.

Q. Did Staff also do analysis to quantify the impact capitalization size has on required ROE?

A. Yes. Staff’s modeling utilized: A) water utilities that passed Staff’s Screen, B) the earlier group restricted to Small- and Mid-Cap companies as a

1 sensitivity, and C) the first group restricted to Small-Cap companies as
2 another sensitivity.

3 **Q. How does Staff apply its analysis of the impact of capitalization size**
4 **to its modeling?**

5 A. Staff examined its full range of ROE results including sensitivities. After
6 applying capitalization size criteria, Staff determined that a return of 8.61
7 percent to 8.64 percent represents a reasonable narrowing of focus on Staff's
8 peer companies.

9 **GROWTH RATES**

10 **Q. What long-term growth rates did you use in the two DCF models?⁶**

11 A. I used three different long-term growth rates, with different methods employed
12 in developing each.

13 The first method uses a 50 percent weight applied to the average annual
14 growth rate resulting from estimates of long-term GDP by the EIA, the OMB,
15 and the CBO, with each receiving one-third of the 50 percent weight.⁷ The
16 remaining 50 percent is the average annual historical real GDP growth rate,

⁶ Methods used here related to GDP-based growth rates are similar, if not identical to methods Staff has used in past proceedings. See, as an example, Staff's discussion of these methods and, to a limited extent, their conceptual underpinnings in Docket No. UE 233, at Exhibit Staff/800, Storm/46-52.

⁷ The EIA is the Energy Information Administration within the U.S. Department of Energy (DOE), OMB is the Office of Management and Budget, and CBO is the Congressional Budget Office. EIA and OMB's estimates are of nominal GDP. I applied to CBO's estimate of real GDP an inflation rate for the relevant timeframe developed using the Treasury Inflation-Protected Securities (TIPS) method described by Staff in testimony in multiple recent general rate case proceedings.

established using regression analysis, for the period 1980 through 2016,⁸ to which I apply the TIPS inflation forecast.

The second long-term growth rate relies on Blue Chip & U.S. Office of Management and Budget (OMB) data. At this time, this data happens to offer little incremental dispositive information beyond the first method. At times, expectations between the first and second sources can vary widely.

Last, I employ a nominal historical growth rate. See Table 1 below:

Table 1
GDP Growth Rates⁹

Stage 3 – Long-Term Annual Dividend and EPS Growth Rates Considered					
Component	Real Rate	TIPS Inflation Forecast	Nominal Rate	Weight	Weighted Rate
EIA	2.20%	2.04%	4.28%	12.50%	0.54%
OMB - 10 Year GDP Projection			4.10%	12.50%	0.51%
White House 2017 Budget			4.30%	12.50%	0.54%
CBO Projections			4.20%	12.50%	0.53%
Historical 1980 Q1 – 2016 Q3	2.80%	2.04%	4.90%	50.0%	2.45%
Composite				100%	4.56%
BEA Avg. Nominal Historical 1980 Q1 – 2016 Q1			5.46%	100.0%	5.46%
Blue Chip* – Top 10% 2019 Values	2.90%	2.04%	5.00%	100.0%	5.00%

⁸ Staff discussed this approach in recent Staff cost of equity testimony in several rate case proceedings. See, as an example, in Docket No. UE 233 Exhibit Staff/800, Storm/46, line 15 through Storm/50 line 3.

⁹ See Staff/202 for this material in electronic form.

1 **Q. Does this approach capture a reasonable set of investor expectations**
2 **similar to Staff's analysis in other recent general rate cases?**

3 A. Yes, Staff modeling captures the expectations of investors who think
4 variously that: A) future conditions will mirror the past, B) federal agency
5 expert analysis also informs the historical track record, and C) the most
6 optimistic 10 percent of Blue Chip referent persons surveyed have the pulse
7 of the future. That last value represents the financial professionals who are
8 most optimistic about the economy's long-run growth. The last element is
9 used as a control, but is not depicted in exhibits as it is bounded by other
10 growth rate results, and adds no incremental information.

11 **Q. Did your analysis include the construction of a synthetic forward**
12 **curve using UST TIPS break even points?**

13 A. Yes. My forward curve is provided in Exhibit Staff/203, reflecting implied
14 market-based inflationary expectations. Staff's recommendations are
15 consistent with market activity indicating investor expectations of future
16 inflation.

17 **Q. Assume one ignored current downward adjustments by a broad**
18 **spectrum of federal agencies and instead presumed that future U.S.**
19 **GDP growth would look like the past 30 years. Would a ROE based**
20 **on that assumption fall within Staff's recommended range?**

21 A. Yes, I extracted and ran regression on data from U.S. BEA to generate the
22 annual real historical GDP growth rate. My recommended range of ROEs

1 includes values that presume GDP growth over the next 30 years would look
2 like that of the past 30 years.

3 **Q. Are there any downward pressures on expected returns for investors**
4 **holding water utility common stock?**

5 A. Yes, there has been a substantial run up in the price of these common stocks.
6 This depresses the expected gains one could have by holding the water utility
7 stocks, receiving dividends for a period of time and then selling the stocks.

8 **Q. Could you explain that concept further?**

9 A. Yes, Benjamin Graham and other value investors like Warren Buffet explain
10 that the price at which one acquires a stock is important. Even though an
11 investor can now expect to sell water utility shares in the future at a price that
12 would be very attractive, current prices are very high by historical metrics.
13 The difference between current purchase price now and expected future sale
14 value is lower than historical trends due to very high prices now.

15 **Q. Are water utility stocks currently overvalued?**

16 A. Market analysts are reluctant to state that directly. Instead, Value Line and
17 other analytic reports contain statements like the following:¹⁰

- 18 1. "In our opinion, most of the good news associated with the stock
19 appears to be reflected in the recent price."
20 2. "The premium demanded by the market for this group of stocks
21 seems excessive, in our opinion."
22 3. "These shares are trading near all-time highs."

¹⁰ See Exhibit Staff 205 for these quotations.

1 4. "The stock is trading above our 3- to 5-year target price range, and
2 **total return potential is sub-par.**" and

3 5. "From a price-to-earnings perspective, the recent valuation is a bit
4 lofty, in our view."

5 While an investor would normally expect larger and divergent stock price
6 appreciation over time, the above statements suggests these stock prices
7 have surged past values supported by the water utilities' underlying expected
8 future cash flows. Higher prices than can be attributed to expected cash
9 flows has the additional effect of narrowing expected total return potential.

10 This is reflective of greater passive investment in the sector with less
11 investment inflow variation based on relative metrics between stocks in the
12 IOU water utility group, as followed by Value Line.

13 **HAMADA EQUATION**

14 **Q. Why is your application of the Hamada Equation?**

15 A. I employ the Hamada Equation as a check on the reasonableness of my
16 modeling results. This eliminates bias based on differences in the amount of
17 LT Debt in peer utilities.

18 **INFORMED STAFF ANALYSIS**

19 **Q. Do you monitor and analyze current and projected market**
20 **conditions?**

21 A. Yes. My analysis includes analysis of the current economic climate and its
22 impact on my estimates of long-term growth. I also rely heavily on feeds from
23 SNL Financial LC (SNL), Bloomberg, Moody's, S&P, WSJ and other sources

1 to make sure that my financial understandings are reflective of investor
2 expectations.

3

4 **Q. Did you use robust and proven analytical methodologies?**

5 A. Yes. My methods are robust, and parallel Staff's work over the last decade.

6

7

SENSITIVITY ANALYSIS

8 **Q. Did you perform sensitivity analysis that attempts to capture unique**
9 **risks present in this case that may not apply more generally to the**
10 **industry?**

11 A. Yes, I did. While I remain confident in my primary analysis, I present
12 alternatives that the Commission could consider if it so chooses. The
13 purpose of the analysis is to broaden the record to provide additional flexibility
14 to the Commission. I note that the additional sensitivity analysis may be more
15 subjective than my primary analysis.

16 **Q. Please list the additional factors you feel the Commission could**
17 **consider if they wished to adopt a cost of equity above your**
18 **recommended range.**

19 A. There are six factors that are unique to this case and create risk for the
20 Company. Consideration of these factors provide support for an ROE
21 towards the higher end of the range:

22 1. Mountain Home has 5 or less total current customers including owners,
23 all of whom are residential;

2. The customer growth trend data are statistically uncertain and biased downward. Loss of one critical current customer may mean the company ceases to exist as a utility and would have no means to recover their investment;
3. Risk of material stranded costs is very high due to the heavy reliance on a single residential customer;
4. Risk of litigation costs in excess of operational costs is high;
5. Salvage or repurpose to serve other customers of any underutilized assets is unlikely; and
6. The utility faces competition as existing customers are currently able to switch to their own supply and terminate service.

Q. Why might the Commission wish to consider these factors?

- A. Given the exceptionally small customer base, Mountain Home needs to show a reasonable expectation that it expects growth in customers and revenue which would allow it to pay a stable and growing dividend should it wish to attract equity investors.

Investors and market analysts look to water companies as a monopoly service. As such, they would want to see sufficient barriers such that once customers are served by the utility, they will be unlikely, based on a combination of satisfaction, costs and inherent difficulties, to cancel or switch away from utility provided services.

1 **Q. Does this mean that such a substantially riskier business cannot**
2 **attract investors?**

3 A. No. However, investors want a higher rate of return to hold substantially
4 riskier investments. To approximate the unique extreme incremental risks, in
5 this particular case, the Commission could find the benchmark total 10-year
6 10.40 percent total returns of the S&P Dow Jones Small Cap 600 utilities
7 equity index informative. Returns have shown a 0.54 benchmark standard
8 deviation.

9 **Q. Were the Commission to consider this alternate 10.4 percent ROE for**
10 **small US utilities further, what indicated dividend yield would that**
11 **imply.**

12 A. To hold this higher risk utility stock, and achieve a satisfactory total return
13 based on December 22, 2017 stock prices, investors would want to be
14 compensated with an indicated 2.52 percent annual yield from quarterly
15 dividends. This dividend calculation and ROE is float-adjusted and market
16 cap weighted, but reflects a historical track back to just December, 30, 1994.

17 **Q. So hypothetically, US utility investors would still be willing to hold**
18 **Mountain Home common stock were Mountain home to hold a public**
19 **offering providing a 2.52 percent annual dividend yield and a**
20 **10.4 percent ROE based on the profile of the S&P Small Cap 600**
21 **Utility Index.¹¹**

¹¹ Staff accessed this index on the S&P Dow Jones Website on Dec. 22, 2017

1 A. Yes. However, I still prefer to bring best available information to bear
2 including that Mountain Home is a public water utility, and thus is best
3 compared to other similar utilities rather than similar sized firms at large. For
4 this reason, I offer my sensitivity analysis as inferior to my primary
5 recommendation of 8.6 percent. This is more in line with the peer projections
6 found in Exhibit No. Staff/202 Muldoon/3.

7
8 **CONCLUSION**

9 **Q. Is it practicable for Mountain Home to adhere to best IOU practices?**

10 A. Yes, regardless of how Dr. Keith Ironside actually met the cost of replacing a
11 well under emergency conditions, prevailing required return on equity
12 provides an informative comparator in the determination of prudent fair cost of
13 capital for a water utility operation. This analysis neither favors nor disfavors
14 Mountain Home, but rather provides an impartial assessment of capital
15 market conditions that would apply for a well-managed alternate investor
16 owned utility faced with need for like capital.

17 **Q. What is your recommendation regarding ROE?**

18 A. I recommend that the Commission consider a range of reasonable ROEs
19 from 7.50 percent to 8.64 percent, and consider a point ROE of 8.6 percent.
20 My analysis appropriately addresses differences in capitalization size.
21 However the unique and material risks associated with Mountain Home
22 partially depicted above prompts me to note that were the Commission to
23 determine that the risks inherent to Mountain Home's prospects are more in

1 line with the smallest utilities in the US covered by Standard and Poor's, then
2 the upper end of this range of reasonable ROEs could be extended to 10.4
3 percent, predicated on Mountain Home offering a higher 2.52 percent
4 dividend yield to compensate investors for higher than typical water utility risk
5 of holding Mountain Home common stock.

6 **Q. Does this sensitivity analysis set a precedent for the future?**

7 A. No. I have higher confidence in my point required ROE of 8.6 percent. But I
8 offer the sensitivity analysis to help broaden the record and provide a basis
9 should the Commission determine the unique risks detailed in my testimony
10 merit Commission consideration of the S&P alternative

11 **Q. Does your primary analysis address the small size of the utility in this**
12 **case?**

13 A. Yes. My primary analysis adds 15 bps to compensate for any perceived
14 differences due to the size differential between the smallest peer utility and
15 the largest peer examined, on top of modeling results. Further, my analysis
16 adds 12.5 bps to address the cost of floating stock that a larger investor
17 owned utility would incur to float new common stock shares. These
18 adjustments are shown in Exhibit No. Staff/ 102 Muldoon/1.

19 The long-term nature of Mountain Home's new assets are a good fit to
20 equity financing and this testimony provides good evidence that an
21 8.6 percent ROE currently reflects a reasonable required return on equity.

22 **Q. Does that conclude your testimony?**

23 A. Yes.

CASE: UW 172
WITNESS: MATT MULDOON

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 201

Witness Qualifications Statement

January 4, 2018

WITNESS QUALIFICATION STATEMENT

NAME: Matthew (Matt) J. Muldoon

EMPLOYER: PUBLIC UTILITY COMMISSION OF OREGON

TITLE: Senior Economist
Energy – Rates Finance and Audit Division

ADDRESS: 201 High Street SE, Suite 100
Salem, OR 97301

EDUCATION: In 1981, I received a Bachelor of Arts Degree in Political Science from the University of Chicago. In 2007, I received a Masters of Business Administration from Portland State University with a certificate in Finance.

EXPERIENCE: From April of 2008 to the present, I have been employed by the OPUC. My current responsibilities include financial and rate analysis with an emphasis on Cost of Capital. I have worked on Cost of Capital in the following general rate case dockets: AVA UG 186; UG 201, UG 246, UG 284, UG 288, and UG 325 current; NWN UG 221; PAC UE 246, and UE 263; PGE UE 262, UE 283, UE 294, and UE 319 current; and CNG UG 287 and UG 305.

From 2002 to 2008 I was Executive Director of the Acceleration Transportation Rate Bureau, Inc. where I developed new rate structures for surface transportation and created metrics to insure program success within regulated processes.

I was the Vice President of Operations for Willamette Traffic Bureau, Inc. from 1993 to 2002. There I managed tariff rate compilation and analysis. I also developed new information systems and did sensitivity analysis for rate modeling.

OTHER: I have prepared, and defended formal testimony in contested hearings before the OPUC, ICC, STB, WUTC and ODOT. I have also prepared OPUC Staff testimony in BPA rate cases.

CASE: UW 172
WITNESS: MATT MULDOON

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 202

Return on Equity (ROE)

**Exhibits in Support
of Direct Testimony**

January 4, 2018

UW 172 Staff ROE Summary

Stage 3 – Long-Term Annual Dividend and EPS Growth Rates Considered					
Component	Real Rate	TIPS Inflation Forecast	Nominal Rate	Weight	Weighted Rate
EIA	2.20%	2.04%	4.28%	12.50%	0.54%
OMB - 10 Year GDP Projection			4.10%	12.50%	0.51%
White House 2017 Budget			4.30%	12.50%	0.54%
CBO Projections			4.20%	12.50%	0.53%
Historical					
1980 Q1 – 2016 Q3	2.80%	2.04%	4.90%	50.0%	2.45%
A Composite				100%	4.56%
B BEA Avg. Nominal Historical			5.46%	100.0%	5.46%
1980 Q1 – 2016 Q1					
C Blue Chip* – Top 10%	2.90%	2.04%	5.00%	100.0%	5.00%
2019 Values					

Model X: 3 Stage DCF - Dividend Growth with Terminal Value as Perpetuity				
X		Composite Growth	4.56%	Nominal Historical Growth
				5.46%
1 VL H2O Screen		6.83%		7.65%
2 VL (Low-Cap) H2O Screen - Under \$2B		6.70%		7.52%
3 VL (Small-Cap) H2O Screen		6.76%		7.59%

→
Hamada
Adjustments

Model X: 3 Stage DCF - Dividend Growth with Terminal Value as Perpetuity (Hamada)				
X		Composite Growth	4.56%	Nominal Historical Growth
				5.46%
1 VL H2O Screen		7.13%		7.95%
2 VL (Low Cap) H2O Screen		7.03%		7.85%
3 VL (Small-Cap) H2O Screen		7.09%		7.92%

Model Y: 3 Stage DCF - Dividend Growth with Terminal Value as Sales based upon EPS Growth and Terminal Stock				
Y		Composite Growth	4.56%	Nominal Historical Growth
				5.46%
1 VL H2O Screen		7.31%		8.03%
2 VL (Low-Cap) H2O Screen		7.17%		7.89%
3 VL (Small-Cap) H2O Screen		7.32%		8.04%

→
Hamada
Adjustments

Model Y: 3 Stage DCF - Dividend & EPS Growth with Terminal Value as Stock Sale				
Y		Composite Growth	4.56%	Nominal Historical Growth
				5.46%
1 VL H2O Screen		7.61%		8.33%
2 VL (Low Cap) H2O Screen		7.50%		8.22%
3 VL (Small-Cap) H2O Screen		7.65%		8.37%

- ❖ Hamada Adjustments to Right Fully Account for Differences in the Amount of Debt in Capital Structure

❖ Common Stock Flotation Costs Adjustment Shifts Range of Reasonable ROE's Upward by :

❖ Sensitivity Study to Account for Difference in Capitalization Size -- Maximum Upward Shift Shown to Right
- Above Right

12.5

15.0

bps

bps

Informed Range of Modeled Results 8.61% to 8.64% ROE

Point ROE Recommendation 8.6% ROE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Water Utility		Screen:		1 Water Utilities Followed by Value Line (VL)											
Mountain Home (MH) UW 172				2 " that have capitalization under \$2B											
				See Note Below											
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	VL Corporate Name Gas Utility	NYSE NSDQ Ticker	VL 12/18/2017 Beta	Yahoo Fin. 12/18/2017 Beta	Yahoo Fin. 12/18/2017 Mkt Cap \$ Billions	VL 12/18/2017 Mkt Cap \$ Billions	Value Line Water Utility w VL Beta < 1 12/18/2017	SNL or VL No Div Declines 5 years	VL 2017 LT Debt < 56% of Capital	VL 2020-2022 LT Debt % of Capital	VL 2017 Common Equity % of Capital	VL Preferred Stock of Capital
1	American States	Yes	Yes	American States Water Company	AWR	0.80	-0.25	2.04	1.90	Yes	Pass	40.0%	43.5%	60.0%	0.0%
2	American Water	No	No	American Water Works Company, Inc.	AWK	0.65	0.05	16.14	14.60	Yes	Fail	53.5%	54.0%	46.4%	0.1%
3	Aqua America	Yes	No	Aqua America, Inc.	WTR	0.70	0.25	6.76	6.00	Yes	Pass	47.0%	51.0%	53.0%	0.0%
4	California Water	Yes	Yes	California Water Service Group	CWT	0.80	0.43	2.11	1.90	Yes	Pass	45.0%	43.0%	55.0%	0.0%
5	Connecticut Water	Yes	Yes	Connecticut Water Services, Inc.	CTWS	0.65	-0.06	0.75	0.70	Yes	Pass	46.5%	46.5%	53.4%	0.1%
6	Consolidated Water	No	No	Consolidated Water Co. Ltd.	CWCO	1.00	0.57	0.19	0.20	No	Pass	0.0%	0.0%	99.0%	1.0%
7	Middlesex Water	Yes	Yes	Middlesex Water Company	MSEX	0.80	0.39	0.68	0.65	Yes	Pass	37.5%	37.5%	62.0%	0.5%
8	SJW	Yes	Yes	SJW Group	SJW	0.75	-0.15	1.32	1.20	Yes	Pass	49.0%	49.0%	51.0%	0.0%
9	York Water	Yes	Yes	The York Water Company	YORW	0.80	0.32	0.45	0.45	Yes	Pass	43.5%	45.0%	56.5%	0.0%
TOTAL PEERS		7	6	Note: Staff further segregates VL Small-Cap in sensitivity modeling to test the effects of Capitalization Size on modeling results.											

12341718

Screen:12

Water Utility
Mountain Home (MH) UW 172

Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	VL Div. Growth Rate > 0%	Notes	Screen #
1	American States	Yes	Yes	Pass	Also has 10 contracts for military installations. Casitas eminent domain force \$34.3M sale of Ojai Water.	1
2	American Water	No	No	Pass	Strategy: Growth through many small acquisitions and controlling expenses, economies of scale.	2
3	Aqua America	Yes	No	Pass	Strategy: Growth through acquisitions.	3
4	California Water	Yes	Yes	Pass	Strategy: Acquisitions and capital spending.	4
5	Connecticut Water	Yes	Yes	Pass	2016-7 M&A: Acquired Heritage Village Water for \$20.7M. Acquiring Avon Water Co. for \$37M.	5
6	Consolidated Water	No	No	Fail	Flat Dividend Growth, Higher Risk International Desalination Projects	6
7	Middlesex Water	Yes	Yes	Pass	Focus: water and wastewater services upgrades under contract with cities and private clients	7
8	SJW	Yes	Yes	Pass	Strategy of New CEO, Pres.Eric Thornburg: Capital spending	8
9	York Water	Yes	Yes	Pass	Oldest Water Utility in US - in continuous operation since 1816.	9
TOTAL PEERS		7	6			

Mountain Home Peer Dividends																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	2012	2013	2013	2013	2013	2013	2014	2014	2014	2014	2014	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2014-16	2017	2018	
					Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Average	Yr	Yr	
1	1	American States	Yes	Mid-Cap	AWR	0.64	0.1775	0.1775	0.2025	0.2025	0.76	0.2025	0.2025	0.213	0.213	0.83	0.213	0.213	0.224	0.224	0.87	0.224	0.224	0.224	0.242	0.91	0.87	0.98	1.05
2	3	Aqua America	Yes	Large-Cap	WTR	0.54	0.14	0.14	0.152	0.152	0.58	0.152	0.152	0.165	0.165	0.63	0.165	0.165	0.178	0.178	0.69	0.178	0.178	0.1913	0.1913	0.74	0.69	0.80	0.85
3	4	California Water	Yes	Mid-Cap	CWT	0.63	0.16	0.16	0.16	0.16	0.64	0.1625	0.1625	0.1625	0.1625	0.65	0.1675	0.1675	0.1675	0.1675	0.67	0.1725	0.1725	0.1725	0.1725	0.69	0.67	0.72	0.75
4	5	Connecticut Water	Yes	Small-Cap	CTWS	0.96	0.2425	0.2425	0.2475	0.2475	0.98	0.2475	0.2475	0.2575	0.2575	1.01	0.2575	0.2575	0.2675	0.2675	1.05	0.2675	0.2825	0.2825	0.2825	1.12	1.06	1.17	1.24
5	7	Middlesex Water	Yes	Small-Cap	MSEX	0.74	0.1875	0.1875	0.1875	0.19	0.75	0.19	0.19	0.19	0.1925	0.76	0.1925	0.1925	0.1925	0.19875	0.78	0.19875	0.19875	0.19875	0.21125	0.81	0.78	0.84	0.87
6	8	SJW	Yes	Mid-Cap	SJW	0.71	0.1825	0.1825	0.1825	0.1825	0.73	0.1875	0.1875	0.1875	0.1875	0.75	0.195	0.195	0.195	0.195	0.78	0.2025	0.2025	0.2025	0.2025	0.81	0.78	0.87	0.93
7	9	York Water	Yes	Small Cap	YORW	0.54	0.138	0.138	0.138	0.138	0.55	0.1431	0.1431	0.1431	0.1431	0.57	0.1495	0.1495	0.1495	0.1555	0.60	0.1555	0.1555	0.1555	0.1602	0.63	0.60	0.66	0.70
TOTAL		7	6																										

(Low-Cap

Mountain Home Peer EPS																													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
Value Line Estimated EPS																													
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	2013 Yr	2014 Q1	2014 Q2	2014 Q3	2014 Q4	2014 Yr	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2015 Yr	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2016 Yr	2014-16 Average	2017 Q1	2017 Q2	2017 Q3	2017 Q4	2017 Yr	2018 Q1	2018 Q2	
1	1	American States	Yes	Mid-Cap	AWR	1.61	0.28	0.39	0.54	0.36	1.57	0.32	0.41	0.56	0.31	1.60	0.28	0.45	0.59	0.30	1.62	1.60	0.34	0.62	0.59	0.30	1.85	0.39	0.48
2	3	Aqua America	Yes	Large-Cap	WTR	1.16	0.24	0.31	0.38	0.27	1.20	0.27	0.32	0.38	0.17	1.14	0.29	0.34	0.41	0.28	1.32	1.22	0.28	0.34	0.43	0.31	1.36	0.31	0.36
3	4	California Water	Yes	Mid-Cap	CWT	1.02	(0.11)	0.36	0.70	0.24	1.19	0.03	0.21	0.52	0.18	0.94	(0.02)	0.24	0.48	0.31	1.01	1.05	0.02	0.39	0.62	0.32	1.35	0.07	0.38
4	5	Connecticut Water	Yes	Small-Cap	CTWS	1.66	0.27	0.67	0.76	0.22	1.92	0.28	0.77	0.79	0.20	2.04	0.28	0.89	0.84	0.07	2.08	2.01	0.36	0.73	0.88	0.23	2.20	0.35	0.80
5	7	Middlesex Water	Yes	Small-Cap	MSEX	1.03	0.20	0.29	0.42	0.22	1.13	0.22	0.31	0.41	0.28	1.22	0.29	0.36	0.54	0.19	1.38	1.24	0.27	0.33	0.55	0.33	1.48	0.33	0.38
6	8	SJW	Yes	Mid-Cap	SJW	1.12	0.04	0.34	1.88	0.28	2.54	0.23	0.36	0.46	0.80	1.85	0.16	0.82	0.92	0.67	2.57	2.32	0.18	0.9	0.75	0.62	2.45	0.27	0.88
7	9	York Water	Yes	Small Cap	YORW	0.75	0.16	0.22	0.23	0.28	0.89	0.20	0.22	0.28	0.27	0.97	0.19	0.23	0.27	0.23	0.92	0.93	0.20	0.23	0.29	0.28	1.00	0.22	0.24
TOTAL		8	6																										

Mountain Home Peer Dividends

d Near Future Dividends in Blue													VL Avg	Div. Growth	
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	2019 Yr	2020 Yr	2021 Yr	2022 Yr	2020- 22 / Yr	2020-22 vs. 2014-16	Screen #				
1	1	American States	Yes	Mid-Cap	AWR	1.14	1.24	1.35	1.46	1.35	7.5%	1	1		
2	3	Aqua America	Yes	Large-Cap	WTR	0.94	1.04	1.15	1.26	1.15	9.0%	3	2		
3	4	California Water	Yes	Mid-Cap	CWT	0.82	0.90	0.99	1.08	0.99	6.7%	4	3		
4	5	Connecticut Water	Yes	Small-Cap	CTWS	1.29	1.34	1.40	1.46	1.40	4.8%	5	4		
5	7	Middlesex Water	Yes	Small-Cap	MSEX	0.92	0.97	1.02	1.07	1.02	4.5%	7	5		
6	8	SJW	Yes	Mid-Cap	SJW	0.99	1.05	1.12	1.19	1.12	6.2%	8	6		
7	9	York Water	Yes	Small Cap	YORW	0.76	0.83	0.90	0.97	0.90	7.0%	9	7		
TOTAL		7	6						VL H2O Screen		6.5%	Mean			
					= Small- & Mid-Cap)					VL (Low Cap) H2O Screen		6.1%			
										VL Small-Cap) H2O Screen		5.4%			

Mountain Home Peer EPS

Mountain Home Peer Earnings																	
Current Earnings per Share in Blue														VL Avg		EPS Growth	
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	2018 Q3	2018 Q4	2018 Yr	2019 Yr	2020 Yr	2021 Yr	2022 Yr	2020 - 22 / Yr	2020-22 vs. 2014-16	Screen #			
1	American States	Yes	Mid-Cap	AWR	0.60	0.38	1.85	2.00	2.17	2.35	2.53	2.35	6.7%	1	1		
2	Aqua America	Yes	Large-Cap	WTR	0.47	0.31	1.45	1.57	1.71	1.85	1.99	1.85	7.2%	3	2		
3	California Water	Yes	Mid-Cap	CWT	0.67	0.33	1.45	1.54	1.64	1.75	1.86	1.75	8.9%	4	3		
4	Connecticut Water	Yes	Small-Cap	CTWS	0.90	0.30	2.35	2.45	2.55	2.65	2.75	2.65	4.7%	5	4		
5	Middlesex Water	Yes	Small-Cap	MSEX	0.57	0.32	1.60	1.74	1.89	2.05	2.21	2.05	8.7%	7	5		
6	SJW	Yes	Mid-Cap	SJW	0.80	0.65	2.60	2.73	2.86	3.00	3.14	3.00	4.4%	8	6		
7	York Water	Yes	Small Cap	YORW	0.30	0.29	1.05	1.16	1.27	1.40	1.53	1.40	7.1%	9	7		
TOTAL		8	6											VL H2O Screen	6.8%	Mean	
														(Low-Cap = Small- & Mid-Cap)	VL (Low-Cap) H2O Screen	6.7%	

1		2	3	4	5	6			7	8	9	10	11	#	12	13	14	15	16	17	#	18	19					
Mountain Home Staff Hamada Adjustments						Yahoo Finance																						
						\$ Stock Closing Price 1st Trading Day of Month			3-Day Avg \$ Stock Price	Div Yield at Recent Price	VL 2017 Return on Common Equity		VL 2017 Cap Structure						Relevered Beta Equity at 50.0%		Equity Risk Premium	Hamada Adjustment Equity At 50.0%						
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	Oct. 9/30/2017	Nov. 10/31/2017	Dec. 12/1/2017						% Long Term Debt	% Common Equity	VL Beta	2017 VL Tax Rate	Hamada Unlevered Beta						Screen #					
1	1	American States	Yes	Mid-Cap	AWR	53.75	57.69	54.97	55.47	1.6%	12.0%		40.0	60.0	0.80	36.5%	0.56		0.92		4.20%	0.50%	1	1				
2	3	Aqua America	Yes	Large-Cap	WTR	35.48	37.99	37.55	37.01	2.0%	12.5%		47.0	53.0	0.70	9.0%	0.39		0.74		4.20%	0.17%	3	2				
3	4	California Water	Yes	Mid-Cap	CWT	42.00	45.60	42.35	43.32	1.6%	9.5%		45.0	55.0	0.80	35.0%	0.52		0.86		4.20%	0.26%	4	3				
4	5	Connecticut Water	Yes	Small-Cap	CTWS	62.02	63.31	60.76	62.03	1.8%	10.0%		46.5	53.5	0.65	19.0%	0.38		0.69		4.20%	0.17%	5	4				
5	7	Middlesex Water	Yes	Small-Cap	MSEX	43.48	46.12	40.86	43.49	1.9%	10.5%		37.5	62.5	0.80	35.0%	0.58		0.95		4.20%	0.63%	7	5				
6	8	SJW	Yes	Mid-Cap	SJW	59.31	68.13	63.00	63.48	1.3%	11.5%		49.0	51.0	0.75	39.0%	0.47		0.76		4.20%	0.05%	8	6				
7	9	York Water	Yes	Small Cap	YORW	35.20	37.15	34.00	35.45	1.8%	11.0%		43.5	56.5	0.80	29.0%	0.52		0.88		4.20%	0.35%	9	7				
TOTAL		7	6																			VL H2O Screen	0.30%	Mean				
																					Dividend Yield = (Annual Dividends per Share) / Price per Share		(Low-Cap = Small- & Mid-Cap)		VL (Low Cap) H2O Screen		0.33%	
																					When Value Line (VL) Beta ratio exceeds 99.9 or earnings are negative, VI shows "NMF" for 'no meaningful figure'.				VL Small-Cap) H2O Screen		0.33%	

4.56% Annual Growth Rate - Stage 3

Dividend Growth with Terminal Value as Perpetuity

E.O.Y. Cash Flows

Staff

Model X

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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B.O.Y. Cash Flows

Staff

Model X

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40								
						Terminal Value as						2017		2018	2019	2020	2021	2022		2023	2024	2025	2026	2027		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2045		2046		2046	Screen
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	IRR	% of NPV _{Div}	NPV @ IRR	Recent Price	Initial Stage					Transition Stage					Final Stage																	Terminal Value	Div	Perpetuity	#											
1	1	American States	Yes	Mid-Cap	6.97%	52.7%	0.00	(55.47)	1.05	1.14	1.24	1.35	1.46	1.61	1.75	1.86	1.94	2.03	2.13	2.22	2.32	2.43	2.54	2.66	2.78	2.90	3.04	3.17	3.32	3.47	3.63	3.79	3.97	4.15	4.34	4.54	4.74	220.51	4.96	215.55	1								
2	3	Aqua America	Yes	Large-Cap	7.70%	43.7%	0.00	(37.01)	0.85	0.94	1.04	1.15	1.26	1.41	1.53	1.64	1.71	1.79	1.87	1.96	2.05	2.14	2.24	2.34	2.45	2.56	2.68	2.80	2.93	3.06	3.20	3.35	3.50	3.66	3.82	4.00	4.18	149.87	4.37	145.49	3								
3	4	California Water	Yes	Mid-Cap	6.81%	54.0%	0.00	(43.32)	0.75	0.82	0.90	0.99	1.08	1.18	1.28	1.36	1.42	1.48	1.55	1.62	1.70	1.77	1.86	1.94	2.03	2.12	2.22	2.32	2.42	2.54	2.65	2.77	2.90	3.03	3.17	3.31	3.46	171.79	3.62	168.17	4								
4	5	Connecticut Water	Yes	Small-Cap	6.65%	56.6%	0.00	(62.03)	1.24	1.29	1.34	1.40	1.46	1.58	1.69	1.78	1.87	1.95	2.04	2.13	2.23	2.33	2.44	2.55	2.67	2.79	2.91	3.05	3.19	3.33	3.48	3.64	3.81	3.98	4.16	4.35	4.55	242.64	4.76	237.88	5								
5	7	Middlesex Water	Yes	Small-Cap	6.75%	55.3%	0.00	(43.49)	0.87	0.92	0.97	1.02	1.07	1.16	1.24	1.31	1.37	1.43	1.50	1.57	1.64	1.71	1.79	1.87	1.96	2.05	2.14	2.24	2.34	2.45	2.56	2.67	2.80	2.92	3.06	3.20	3.34	170.63	3.49	167.13	7								
6	8	SJW	Yes	Mid-Cap	6.26%	63.3%	(0.00)	(63.48)	0.93	0.99	1.05	1.12	1.19	1.30	1.40	1.49	1.55	1.62	1.70	1.78	1.86	1.94	2.03	2.12	2.22	2.32	2.43	2.54	2.65	2.77	2.90	3.03	3.17	3.32	3.47	3.62	3.79	248.22	3.96	244.25	8								
7	9	York Water	Yes	Small Cap	7.05%	51.5%	0.00	(35.45)	0.70	0.76	0.83	0.90	0.97	1.07	1.16	1.23	1.29	1.34	1.41	1.47	1.54	1.61	1.68	1.76	1.84	1.92	2.01	2.10	2.20	2.30	2.40	2.51	2.62	2.74	2.87	3.00	3.14	140.99	3.28	137.71	9								
TOTALS		7	6		Mean																																												
					6.88%	53.89%	0%	VL H2O Screen																																									
					6.75%	52.32%	0%	VL (Low Cap) H2O Screen (Low-Cap = Small- & Mid-Cap)																																									
					6.82%	54.48%	0%	VL Small-Cap) H2O Screen																																									

Average B.O.Y. & E.O.Y. Cash Flows

Model X

	1	2	3	4	5	6	7	8	9		
						Terminal Value as	Average 2017 - 2021 Dividend Growth Rates			Screen	
	Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Average IRR	% of NPV _{Div}	EOY	BOY	Average	#	
1	1	American States	Yes	Mid-Cap	6.91%	53.6%	8.3%	8.6%	8.4%	1	
2	3	Aqua America	Yes	Large-Cap	7.62%	44.8%	9.5%	10.3%	9.9%	3	
3	4	California Water	Yes	Mid-Cap	6.76%	55.4%	8.3%	9.5%	8.9%	4	
4	5	Connecticut Water	Yes	Small-Cap	6.61%	57.4%	4.6%	4.1%	4.3%	5	
5	7	Middlesex Water	Yes	Small-Cap	6.70%	56.1%	5.0%	5.4%	5.2%	7	
6	8	SJW	Yes	Mid-Cap	6.22%	64.0%	6.5%	6.3%	6.4%	8	
7	9	York Water	Yes	Small Cap	6.99%	52.4%	8.1%	8.6%	8.3%	9	
TOTALS					7	6					
					Mean						
					6.83%	54.83%	7%	VL H2O Screen			
					6.70%	53.29%	7%	VL (Low Cap) H2O Screen			(Low-Cap = Small- & Mid-Cap)
					6.76%	55.42%	7%	VL Small-Cap) H2O Screen			

UW 172 Staff ROE Summary

Stage 3 – Long-Term Annual Dividend and EPS Growth Rates Considered					
Component	Real Rate	TIPS Inflation Forecast	Nominal Rate	Weight	Weighted Rate
EIA	2.20%	2.04%	4.28%	12.50%	0.54%
OMB - 10 Year GDP Projection			4.10%	12.50%	0.51%
White House 2017 Budget			4.30%	12.50%	0.54%
CBO Projections			4.20%	12.50%	0.53%
Historical					
1980 Q1 – 2016 Q3	2.80%	2.04%	4.90%	50.0%	2.45%
A Composite				100%	4.56%
B BEA Avg. Nominal Historical			5.46%	100.0%	5.46%
1980 Q1 – 2016 Q1					
C Blue Chip* – Top 10% 2019 Values	2.90%	2.04%	5.00%	100.0%	5.00%

Model X: 3 Stage DCF - Dividend Growth with Terminal Value as Perpetuity				
X	Composite Growth	4.56%	Nominal Historical Growth	5.46%
1 VL H2O Screen	6.83%		7.65%	
2 VL (Low-Cap) H2O Screen - Under \$2B	6.70%		7.52%	
3 VL Small-Cap) H2O Screen	6.76%		7.59%	

→
Hamada
Adjustments

Model X: 3 Stage DCF - Dividend Growth with Terminal Value as Perpetuity (Hamada)				
X	Composite Growth	4.56%	Nominal Historical Growth	5.46%
1 VL H2O Screen	7.13%		7.95%	
2 VL (Low Cap) H2O Screen	7.03%		7.85%	
3 VL Small-Cap) H2O Screen	7.09%		7.92%	

Model Y: 3 Stage DCF - Dividend Growth with Terminal Value as Sales based upon EPS Growth and Terminal Stock				
Y	Composite Growth	4.56%	Nominal Historical Growth	5.46%
1 VL H2O Screen	7.31%		8.03%	
2 VL (Low-Cap) H2O Screen	7.17%		7.89%	
3 VL (Small-Cap) H2O Screen	7.32%		8.04%	

→
Hamada
Adjustments

Model Y: 3 Stage DCF - Dividend & EPS Growth with Terminal Value as Stock Sale				
Y	Composite Growth	4.56%	Nominal Historical Growth	5.46%
1 VL H2O Screen	7.61%		8.33%	
2 VL (Low Cap) H2O Screen	7.50%		8.22%	
3 VL Small-Cap) H2O Screen	7.65%		8.37%	

- ❖ Hamada Adjustments to Right Fully Account for Differences in the Amount of Debt in Capital Structure

❖ Common Stock Flotation Costs Adjustment Shifts Range of Reasonable ROE's Upward by :

❖ Sensitivity Study to Account for Difference in Capitalization Size -- Maximum Upward Shift Shown to Right
- Above Right

12.5

15.0

bps

bps

Informed Range of Modeled Results 8.61% to 8.64% ROE

Point ROE Recommendation 8.6% ROE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Water Utility Mountain Home (MH) UW 172		Screen:		1 Water Utilities Followed by Value Line (VL)											
				2 " that have capitalization under \$2B											
				See Note Below											
		1	2												
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	VL Corporate Name Gas Utility	NYSE NSDQ Ticker	VL 12/18/2017 Beta	Yahoo Fin. 12/18/2017 Beta	Yahoo Fin. 12/18/2017 Mkt Cap \$ Billions	VL 12/18/2017 Mkt Cap \$ Billions	Value Line Water Utility w VL Beta < 1 12/18/2017	SNL or VL No Div Declines 5 years	VL 2017 LT Debt < 56% of Capital	VL 2020-2022 LT Debt % of Capital	VL 2017 Common Equity % of Capital	VL Preferred Stock of Capital
1	American States	Yes	Yes	American States Water Company	AWR	0.80	-0.25	2.04	1.90	Yes	Pass	40.0%	43.5%	60.0%	0.0%
2	American Water	No	No	American Water Works Company, Inc.	AWK	0.65	0.05	16.14	14.60	Yes	Fail	53.5%	54.0%	46.4%	0.1%
3	Aqua America	Yes	No	Aqua America, Inc.	WTR	0.70	0.25	6.76	6.00	Yes	Pass	47.0%	51.0%	53.0%	0.0%
4	California Water	Yes	Yes	California Water Service Group	CWT	0.80	0.43	2.11	1.90	Yes	Pass	45.0%	43.0%	55.0%	0.0%
5	Connecticut Water	Yes	Yes	Connecticut Water Services, Inc.	CTWS	0.65	-0.06	0.75	0.70	Yes	Pass	46.5%	46.5%	53.4%	0.1%
6	Consolidated Water	No	No	Consolidated Water Co. Ltd.	CWCO	1.00	0.57	0.19	0.20	No	Pass	0.0%	0.0%	99.0%	1.0%
7	Middlesex Water	Yes	Yes	Middlesex Water Company	MSEX	0.80	0.39	0.68	0.65	Yes	Pass	37.5%	37.5%	62.0%	0.5%
8	SJW	Yes	Yes	SJW Group	SJW	0.75	-0.15	1.32	1.20	Yes	Pass	49.0%	49.0%	51.0%	0.0%
9	York Water	Yes	Yes	The York Water Company	YORW	0.80	0.32	0.45	0.45	Yes	Pass	43.5%	45.0%	56.5%	0.0%
TOTAL PEERS		7	6	Note: Staff further segregates VL Small-Cap in sensitivity modeling to test the effects of Capitalization Size on modeling results.											

1

2

3

4

17

18

Screen:

1

2

Water Utility

Mountain Home (MH) UW 172

Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	VL Div. Growth Rate > 0%	Notes	Screen #
1	American States	Yes	Yes	Pass	Also has 10 contracts for military installations. Casitas eminent domain force \$34.3M sale of Ojai Water.	1
2	American Water	No	No	Pass	Strategy: Growth through many small acquisitions and controlling expenses, economies of scale.	2
3	Aqua America	Yes	No	Pass	Strategy: Growth through acquisitions.	3
4	California Water	Yes	Yes	Pass	Strategy: Acquisitions and capital spending.	4
5	Connecticut Water	Yes	Yes	Pass	2016-7 M&A: Acquired Heritage Village Water for \$20.7M. Acquiring Avon Water Co. for \$37M.	5
6	Consolidated Water	No	No	Fail	Flat Dividend Growth, Higher Risk International Desalination Projects	6
7	Middlesex Water	Yes	Yes	Pass	Focus: water and wastewater services upgrades under contract with cities and private clients	7
8	SJW	Yes	Yes	Pass	Strategy of New CEO, Pres.Eric Thornburg: Capital spending	8
9	York Water	Yes	Yes	Pass	Oldest Water Utility in US - in continuous operation since 1816.	9
TOTAL PEERS		7	6			

Mountain Home Peer Dividends

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	Screen	Abbreviated	UW 172	UW 172		2012	2013	2013	2013	2013	2013	2014	2014	2014	2014	2014	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2014-16	2017	2018
	#	Utility	VL Group	VL Low-Cap	Ticker	Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Average	Yr	Yr
1	1	American States	Yes	Mid-Cap	AWR	0.64	0.1775	0.1775	0.2025	0.2025	0.76	0.2025	0.2025	0.213	0.213	0.83	0.213	0.213	0.224	0.224	0.87	0.224	0.224	0.224	0.242	0.91	0.87	0.98	1.05
2	3	Aqua America	Yes	Large-Cap	WTR	0.54	0.14	0.14	0.152	0.152	0.58	0.152	0.152	0.165	0.165	0.63	0.165	0.165	0.178	0.178	0.69	0.178	0.178	0.1913	0.1913	0.74	0.69	0.80	0.85
3	4	California Water	Yes	Mid-Cap	CWT	0.63	0.16	0.16	0.16	0.16	0.64	0.1625	0.1625	0.1625	0.1625	0.65	0.1675	0.1675	0.1675	0.1675	0.67	0.1725	0.1725	0.1725	0.1725	0.69	0.67	0.72	0.75
4	5	Connecticut Water	Yes	Small-Cap	CTWS	0.96	0.2425	0.2425	0.2475	0.2475	0.98	0.2475	0.2475	0.2575	0.2575	1.01	0.2575	0.2575	0.2675	0.2675	1.05	0.2675	0.2825	0.2825	0.2825	1.12	1.06	1.17	1.24
5	7	Middlesex Water	Yes	Small-Cap	MSEX	0.74	0.1875	0.1875	0.1875	0.19	0.75	0.19	0.19	0.19	0.1925	0.76	0.1925	0.1925	0.1925	0.19875	0.78	0.19875	0.19875	0.19875	0.21125	0.81	0.78	0.84	0.87
6	8	SJW	Yes	Mid-Cap	SJW	0.71	0.1825	0.1825	0.1825	0.1825	0.73	0.1875	0.1875	0.1875	0.1875	0.75	0.195	0.195	0.195	0.195	0.78	0.2025	0.2025	0.2025	0.2025	0.81	0.78	0.87	0.93
7	9	York Water	Yes	Small Cap	YORW	0.54	0.138	0.138	0.138	0.138	0.55	0.1431	0.1431	0.1431	0.1431	0.57	0.1495	0.1495	0.1495	0.1555	0.60	0.1555	0.1555	0.1555	0.1602	0.63	0.60	0.66	0.70
TOTAL			7	6																									

(Low-Cap

Mountain Home Peer EPS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	Screen	Abbreviated	UW 172	UW 172		2013	2014	2014	2014	2014	2014	2015	2015	2015	2015	2015	2016	2016	2016	2016	2016	2014-16	2017	2017	2017	2017	2017	2018	2018
	#	Utility	VL Group	VL Low-Cap	Ticker	Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Q1	Q2	Q3	Q4	Yr	Average	Q1	Q2	Q3	Q4	Yr	Q1	Q2
1	1	American States	Yes	Mid-Cap	AWR	1.61	0.28	0.39	0.54	0.36	1.57	0.32	0.41	0.56	0.31	1.60	0.28	0.45	0.59	0.30	1.62	1.60	0.34	0.62	0.59	0.30	1.85	0.39	0.48
2	3	Aqua America	Yes	Large-Cap	WTR	1.16	0.24	0.31	0.38	0.27	1.20	0.27	0.32	0.38	0.17	1.14	0.29	0.34	0.41	0.28	1.32	1.22	0.28	0.34	0.43	0.31	1.36	0.31	0.36
3	4	California Water	Yes	Mid-Cap	CWT	1.02	(0.11)	0.36	0.70	0.24	1.19	0.03	0.21	0.52	0.18	0.94	(0.02)	0.24	0.48	0.31	1.01	1.05	0.02	0.39	0.62	0.32	1.35	0.07	0.38
4	5	Connecticut Water	Yes	Small-Cap	CTWS	1.66	0.27	0.67	0.76	0.22	1.92	0.28	0.77	0.79	0.20	2.04	0.28	0.89	0.84	0.07	2.08	2.01	0.36	0.73	0.88	0.23	2.20	0.35	0.80
5	7	Middlesex Water	Yes	Small-Cap	MSEX	1.03	0.20	0.29	0.42	0.22	1.13	0.22	0.31	0.41	0.28	1.22	0.29	0.36	0.54	0.19	1.38	1.24	0.27	0.33	0.55	0.33	1.48	0.33	0.38
6	8	SJW	Yes	Mid-Cap	SJW	1.12	0.04	0.34	1.88	0.28	2.54	0.23	0.36	0.46	0.80	1.85	0.16	0.82	0.92	0.67	2.57	2.32	0.18	0.9	0.75	0.62	2.45	0.27	0.88
7	9	York Water	Yes	Small Cap	YORW	0.75	0.16	0.22	0.23	0.28	0.89	0.20	0.22	0.28	0.27	0.97	0.19	0.23	0.27	0.23	0.92	0.93	0.20	0.23	0.29	0.28	1.00	0.22	0.24
TOTAL			8	6																									

Mountain Home Peer Dividends

d Near Future Dividends in Blue												
Screen #		Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	2019 Yr	2020 Yr	2021 Yr	2022 Yr	2020- 22 / Yr	2020-22 vs. 2014-16	Screen #
1	1	American States	Yes	Mid-Cap	AWR	1.14	1.24	1.35	1.46	1.35	7.5%	1
2	3	Aqua America	Yes	Large-Cap	WTR	0.94	1.04	1.15	1.26	1.15	9.0%	2
3	4	California Water	Yes	Mid-Cap	CWT	0.82	0.90	0.99	1.08	0.99	6.7%	3
4	5	Connecticut Water	Yes	Small-Cap	CTWS	1.29	1.34	1.40	1.46	1.40	4.8%	5
5	7	Middlesex Water	Yes	Small-Cap	MSEX	0.92	0.97	1.02	1.07	1.02	4.5%	7
6	8	SJW	Yes	Mid-Cap	SJW	0.99	1.05	1.12	1.19	1.12	6.2%	8
7	9	York Water	Yes	Small Cap	YORW	0.76	0.83	0.90	0.97	0.90	7.0%	9
TOTAL			7	6						VL H2O Screen	6.5%	Mean
					(= Small- & Mid-Cap)	VL (Low Cap) H2O Screen					6.1%	
						VL Small-Cap) H2O Screen					5.4%	

Mountain Home Peer EPS

Pure Earnings per Share in Blue													VL Avg		EPS Growth		Screen	
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	2018 Q3	2018 Q4	2018 Yr	2019 Yr	2020 Yr	2021 Yr	2022 Yr	2020 - 22 / Yr	2020-22 vs. 2014-16	Screen #				
1	1	American States	Yes	Mid-Cap	AWR	0.60	0.38	1.85	2.00	2.17	2.35	2.53	2.35	6.7%	1			
2	3	Aqua America	Yes	Large-Cap	WTR	0.47	0.31	1.45	1.57	1.71	1.85	1.99	1.85	7.2%	3			
3	4	California Water	Yes	Mid-Cap	CWT	0.67	0.33	1.45	1.54	1.64	1.75	1.86	1.75	8.9%	4			
4	5	Connecticut Water	Yes	Small-Cap	CTWS	0.90	0.30	2.35	2.45	2.55	2.65	2.75	2.65	4.7%	5			
5	7	Middlesex Water	Yes	Small-Cap	MSEX	0.57	0.32	1.60	1.74	1.89	2.05	2.21	2.05	8.7%	7			
6	8	SJW	Yes	Mid-Cap	SJW	0.80	0.65	2.60	2.73	2.86	3.00	3.14	3.00	4.4%	8			
7	9	York Water	Yes	Small Cap	YORW	0.30	0.29	1.05	1.16	1.27	1.40	1.53	1.40	7.1%	9			
TOTAL		8	6											VL H2O Screen	6.8%	Mean		
													VL (Low-Cap) H2O Screen	6.7%				

1	2	3	4	5	6	7	8	9	10	11	#	12	13	14	15	16	17	#	18	19		
Mountain Home Staff Hamada Adjustments					Yahoo Finance			3-Day Avg \$ Stock Price	Div Yield at Recent Price	VL 2017 Return on Common Equity		VL 2017 Cap Structure		VL Beta	2017 VL Tax Rate	Hamada Unlevered Beta	Relevered Beta		Equity Risk Premium	Hamada Adjustment Equity At 50.0%	Screen #	
					\$ Stock Closing Price 1st Trading Day of Month							% Long Term Debt	% Common Equity				50.0%					
					Oct. 9/30/2017	Nov. 10/31/2017	Dec. 12/1/2017															
Screen #	Abbreviated Utility	UW 172 VL Group	UW 172 VL Low-Cap	Ticker	9/30/2017	10/31/2017	12/1/2017										50.0%					
1	1	American States	Yes	Mid-Cap	AWR	53.75	57.69	54.97	55.47	1.6%	12.0%		40.0	60.0	0.80	36.5%	0.56	0.92		4.20%	0.50%	1
2	3	Aqua America	Yes	Large-Cap	WTR	35.48	37.99	37.55	37.01	2.0%	12.5%		47.0	53.0	0.70	9.0%	0.39	0.74		4.20%	0.17%	3
3	4	California Water	Yes	Mid-Cap	CWT	42.00	45.60	42.35	43.32	1.6%	9.5%		45.0	55.0	0.80	35.0%	0.52	0.86		4.20%	0.26%	4
4	5	Connecticut Water	Yes	Small-Cap	CTWS	62.02	63.31	60.76	62.03	1.8%	10.0%		46.5	53.5	0.65	19.0%	0.38	0.69		4.20%	0.17%	5
5	7	Middlesex Water	Yes	Small-Cap	MSEX	43.48	46.12	40.86	43.49	1.9%	10.5%		37.5	62.5	0.80	35.0%	0.58	0.95		4.20%	0.63%	7
6	8	SJW	Yes	Mid-Cap	SJW	59.31	68.13	63.00	63.48	1.3%	11.5%		49.0	51.0	0.75	39.0%	0.47	0.76		4.20%	0.05%	8
7	9	York Water	Yes	Small Cap	YORW	35.20	37.15	34.00	35.45	1.8%	11.0%		43.5	56.5	0.80	29.0%	0.52	0.88		4.20%	0.35%	9
TOTAL		7	6																		Mean	
																			VL H2O Screen		0.30%	
																			(Low-Cap = Small- & Mid-Cap) VL (Low Cap) H2O Screen		0.33%	
																			VL Small-Cap) H2O Screen		0.33%	
Dividend Yield = (Annual Dividends per Share) / Price per Share																						
When Value Line (VL) Beta ratio exceeds 99.9 or earnings are negative, VI shows "NMF" for 'no meaningful figure'.																						

CASE: UW 172
WITNESS: MATT MULDOON

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 203

Staff Synthetic Forward Curve TIPS Analysis

Treasury Inflation-Protected Securities (TIPS)

**Exhibits in Support
of Direct Testimony**

January 4, 2018

2028 through 2047 TIPS-Implied Average Annual Inflation Rate:

2.04%

Yr. End Mo.-Yr.	Years	Individually Implied Price Levels					Implied Forward Curve/Price Level					Implied Price Level	Check
		5-Yr	7-Yr	10-Yr	20-Yr	30-Yr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr		
Dec-17	0	100.00	100.00	100.00	100.00	100.00	100.00					100.00	
Dec-18	1	101.67	101.80	101.80	101.83	101.96	101.67					101.67	
Dec-19	2	103.37	103.64	103.64	103.69	103.96	103.37					103.37	
Dec-20	3	105.09	105.51	105.51	105.58	106.00	105.09					105.09	
Dec-21	4	106.85	107.41	107.41	107.51	108.07	106.85					106.85	
Dec-22	5	108.63	109.35	109.35	109.47	110.19	108.63					108.63	
Dec-23	6		111.32	111.32	111.47	112.35		110.96				110.96	
Dec-24	7		113.33	113.33	113.51	114.55		113.33				113.33	
Dec-25	8			115.37	115.58	116.80			115.37			115.37	
Dec-26	9			117.45	117.69	119.09			117.45			117.45	
Dec-27	10			119.57	119.84	121.42			119.57			119.57	
Dec-28	11				122.03	123.80				121.78		121.78	122.01
Dec-29	12				124.26	126.23				124.03		124.03	124.49
Dec-30	13				126.53	128.70				126.33		126.33	127.03
Dec-31	14				128.84	131.23				128.67		128.67	129.62
Dec-32	15				131.20	133.80				131.05		131.05	132.26
Dec-33	16				133.59	136.42				133.47		133.47	134.96
Dec-34	17				136.03	139.09				135.94		135.94	137.71
Dec-35	18				138.52	141.82				138.45		138.45	140.52
Dec-36	19				141.05	144.60				141.02		141.02	143.38
Dec-37	20				143.63	147.43				143.63		143.63	146.30
Dec-38	21					150.32					146.82	146.82	149.29
Dec-39	22					153.27					150.09	150.09	152.33
Dec-40	23					156.27					153.44	153.44	155.43
Dec-41	24					159.34					156.85	156.85	158.60
Dec-42	25					162.46					160.35	160.35	161.84
Dec-43	26					165.64					163.92	163.92	165.14
Dec-44	27					168.89					167.57	167.57	168.50
Dec-45	28					172.20					171.30	171.30	171.94
Dec-46	29					175.58					175.12	175.12	175.44
Dec-47	30					179.02					179.02	179.02	179.02

Average Quarterly Values for FRB H15 Data

See FRB H.15 Tab for Data Feed Sources.

Staff TIPS Analysis

Quarterly Aggregation

Average Monthly Inflation Indexed Rates by Quarter					
Qtr	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2003-Q1	1.33	1.81	2.07		
2003-Q2	1.15	1.61	1.94		
2003-Q3	1.36	1.84	2.21		
2003-Q4	1.24	1.65	2.01		
2004-Q1	0.82	1.26	1.71		
2004-Q2	1.26	1.69	2.05		
2004-Q3	1.17	1.55	1.89	2.28	
2004-Q4	0.93	1.30	1.69	2.08	
2005-Q1	1.17	1.41	1.71	1.93	
2005-Q2	1.30	1.44	1.68	1.83	
2005-Q3	1.59	1.70	1.82	1.98	
2005-Q4	1.92	1.98	2.04	2.13	
2006-Q1	2.00	2.05	2.09	2.08	
2006-Q2	2.34	2.39	2.46	2.48	
2006-Q3	2.37	2.37	2.37	2.38	
2006-Q4	2.40	2.36	2.32	2.29	
2007-Q1	2.28	2.33	2.33	2.36	
2007-Q2	2.35	2.40	2.44	2.49	
2007-Q3	2.38	2.44	2.45	2.46	
2007-Q4	1.54	1.81	1.92	2.11	
2008-Q1	0.58	1.02	1.32	1.81	
2008-Q2	0.79	1.17	1.48	2.03	
2008-Q3	1.18	1.47	1.70	2.16	
2008-Q4	2.73	2.92	2.60	2.73	
2009-Q1	1.37	1.54	1.79	2.34	
2009-Q2	1.12	1.37	1.72	2.31	
2009-Q3	1.17	1.41	1.74	2.22	
2009-Q4	0.58	0.94	1.37	1.98	
2010-Q1	0.47	0.94	1.43	2.00	2.16
2010-Q2	0.46	0.91	1.36	1.77	1.88
2010-Q3	0.20	0.57	1.06	1.68	1.76
2010-Q4	-0.11	0.28	0.75	1.48	1.65
2011-Q1	0.07	0.67	1.09	1.71	2.00
2011-Q2	-0.29	0.33	0.80	1.49	1.78
2011-Q3	-0.65	-0.22	0.28	0.95	1.25
2011-Q4	-0.75	-0.39	0.05	0.61	0.85
2012-Q1	-1.02	-0.60	-0.17	0.51	0.78
2012-Q2	-1.08	-0.75	-0.35	0.35	0.66
2012-Q3	-1.27	-1.01	-0.63	0.02	0.43
2012-Q4	-1.42	-1.15	-0.76	-0.02	0.36
2013-Q1	-1.40	-0.98	-0.59	0.19	0.56
2013-Q2	-1.04	-0.62	-0.25	0.47	0.80
2013-Q3	-0.32	0.17	0.56	1.16	1.43
2013-Q4	-0.29	0.25	0.57	1.19	1.50
2014-Q1	-0.16	0.37	0.58	1.11	1.39
2014-Q2	-0.25	0.27	0.43	0.88	1.14
2014-Q3	-0.13	0.24	0.32	0.72	0.98
2014-Q4	0.19	0.39	0.45	0.75	0.95
2015-Q1	0.11	0.23	0.27	0.52	0.71
2015-Q2	-0.10	0.22	0.30	0.67	0.91
2015-Q3	0.26	0.48	0.57	0.92	1.14
2015-Q4	0.36	0.51	0.66	1.02	1.24
2016-Q1	0.15	0.32	0.49	0.88	1.11
2016-Q2	-0.24	-0.05	0.19	0.62	0.85
2016-Q3	-0.22	-0.09	0.08	0.44	0.62
2016-Q4	-0.06	0.12	0.33	0.69	0.86

Average Monthly Nominal UST Rates by Quarter					
Qtr	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m
2003-Q1	2.91	3.46	3.92	4.90	
2003-Q2	2.57	3.13	3.62	4.59	
2003-Q3	3.14	3.72	4.23	5.17	
2003-Q4	3.25	3.78	4.29	5.16	
2004-Q1	2.99	3.52	4.02	4.89	
2004-Q2	3.72	4.18	4.60	5.36	
2004-Q3	3.51	3.92	4.30	5.07	
2004-Q4	3.49	3.85	4.17	4.87	
2005-Q1	3.88	4.09	4.30	4.76	
2005-Q2	3.87	3.99	4.16	4.55	
2005-Q3	4.04	4.11	4.21	4.51	
2005-Q4	4.39	4.42	4.49	4.77	
2006-Q1	4.55	4.55	4.57	4.76	4.64
2006-Q2	4.99	5.02	5.07	5.29	5.14
2006-Q3	4.84	4.85	4.90	5.09	4.99
2006-Q4	4.60	4.60	4.63	4.83	4.74
2007-Q1	4.65	4.65	4.68	4.90	4.80
2007-Q2	4.76	4.79	4.85	5.07	4.99
2007-Q3	4.50	4.60	4.73	5.01	4.94
2007-Q4	3.79	3.98	4.26	4.65	4.61
2008-Q1	2.75	3.15	3.66	4.40	4.41
2008-Q2	3.16	3.46	3.89	4.59	4.58
2008-Q3	3.11	3.44	3.86	4.49	4.45
2008-Q4	2.18	2.63	3.25	3.97	3.68
2009-Q1	1.76	2.23	2.74	3.69	3.45
2009-Q2	2.23	2.88	3.31	4.19	4.17
2009-Q3	2.47	3.12	3.52	4.28	4.32
2009-Q4	2.30	2.98	3.46	4.27	4.33
2010-Q1	2.42	3.16	3.72	4.49	4.62
2010-Q2	2.25	2.93	3.49	4.20	4.37
2010-Q3	1.55	2.19	2.79	3.60	3.85
2010-Q4	1.49	2.18	2.86	3.84	4.16
2011-Q1	2.12	2.83	3.46	4.32	4.56
2011-Q2	1.86	2.55	3.21	4.07	4.34
2011-Q3	1.15	1.78	2.43	3.34	3.70
2011-Q4	0.95	1.50	2.05	2.75	3.04
2012-Q1	0.90	1.44	2.04	2.80	3.14
2012-Q2	0.79	1.24	1.82	2.55	2.94
2012-Q3	0.67	1.08	1.64	2.37	2.75
2012-Q4	0.69	1.12	1.71	2.46	2.86
2013-Q1	0.83	1.32	1.95	2.75	3.14
2013-Q2	0.92	1.39	2.00	2.78	3.15
2013-Q3	1.51	2.12	2.71	3.44	3.72
2013-Q4	1.44	2.12	2.75	3.50	3.79
2014-Q1	1.60	2.22	2.76	3.42	3.68
2014-Q2	1.66	2.19	2.62	3.18	2.86
2014-Q3	1.70	2.16	2.50	3.01	3.26
2014-Q4	1.60	2.00	2.28	2.69	2.97
2015-Q1	1.45	1.77	1.97	2.32	2.55
2015-Q2	1.52	1.91	2.17	2.62	2.89
2015-Q3	1.55	1.94	2.22	2.65	2.96
2015-Q4	1.59	1.94	2.19	2.60	2.96
2016-Q1	1.37	1.69	1.92	2.32	2.72
2016-Q2	1.24	1.54	1.75	2.15	2.57
2016-Q3	1.13	1.40	1.56	1.91	2.28
2016-Q4	1.61	1.93	2.13	2.52	2.82

Implied Market-based Inflationary Expectations					
Qtr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr
2003-Q1	1.58	1.65	1.85		
2003-Q2	1.42	1.52	1.68		
2003-Q3	1.78	1.87	2.03		
2003-Q4	2.01	2.13	2.28		
2004-Q1	2.17	2.26	2.31		
2004-Q2	2.47	2.50	2.55		
2004-Q3	2.34	2.37	2.41	2.79	
2004-Q4	2.56	2.55	2.48	2.79	
2005-Q1	2.72	2.68	2.58	2.83	
2005-Q2	2.57	2.55	2.48	2.72	
2005-Q3	2.44	2.41	2.39	2.52	
2005-Q4	2.47	2.44	2.45	2.64	
2006-Q1	2.55	2.50	2.48	2.69	
2006-Q2	2.65	2.62	2.61	2.80	
2006-Q3	2.47	2.48	2.52	2.71	
2006-Q4	2.20	2.24	2.31	2.54	
2007-Q1	2.36	2.32	2.35	2.54	
2007-Q2	2.41	2.39	2.41	2.58	
2007-Q3	2.13	2.16	2.28	2.55	
2007-Q4	2.24	2.17	2.34	2.54	
2008-Q1	2.17	2.13	2.34	2.59	
2008-Q2	2.37	2.29	2.40	2.56	
2008-Q3	1.93	1.96	2.16	2.33	
2008-Q4	-0.55	-0.29	0.65	1.24	
2009-Q1	0.39	0.69	0.95	1.35	
2009-Q2	1.11	1.51	1.60	1.88	
2009-Q3	1.30	1.72	1.77	2.06	
2009-Q4	1.72	2.04	2.09	2.29	
2010-Q1	1.96	2.22	2.28	2.49	2.47
2010-Q2	1.80	2.03	2.13	2.43	2.49
2010-Q3	1.35	1.63	1.73	1.92	2.09
2010-Q4	1.59	1.90	2.12	2.36	2.51
2011-Q1	2.05	2.16	2.37	2.61	2.56
2011-Q2	2.15	2.22	2.41	2.57	2.56
2011-Q3	1.81	2.00	2.15	2.39	2.45
2011-Q4	1.71	1.89	1.99	2.14	2.19
2012-Q1	1.92	2.04	2.20	2.29	2.36
2012-Q2	1.86	1.99	2.17	2.21	2.28
2012-Q3	1.94	2.09	2.28	2.35	2.31
2012-Q4	2.11	2.27	2.47	2.48	2.50
2013-Q1	2.23	2.31	2.54	2.55	2.58
2013-Q2	1.95	2.01	2.25	2.32	2.34
2013-Q3	1.82	1.95	2.15	2.29	2.29
2013-Q4	1.73	1.86	2.17	2.31	2.29
2014-Q1	1.77	1.85	2.18	2.30	2.29
2014-Q2	1.90	1.92	2.20	2.30	1.72
2014-Q3	1.83	1.92	2.18	2.28	2.29
2014-Q4	1.41	1.61	1.83	1.95	2.02
2015-Q1	1.35	1.54	1.70	1.79	1.85
2015-Q2	1.63	1.69	1.86	1.95	1.97
2015-Q3	1.29	1.47	1.65	1.73	1.82
2015-Q4	1.23	1.43	1.53	1.58	1.72
2016-Q1	1.23	1.37	1.43	1.45	1.61
2016-Q2	1.48	1.58	1.56	1.53	1.72
2016-Q3	1.35	1.49	1.48	1.47	1.66
2016-Q4	1.67	1.80	1.80	1.83	1.96

FRB H.15 Market Yield on U.S. Treasury (UST) Securities at Constant Maturity. Quoted on an Investment Basis in Percent per Year

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Monthly	TIPS-05m	5	Year	Inflation Indexed	H.15 ID	RIFLGFCY05 XII N.M
TIPS-07m	7					RIFLGFCY07 XII N.M
TIPS-10m	10					RIFLGFCY10 XII N.M
TIPS-20m	20					RIFLGFCY20 XII N.M
TIPS-30m	30					RIFLGFCY30 XII N.M

Monthly	UST-05m	5	Year	H.15 ID	RIFLGFCY05 N.M
UST-07m	7				RIFLGFCY07 N.M
UST-10m	10				RIFLGFCY10 N.M
UST-20m	20				RIFLGFCY20 N.M
UST-30m	30				RIFLGFCY30 N.M

Annual	TIPS-05a	5	Year	Inflation Indexed	H.15 ID	RIFLGFCY05 XII N.A
TIPS-07a	7					RIFLGFCY07 XII N.A
TIPS-10a	10					RIFLGFCY10 XII N.A
TIPS-20a	20					RIFLGFCY20 XII N.A
TIPS-30a	30					RIFLGFCY30 XII N.A

Annual	UST-05a	5	Year	H.15 ID	RIFLGFCY05 N.A
UST-07a	7				RIFLGFCY07 N.A
UST-10a	10				RIFLGFCY10 N.A
UST-20a	20				RIFLGFCY20 N.A
UST-30a	30				RIFLGFCY30 N.A

Month	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2003-01	1.65	2.10	2.29		
2003-02	1.24	1.74	1.99		
2003-03	1.09	1.60	1.94		
2003-04	1.36	1.85	2.18		
2003-05	1.18	1.61	1.91		
2003-06	0.91	1.37	1.72		
2003-07	1.30	1.76	2.11		
2003-08	1.48	1.97	2.32		
2003-09	1.29	1.80	2.19		
2003-10	1.21	1.68	2.08		
2003-11	1.27	1.64	1.96		
2003-12	1.23	1.64	1.98		
2004-01	1.09	1.48	1.89		
2004-02	0.86	1.31	1.76		
2004-03	0.52	0.98	1.47		
2004-04	1.02	1.49	1.90		
2004-05	1.34	1.77	2.09		
2004-06	1.41	1.80	2.15		
2004-07	1.29	1.68	2.02		
2004-08	1.12	1.51	1.86		
2004-09	1.10	1.46	1.80		
2004-10	0.97	1.35	1.73		
2004-11	0.90	1.27	1.68		
2004-12	0.92	1.28	1.67		
2005-01	1.13	1.40	1.72		
2005-02	1.08	1.33	1.63		
2005-03	1.29	1.49	1.79		
2005-04	1.23	1.42	1.71		
2005-05	1.28	1.41	1.65		
2005-06	1.39	1.49	1.67		
2005-07	1.67	1.75	1.88		
2005-08	1.71	1.79	1.89		
2005-09	1.40	1.56	1.70		
2005-10	1.70	1.82	1.94		
2005-11	1.97	2.03	2.08		
2005-12	2.08	2.10	2.12		
2006-01	1.98	2.01	2.03		
2006-02	1.93	2.02	2.05		
2006-03	2.09	2.15	2.20		
2006-04	2.26	2.34	2.41		
2006-05	2.30	2.36	2.45		
2006-06	2.45	2.48	2.53		
2006-07	2.46	2.48	2.51		
2006-08	2.27	2.29	2.29		
2006-09	2.38	2.35	2.32		
2006-10	2.51	2.45	2.41		
2006-11	2.41	2.35	2.29		
2006-12	2.28	2.28	2.25		
2007-01	2.47	2.47	2.44		
2007-02	2.34	2.38	2.36		
2007-03	2.04	2.14	2.18		
2007-04	2.12	2.20	2.26		
2007-05	2.29	2.32	2.37		
2007-06	2.65	2.67	2.69		
2007-07	2.60	2.63	2.64		
2007-08	2.39	2.45	2.44		
2007-09	2.14	2.24	2.26		
2007-10	2.01	2.15	2.20		
2007-11	1.35	1.65	1.77		
2007-12	1.27	1.62	1.79		
2008-01	0.86	1.24	1.47		
2008-02	0.65	1.09	1.41		
2008-03	0.23	0.73	1.09		
2008-04	0.62	1.00	1.36		
2008-05	0.79	1.16	1.46		
2008-06	0.97	1.35	1.63		
2008-07	0.84	1.24	1.57		
2008-08	1.15	1.47	1.68		
2008-09	1.55	1.71	1.85		
2008-10	2.75	2.96	2.75		
2008-11	3.69	3.84	2.89		
2008-12	1.76	1.96	2.17		
2009-01	1.59	1.72	1.91		
2009-02	1.28	1.48	1.75		
2009-03	1.23	1.43	1.71		
2009-04	1.11	1.29	1.57		
2009-05	1.07	1.34	1.72		
2009-06	1.18	1.48	1.86		
2009-07	1.18	1.44	1.62		
2009-08	1.29	1.49	1.77		
2009-09	1.03	1.29	1.64		
2009-10	0.83	1.12	1.48		
2009-11	0.48	0.84	1.28		
2009-12	0.43	0.86	1.36		
2010-01	0.42	0.85	1.37		
2010-02	0.42	0.90	1.42		
2010-03	0.56	1.08	1.51		
2010-04	0.62	1.10	1.50		
2010-05	0.41	0.86	1.31		
2010-06	0.34	0.76	1.26		
2010-07	0.34	0.73	1.24		
2010-08	0.13	0.51	1.02		
2010-09	0.13	0.46	0.91		
2010-10	-0.32	0.02	0.53		
2010-11	-0.21	0.17	0.67		
2010-12	0.21	0.65	1.04		
2011-01	0.08	0.62	1.06		
2011-02	0.25	0.84	1.24		
2011-03	-0.09	0.54	0.96		
2011-04	-0.14	0.49	0.86		
2011-05	-0.34	0.29	0.78		
2011-06	-0.38	0.21	0.76		
2011-07	-0.49	0.09	0.62		
2011-08	-0.75	-0.36	0.14		
2011-09	-0.72	-0.39	0.08		
2011-10	-0.63	-0.28	0.19		
2011-11	-0.85	-0.46	0.00		
2011-12	-0.78	-0.44	-0.03		
2012-01	-0.92	-0.55	-0.11		
2012-02	-1.11	-0.69	-0.25		
2012-03	-1.03	-0.57	-0.14		
2012-04	-1.06	-0.65	-0.21		
2012-05	-1.12	-0.79	-0.34		
2012-06	-1.05	-0.82	-0.50		
2012-07	-1.15	-0.92	-0.50		
2012-08	-1.19	-0.94	-0.59		
2012-09	-1.47	-1.17	-0.71		
2012-10	-1.47	-1.18	-0.75		
2012-11	-1.38	-1.13	-0.77		
2012-12	-1.40	-1.13	-0.76		
2013-01	-1.39	-1.04	-0.61		
2013-02	-1.39	-0.94	-0.57		
2013-03	-1.43	-0.97	-0.59		
2013-04	-1.38	-0.97	-0.65		
2013-05	-1.14	-0.69	-0.36		
2013-06	-0.59	-0.21	0.25		
2013-07	-0.45	0.02	0.46		
2013-08	-0.33	0.15	0.55		
2013-09	-0.17	0.34	0.66		
2013-10	-0.41	0.11	0.43		
2013-11	-0.38	0.18	0.55		
2013-12	-0.09	0.47	0.74		
2014-01	-0.09	0.45	0.83		
2014-02	-0.26	0.30	0.55		
2014-03	-0.14	0.37	0.56		
2014-04	-0.11	0.38	0.54		
2014-05	-0.34	0.21	0.37		
2014-06	-0.29	0.23	0.37		
2014-07	-0.27	0.18	0.28		
2014-08	-0.21	0.15	0.22		
2014-09	0.10	0.38	0.46		
2014-10	0.06	0.32	0.38		
2014-11	0.14	0.37	0.45		
2014-12	0.37	0.47	0.51		
2015-01	0.17	0.24	0.27		
2015-02	0.11	0.22	0.26		
2015-03	0.04	0.23	0.28		
2015-04	-0.26	-0.01	0.08		
2015-05	-0.10	0.27	0.33		
2015-06	0.05	0.39	0.50		
2015-07	0.14	0.42	0.50		
2015-08	0.31	0.49	0.56		
2015-09	0.33	0.52	0.85		
2015-10	0.21	0.39	0.57		
2015-11	0.40	0.55	0.69		
2015-12	0.46	0.59	0.73		
2016-01	0.33	0.49	0.67		
2016-02	0.14	0.30	0.47		
2016-03	-0.03	0.16	0.34		
2016-04	-0.22	-0.03	0.19		
2016-05	-0.22	-0.04	0.21		
2016-06	-0.27	-0.07	0.17		
2016-07	-0.32	-0.16	0.04		
2016-08	-0.17	-0.06	0.09		
2016-09	-0.17	-0.05	0.12		
2016-10	-0.26	-0.10	0.10		
2016-11	-0.07	0.11	0.32		
2016-12	0.15	0.36	0.56		

Month	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m
2003-01	3.05	3.60	4.05	5.02	
2003-02	2.90	3.45	3.80	4.87	
2003-03	2.78	3.34	3.81	4.82	
2003-04	2.93	3.47	3.96	4.91	
2003-05	2.52	3.07	3.57	4.52	
2003-06	2.27	2.84	3.33	4.34	
2003-07	2.87	3.45	3.98	4.92	
2003-08	3.37	3.96	4.45	5.39	
2003-09	3.18	3.74	4.27	5.21	
2003-10	3.19	3.75	4.29	5.21	
2003-11	3.29	3.81	4.30	5.17	
2003-12	3.27	3.79	4.27	5.11	
2004-01	3.12	3.65	4.15	5.01	
2004-02	3.07	3.59	4.08	4.94	
2004-03	2.79	3.31	3.83	4.72	
2004-04	3.39	3.89	4.35	5.16	
2004-05	3.85	4.31	4.72	5.46	
2004-06	3.93	4.35	4.73	5.45	
2004-07	3.69	4.11	4.50	5.24	
2004-08	3.47	3.90	4.28	5.07	
2004-09	3.36	3.75	4.13	4.89	
2004-10	3.35	3.75	4.10	4.85	
2004-11	3.53	3.88	4.19	4.89	
2004-12	3.60	3.93	4.23	4.88	
2005-01	3.71	3.97	4.22	4.77	
2005-02	3.77	3.97	4.17	4.61	
2005-03	4.17	4.33	4.50	4.89	
2005-04	4.00	4.16	4.34	4.75	
2005-05	3.85	3.94	4.14	4.56	
2005-06	3.77	3.86	4.00	4.35	
2005-07	3.98	4.06	4.18	4.48	
2005-08	4.12	4.18	4.26	4.53	
2005-09	4.01	4.08	4.20	4.51	
2005-10	4.33	4.38	4.46	4.74	
2005-11	4.45	4.48	4.54	4.83	
2005-12	4.39	4.41	4.47	4.73	
2006-01	4.35	4.37	4.42	4.65	
2006-02	4.57	4.56	4.57	4.73	4.54
2006-03	4.72	4.71	4.72	4.91	4.73
2006-04	4.90	4.94	4.99	5.22	5.06
2006-05	5.00	5.03	5.11	5.35	5.20
2006-06	5.07	5.08	5.11	5.29	5.15
2006-07	5.04	5.05	5.09	5.25	5.13
2006-08	4.82	4.83	4.88	5.08	5.00
2006-09	4.67	4.68	4.72	4.93	4.85
2006-10	4.69	4.69	4.73	4.94	4.85
2006-11	4.58	4.58	4.60	4.78	4.69
2006-12	4.53	4.54	4.56	4.78	4.68
2007-01	4.75	4.75	4.76	4.95	4.85
2007-02	4.71	4.71	4.72	4.93	4.82
2007-03	4.48	4.50	4.52	4.81	4.72
2007-04	4.59	4.62	4.69	4.98	4.87
2007-05	4.67	4.68	4.75	4.98	4.87
2007-06	5.03	5.05	5.10	5.29	5.20
2007-07	4.88	4.93	5.00	5.19	5.11
2007-08	4.43	4.53	4.67	5.00	4.93
2007-09	4.20	4.33	4.52	4.84	4.79
2007-10	4.20	4.33	4.53	4.83	4.77
2007-11	3.67	3.87	4.15	4.56	4.52
2007-12	3.49	3.74	4.10	4.57	4.53
2008-01	2.98	3.31	3.74	4.35	4.33
2008-02	2.78	3.21	3.74	4.49	4.52
2008-03	2.48	2.93	3.51	4.36	4.39
2008-04	2.84	3.19	3.68	4.44	4.44
2008-05	3.15	3.46	3.88	4.60	4.60
2008-06	3.49	3.73	4.10	4.74	4.69
2008-07	3.30	3.46	3.89	4.53	4.50
2008-08	3.14	3.28	3.69	4.32	4.27
2008-09	2.88	3.25	3.81	4.45	4.17
2008-10	2.73	3.19	3.81	4.45	4.17
2008-11	2.29	2.82	3.53	4.27	4.07
2008-12	1.52	1.89	2.42	3.18	2.87
2009-01	1.60	1.98	2.52	3.46	3.13
2009-02	1.87	2.30	2.87	3.83	3.59
2009-03	1.82	2.42	2.82	3.78	3.64
2009-04	1.86	2.47	2.93	3.84	3.76
2009-05	2.13	2.81	3.29	4.22	4.23
2009-06	2.71	3.37	3.72	4.51	4.52
2009-07	2.46	3.14	3.56	4.38	4.41
2009-08	2.57	3.21	3.59	4.33	4.37
2009-09	2.37	3.02	3.40	4.14	4.19
2009-10	2.33	2.96	3.39	4.16	4.19
2009-11	2.25	2.92	3.40	4.24	4.31
2009-12	2.34	3.01	3.59	4.40	4.49
2010-01	2.48	3.27	3.73	4.50	4.60
2010-02	2.36	3.12	3.69	4.49	4.62
2010-03	2.43	3.16	3.73	4.49	4.64
2010-04	2.58	3.28	3.85	4.53	4.69
2010-05	2.18	2.86	3.42	4.11	4.29
2010-06	2.00	2.68	3.20	3.95	4.10
2010-07	1.76	2.43	3.01	3.55	3.83
2010-08	1.47	2.10	2.70	3.52	3.18
2010-09	1.41	2.05	2.65	3.47	3.77
2010-10	1.18	1.85	2.54	3.52	3.87
2010-11	1.35	2.02	2.76	3.82	4.19
2010-12	1.93	2.66	3.29	4.17	4.42
2011-01	1.99	2.72	3.39	4.28	4.52
2011-02	2.26	2.96	3.58	4.42	4.65
2011-03	2.11	2.80	3.41	4.27	4.51
2011-04	2.17	2.84	3.46	4.28	4.50
2011-05	1.84	2.51	3.17	4.01	4.29
2011-06	1.58	2.29	3.00	3.91	4.23
2011-07	1.54	2.28	3.00	3.95	4.27
2011-08	1.62	2.33	3.20	3.94	4.35
2011-09	1.42	1.98	2.82	3.83	3.18
2011-10	1.06	1.45	2.15	2.87	3.13
2011-11	0.91	1.45	2.01	2.72	3.02
2011-12	0.89	1.43	1.98	2.67	2.99
2012-01	0.84	1.38	1.97	2.70	3.03
2012-02	0.83	1.37	1.97	2.75	3.11
2012-03	1.02	1.56	2.17	2.94	3.28
2012-04	0.89	1.43	2.05	2.82	3.18
2012-05	0.76	1.21	1.80	2.53	2.93
2012-06	0.71	1.08	1.62	2.31	2.70
2012-07	0.62	0.98	1.53	2.22	2.69
2012-08	0.71	1.14	1.68	2.40	2.77
2012-09	0.67	1.12	1.72	2.49	2.88
2012-10	0.71	1.15	1.75	2.51	2.90
2012-11	0.67	1.08	1.65	2.39	2.80
2012-12	0.70	1.13	1.72	2.47	2.88
2013-01	0.81	1.30	1.91	2.68	3.08
2013-02	0.85	1.35	1.98	2.78	3.17
2013-03	0.82	1.32	1.96	2.78	3.16
2013-04	0.71	1.15	1.76	2.55	2.93
2013-05	0.84	1.31	1.93	2.73	3.11
2013-06	1.20	1.71	2.30	3.31	3.61
2013-07	1.40	1.99	2.58	3.70	3.91
2013-08	1.52	2.15	2.74	3.49	3.78
2013-09	1.60	2.22	2.81	3.53	3.79
2013-10	1.37	1.99	2.62	3.38	3.68
2013-11	1.37	2.07	2.72	3.50	3.80
2013-12	1.58	2.29	2.90	3.63	3.89
2014-01	1.65	2.29	2.86	3.52	3.77
2014-02	1.52	2.15	2.71	3.38	3.66
2014-03	1.64	2.23	2.72	3.35	3.62
2014-04	1.70	2.27	2.71	3.27	3.52
2014-05	1.59	2.12	2.56	3.12	3.39
2014-06	1.68	2.19	2.60	3.15	3.42
2014-07	1.63	2.17	2.54	3.07	3.33
2014-08	1.70	2.08	2.42	2.94	3.20
2014-09	1.77	2.22	2.53	3.01	3.26
2014-10	1.85	2.33	2.60	3.20	3.41
2014-11	1.62	2.03	2.30	2.77	3.04
2014-12	1.64	1.98	2.22	2.76	3.04
2015-01	1.37	1.68	1.88	2.45	2.85
2015-02	1.47	1.79	1.98	2.34	2.57
2015-03	1.52	1.84	2.04	2.41	2.63
2015-04	1.35	1.69	1.94	2.33	2.59
2015-05	1.54	1.93	2.20	2.69	2.95
2015-06	1.68	2.10	2.36	2.85	3.11
2015-07	1.63	2.04	2.32	2.77	3.07
2015-08	1.54	1.91	2.17	2.55	2.86
2015-09	1.49	1.88	2.17	2.62	2.95
2015-10	1.39	1.76	2.07	2.50	2.89
2015-11	1.67	2.02	2.26	2.69	3.03
2015-12	1.70	2.04	2.24	2.61	2.97
2016-01	1.52	1.85	2.09	2.49	2.86
2016-02	1.22	1.53	1.78	2.20	2.62
2016-03	1.38	1.68	1.89	2.28	2.68
2016-04	1.26	1.57	1.81	2.21	2.62
2016-05	1.30	1.60	1.81	2.22	2.63
2016-06	1.17	1.44	1.64	2.02	2.45
2016-07	1.07	1.33	1.50	1.82	2.23
2016-08	1.13	1.40	1.56	1.82	2.28
2016-09	1.17	1.46	1.63	2.02	2.35
2016-10	1.28	1.56	1.76	2.17	2.50
2016-11	1.60	1.93	2.14	2.54	2.86
2016-12	1.96	2.29	2.49	2.84	3.11

2028 through 2047 TIPS-Implied Average Annual Inflation Rate:

2.04%

Yr. End Mo.-Yr.	Years	Individually Implied Price Levels					Implied Forward Curve/Price Level					Implied Price Level	Check
		5-Yr	7-Yr	10-Yr	20-Yr	30-Yr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr		
Dec-17	0	100.00	100.00	100.00	100.00	100.00	100.00					100.00	
Dec-18	1	101.67	101.80	101.80	101.83	101.96	101.67					101.67	
Dec-19	2	103.37	103.64	103.64	103.69	103.96	103.37					103.37	
Dec-20	3	105.09	105.51	105.51	105.58	106.00	105.09					105.09	
Dec-21	4	106.85	107.41	107.41	107.51	108.07	106.85					106.85	
Dec-22	5	108.63	109.35	109.35	109.47	110.19	108.63					108.63	
Dec-23	6		111.32	111.32	111.47	112.35		110.96				110.96	
Dec-24	7		113.33	113.33	113.51	114.55		113.33				113.33	
Dec-25	8			115.37	115.58	116.80			115.37			115.37	
Dec-26	9			117.45	117.69	119.09			117.45			117.45	
Dec-27	10			119.57	119.84	121.42			119.57			119.57	
Dec-28	11				122.03	123.80				121.78		121.78	122.01
Dec-29	12				124.26	126.23				124.03		124.03	124.49
Dec-30	13				126.53	128.70				126.33		126.33	127.03
Dec-31	14				128.84	131.23				128.67		128.67	129.62
Dec-32	15				131.20	133.80				131.05		131.05	132.26
Dec-33	16				133.59	136.42				133.47		133.47	134.96
Dec-34	17				136.03	139.09				135.94		135.94	137.71
Dec-35	18				138.52	141.82				138.45		138.45	140.52
Dec-36	19				141.05	144.60				141.02		141.02	143.38
Dec-37	20				143.63	147.43				143.63		143.63	146.30
Dec-38	21					150.32					146.82	146.82	149.29
Dec-39	22					153.27					150.09	150.09	152.33
Dec-40	23					156.27					153.44	153.44	155.43
Dec-41	24					159.34					156.85	156.85	158.60
Dec-42	25					162.46					160.35	160.35	161.84
Dec-43	26					165.64					163.92	163.92	165.14
Dec-44	27					168.89					167.57	167.57	168.50
Dec-45	28					172.20					171.30	171.30	171.94
Dec-46	29					175.58					175.12	175.12	175.44
Dec-47	30					179.02					179.02	179.02	179.02

Average Quarterly Values for FRB H15 Data

See FRB H.15 Tab for Data Feed Sources.

Staff TIPS Analysis

Quarterly Aggregation

Average Monthly Inflation Indexed Rates by Quarter					
Qtr	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2003-Q1	1.33	1.81	2.07		
2003-Q2	1.15	1.61	1.94		
2003-Q3	1.36	1.84	2.21		
2003-Q4	1.24	1.65	2.01		
2004-Q1	0.82	1.26	1.71		
2004-Q2	1.26	1.69	2.05		
2004-Q3	1.17	1.55	1.89	2.28	
2004-Q4	0.93	1.30	1.69	2.08	
2005-Q1	1.17	1.41	1.71	1.93	
2005-Q2	1.30	1.44	1.68	1.83	
2005-Q3	1.59	1.70	1.82	1.98	
2005-Q4	1.92	1.98	2.04	2.13	
2006-Q1	2.00	2.05	2.09	2.08	
2006-Q2	2.34	2.39	2.46	2.48	
2006-Q3	2.37	2.37	2.37	2.38	
2006-Q4	2.40	2.36	2.32	2.29	
2007-Q1	2.28	2.33	2.33	2.36	
2007-Q2	2.35	2.40	2.44	2.49	
2007-Q3	2.38	2.44	2.45	2.46	
2007-Q4	1.54	1.81	1.92	2.11	
2008-Q1	0.58	1.02	1.32	1.81	
2008-Q2	0.79	1.17	1.48	2.03	
2008-Q3	1.18	1.47	1.70	2.16	
2008-Q4	2.73	2.92	2.60	2.73	
2009-Q1	1.37	1.54	1.79	2.34	
2009-Q2	1.12	1.37	1.72	2.31	
2009-Q3	1.17	1.41	1.74	2.22	
2009-Q4	0.58	0.94	1.37	1.98	
2010-Q1	0.47	0.94	1.43	2.00	2.16
2010-Q2	0.46	0.91	1.36	1.77	1.88
2010-Q3	0.20	0.57	1.06	1.68	1.76
2010-Q4	-0.11	0.28	0.75	1.48	1.65
2011-Q1	0.07	0.67	1.09	1.71	2.00
2011-Q2	-0.29	0.33	0.80	1.49	1.78
2011-Q3	-0.65	-0.22	0.28	0.95	1.25
2011-Q4	-0.75	-0.39	0.05	0.61	0.85
2012-Q1	-1.02	-0.60	-0.17	0.51	0.78
2012-Q2	-1.08	-0.75	-0.35	0.35	0.66
2012-Q3	-1.27	-1.01	-0.63	0.02	0.43
2012-Q4	-1.42	-1.15	-0.76	-0.02	0.36
2013-Q1	-1.40	-0.98	-0.59	0.19	0.56
2013-Q2	-1.04	-0.62	-0.25	0.47	0.80
2013-Q3	-0.32	0.17	0.56	1.16	1.43
2013-Q4	-0.29	0.25	0.57	1.19	1.50
2014-Q1	-0.16	0.37	0.58	1.11	1.39
2014-Q2	-0.25	0.27	0.43	0.88	1.14
2014-Q3	-0.13	0.24	0.32	0.72	0.98
2014-Q4	0.19	0.39	0.45	0.75	0.95
2015-Q1	0.11	0.23	0.27	0.52	0.71
2015-Q2	-0.10	0.22	0.30	0.67	0.91
2015-Q3	0.26	0.48	0.57	0.92	1.14
2015-Q4	0.36	0.51	0.66	1.02	1.24
2016-Q1	0.15	0.32	0.49	0.88	1.11
2016-Q2	-0.24	-0.05	0.19	0.62	0.85
2016-Q3	-0.22	-0.09	0.08	0.44	0.62
2016-Q4	-0.06	0.12	0.33	0.69	0.86

Average Monthly Nominal UST Rates by Quarter					
Qtr	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m
2003-Q1	2.91	3.46	3.92	4.90	
2003-Q2	2.57	3.13	3.62	4.59	
2003-Q3	3.14	3.72	4.23	5.17	
2003-Q4	3.25	3.78	4.29	5.16	
2004-Q1	2.99	3.52	4.02	4.89	
2004-Q2	3.72	4.18	4.60	5.36	
2004-Q3	3.51	3.92	4.30	5.07	
2004-Q4	3.49	3.85	4.17	4.87	
2005-Q1	3.88	4.09	4.30	4.76	
2005-Q2	3.87	3.99	4.16	4.55	
2005-Q3	4.04	4.11	4.21	4.51	
2005-Q4	4.39	4.42	4.49	4.77	
2006-Q1	4.55	4.55	4.57	4.76	4.64
2006-Q2	4.99	5.02	5.07	5.29	5.14
2006-Q3	4.84	4.85	4.90	5.09	4.99
2006-Q4	4.60	4.60	4.63	4.83	4.74
2007-Q1	4.65	4.65	4.68	4.90	4.80
2007-Q2	4.76	4.79	4.85	5.07	4.99
2007-Q3	4.50	4.60	4.73	5.01	4.94
2007-Q4	3.79	3.98	4.26	4.65	4.61
2008-Q1	2.75	3.15	3.66	4.40	4.41
2008-Q2	3.16	3.46	3.89	4.59	4.58
2008-Q3	3.11	3.44	3.86	4.49	4.45
2008-Q4	2.18	2.63	3.25	3.97	3.68
2009-Q1	1.76	2.23	2.74	3.69	3.45
2009-Q2	2.23	2.88	3.31	4.19	4.17
2009-Q3	2.47	3.12	3.52	4.28	4.32
2009-Q4	2.30	2.98	3.46	4.27	4.33
2010-Q1	2.42	3.16	3.72	4.49	4.62
2010-Q2	2.25	2.93	3.49	4.20	4.37
2010-Q3	1.55	2.19	2.79	3.60	3.85
2010-Q4	1.49	2.18	2.86	3.84	4.16
2011-Q1	2.12	2.83	3.46	4.32	4.56
2011-Q2	1.86	2.55	3.21	4.07	4.34
2011-Q3	1.15	1.78	2.43	3.34	3.70
2011-Q4	0.95	1.50	2.05	2.75	3.04
2012-Q1	0.90	1.44	2.04	2.80	3.14
2012-Q2	0.79	1.24	1.82	2.55	2.94
2012-Q3	0.67	1.08	1.64	2.37	2.75
2012-Q4	0.69	1.12	1.71	2.46	2.86
2013-Q1	0.83	1.32	1.95	2.75	3.14
2013-Q2	0.92	1.39	2.00	2.78	3.15
2013-Q3	1.51	2.12	2.71	3.44	3.72
2013-Q4	1.44	2.12	2.75	3.50	3.79
2014-Q1	1.60	2.22	2.76	3.42	3.68
2014-Q2	1.66	2.19	2.62	3.18	2.86
2014-Q3	1.70	2.16	2.50	3.01	3.26
2014-Q4	1.60	2.00	2.28	2.69	2.97
2015-Q1	1.45	1.77	1.97	2.32	2.55
2015-Q2	1.52	1.91	2.17	2.62	2.89
2015-Q3	1.55	1.94	2.22	2.65	2.96
2015-Q4	1.59	1.94	2.19	2.60	2.96
2016-Q1	1.37	1.69	1.92	2.32	2.72
2016-Q2	1.24	1.54	1.75	2.15	2.57
2016-Q3	1.13	1.40	1.56	1.91	2.28
2016-Q4	1.61	1.93	2.13	2.52	2.82

Implied Market-based Inflationary Expectations					
Qtr	5-Yr	7-Yr	10-Yr	20-Yr	30-Yr
2003-Q1	1.58	1.65	1.85		
2003-Q2	1.42	1.52	1.68		
2003-Q3	1.78	1.87	2.03		
2003-Q4	2.01	2.13	2.28		
2004-Q1	2.17	2.26	2.31		
2004-Q2	2.47	2.50	2.55		
2004-Q3	2.34	2.37	2.41	2.79	
2004-Q4	2.56	2.55	2.48	2.79	
2005-Q1	2.72	2.68	2.58	2.83	
2005-Q2	2.57	2.55	2.48	2.72	
2005-Q3	2.44	2.41	2.39	2.52	
2005-Q4	2.47	2.44	2.45	2.64	
2006-Q1	2.55	2.50	2.48	2.69	
2006-Q2	2.65	2.62	2.61	2.80	
2006-Q3	2.47	2.48	2.52	2.71	
2006-Q4	2.20	2.24	2.31	2.54	
2007-Q1	2.36	2.32	2.35	2.54	
2007-Q2	2.41	2.39	2.41	2.58	
2007-Q3	2.13	2.16	2.28	2.55	
2007-Q4	2.24	2.17	2.34	2.54	
2008-Q1	2.17	2.13	2.34	2.59	
2008-Q2	2.37	2.29	2.40	2.56	
2008-Q3	1.93	1.96	2.16	2.33	
2008-Q4	-0.55	-0.29	0.65	1.24	
2009-Q1	0.39	0.69	0.95	1.35	
2009-Q2	1.11	1.51	1.60	1.88	
2009-Q3	1.30	1.72	1.77	2.06	
2009-Q4	1.72	2.04	2.09	2.29	
2010-Q1	1.96	2.22	2.28	2.49	2.47
2010-Q2	1.80	2.03	2.13	2.43	2.49
2010-Q3	1.35	1.63	1.73	1.92	2.09
2010-Q4	1.59	1.90	2.12	2.36	2.51
2011-Q1	2.05	2.16	2.37	2.61	2.56
2011-Q2	2.15	2.22	2.41	2.57	2.56
2011-Q3	1.81	2.00	2.15	2.39	2.45
2011-Q4	1.71	1.89	1.99	2.14	2.19
2012-Q1	1.92	2.04	2.20	2.29	2.36
2012-Q2	1.86	1.99	2.17	2.21	2.28
2012-Q3	1.94	2.09	2.28	2.35	2.31
2012-Q4	2.11	2.27	2.47	2.48	2.50
2013-Q1	2.23	2.31	2.54	2.55	2.58
2013-Q2	1.95	2.01	2.25	2.32	2.34
2013-Q3	1.82	1.95	2.15	2.29	2.29
2013-Q4	1.73	1.86	2.17	2.31	2.29
2014-Q1	1.77	1.85	2.18	2.30	2.29
2014-Q2	1.90	1.92	2.20	2.30	1.72
2014-Q3	1.83	1.92	2.18	2.28	2.29
2014-Q4	1.41	1.61	1.83	1.95	2.02
2015-Q1	1.35	1.54	1.70	1.79	1.85
2015-Q2	1.63	1.69	1.86	1.95	1.97
2015-Q3	1.29	1.47	1.65	1.73	1.82
2015-Q4	1.23	1.43	1.53	1.58	1.72
2016-Q1	1.23	1.37	1.43	1.45	1.61
2016-Q2	1.48	1.58	1.56	1.53	1.72
2016-Q3	1.35	1.49	1.48	1.47	1.66
2016-Q4	1.67	1.80	1.80	1.83	1.96

FRB H.15 Market Yield on U.S. Treasury (UST) Securities at Constant Maturity, Quoted on an Investment Basis in Percent per Year
Staff Accessed , Jan. 6, 2017 at: <http://federalreserve.gov/releases/h15/data.htm>

Staff Accessed , Jan. 6, 2017 at: <http://federalreserve.gov/releases/h15/data.htm>
<https://www.federalreserve.gov/data/download/Choose.aspx?rel=H15>

Monthly					
TIPS-05m	5	Year	Inflation Indexed	H.15 ID	RIFLGFCY05_XII_N.M
TIPS-07m	7				RIFLGFCY07_XII_N.M
TIPS-10m	10				RIFLGFCY10_XII_N.M
TIPS-20m	20				RIFLGFCY20_XII_N.M
TIPS-30m	30				RIFLGFCY30_XII_N.M

Month	TIPS-05m	TIPS-07m	TIPS-10m	TIPS-20m	TIPS-30m
2003-01	1.65	2.10	2.29		
2003-02	1.24	1.74	1.99		
2003-03	1.09	1.60	1.94		
2003-04	1.36	1.85	2.18		
2003-05	1.18	1.61	1.91		
2003-06	0.91	1.37	1.72		
2003-07	1.30	1.76	2.11		
2003-08	1.48	1.97	2.32		
2003-09	1.29	1.80	2.19		
2003-10	1.21	1.68	2.08		
2003-11	1.27	1.64	1.96		
2003-12	1.23	1.64	1.98		
2004-01	1.09	1.48	1.89	TIPS-20	
2004-02	0.86	1.31	1.76		
2004-03	0.52	0.98	1.47		
2004-04	1.02	1.49	1.90		
2004-05	1.34	1.77	2.09		
2004-06	1.41	1.80	2.15		
2004-07	1.29	1.68	2.02		
2004-08	1.12	1.51	1.86		
2004-09	1.10	1.46	1.80		
2004-10	0.97	1.35	1.73		
2004-11	0.90	1.27	1.68		
2004-12	0.92	1.28	1.67		
2005-01	1.13	1.40	1.72		
2005-02	1.08	1.33	1.63		
2005-03	1.29	1.49	1.79		
2005-04	1.23	1.42	1.71		
2005-05	1.28	1.41	1.65		
2005-06	1.39	1.49	1.67		
2005-07	1.67	1.75	1.88		
2005-08	1.71	1.79	1.89		
2005-09	1.40	1.56	1.70		
2005-10	1.70	1.82	1.94		
2005-11	1.97	2.03	2.06		
2005-12	2.09	2.10	2.12		
2006-01	1.93	1.98	2.01		
2006-02	1.98	2.02	2.05		
2006-03	2.09	2.15	2.20		
2006-04	2.26	2.34	2.41		
2006-05	2.30	2.36	2.45		
2006-06	2.45	2.48	2.53		
2006-07	2.46	2.48	2.51		
2006-08	2.27	2.29	2.29		
2006-09	2.38	2.35	2.32		
2006-10	2.51	2.45	2.41		
2006-11	2.41	2.35	2.29		
2006-12	2.28	2.28	2.25		
2007-01	2.47	2.47	2.44		
2007-02	2.34	2.38	2.36		
2007-03	2.04	2.14	2.18		
2007-04	2.12	2.20	2.26		
2007-05	2.29	2.32	2.37		
2007-06	2.65	2.67	2.69		
2007-07	2.60	2.63	2.64		
2007-08	2.39	2.45	2.44		
2007-09	2.14	2.24	2.26		
2007-10	2.01	2.15	2.20		
2007-11	1.35	1.65	1.77		
2007-12	1.27	1.62	1.79		
2008-01	0.86	1.24	1.47		
2008-02	0.65	1.09	1.41		
2008-03	0.23	0.73	1.09		
2008-04	0.62	1.00	1.36		
2008-05	0.79	1.16	1.46		
2008-06	0.97	1.35	1.63		
2008-07	0.84	1.24	1.57		
2008-08	1.15	1.47	1.68		
2008-09	1.55	1.71	1.85		
2008-10	2.75	2.96	2.75		
2008-11	3.69	3.84	2.89		
2008-12	1.76	1.96	2.17		
2009-01	1.59	1.72	1.91		
2009-02	1.29	1.48	1.75		
2009-03	1.23	1.43	1.71		
2009-04	1.11	1.29	1.57		
2009-05	1.07	1.34	1.72		
2009-06	1.18	1.48	1.86		
2009-07	1.18	1.44	1.82		
2009-08	1.29	1.49	1.77		
2009-09	1.03	1.29	1.64		
2009-10	0.83	1.12	1.48		
2009-11	0.48	0.84	1.28		
2009-12	0.43	0.86	1.36		
2010-01	0.42	0.85	1.37	TIPS-30	
2010-02	0.42	0.90	1.42		
2010-03	0.56	1.08	1.51		
2010-04	0.62	1.10	1.50		
2010-05	0.41	0.86	1.31		
2010-06	0.34	0.76	1.26		
2010-07	0.34	0.73	1.24		
2010-08	0.13	0.51	1.02		
2010-09	0.13	0.46	0.91		
2010-10	-0.32	0.02	0.53		
2010-11	-0.21	0.17	0.67		
2010-12	0.21	0.65	1.04		
2011-01	0.06	0.62	1.06		
2011-02	0.25	0.84	1.24		
2011-03	-0.09	0.54	0.96		
2011-04	-0.14	0.49	0.86		
2011-05	-0.34	0.29	0.78		
2011-06	-0.38	0.21	0.76		
2011-07	-0.49	0.09	0.62		
2011-08	-0.75	-0.36	0.14		
2011-09	-0.72	-0.39	0.08		
2011-10	-0.63	-0.28	0.19		
2011-11	-0.85	-0.46	0.00		
2011-12	-0.78	-0.44	-0.03		
2012-01	-0.92	-0.55	-0.11		
2012-02	-1.11	-0.69	-0.25		
2012-03	-1.03	-0.57	-0.14		
2012-04	-1.06	-0.65	-0.21		
2012-05	-1.12	-0.79	-0.34		
2012-06	-1.05	-0.82	-0.50		
2012-07	-1.15	-0.92	-0.60		
2012-08	-1.19	-0.94	-0.59		
2012-09	-1.47	-1.17	-0.71		
2012-10	-1.47	-1.18	-0.75		
2012-11	-1.38	-1.13	-0.77		
2012-12	-1.40	-1.13	-0.76		
2013-01	-1.39	-1.04	-0.61		
2013-02	-1.39	-0.94	-0.57		
2013-03	-1.43	-0.97	-0.59		
2013-04	-1.38	-0.97	-0.65		
2013-05	-1.14	-0.69	-0.36		
2013-06	-0.59	-0.21	0.25		
2013-07	-0.45	0.02	0.46		
2013-08	-0.33	0.15	0.55		
2013-09	-0.17	0.34	0.66		
2013-10	-0.41	0.11	0.43		
2013-11	-0.38	0.18	0.55		
2013-12	-0.09	0.47	0.74		
2014-01	-0.09	0.45	0.63		
2014-02	-0.26	0.30	0.55		
2014-03	-0.14	0.37	0.56		
2014-04	-0.11	0.38	0.54		
2014-05	-0.34	0.21	0.37		
2014-06	-0.29	0.23	0.37		
2014-07	-0.27	0.18	0.28		
2014-08	-0.21	0.15	0.22		
2014-09	0.10	0.38	0.46		
2014-10	0.06	0.32	0.38		
2014-11	0.14	0.37	0.45		
2014-12	0.37	0.47	0.51		
2015-01	0.17	0.24	0.27		
2015-02	0.11	0.22	0.26		
2015-03	0.04	0.23	0.28		
2015-04	-0.26	-0.01	0.08		
2015-05	-0.10	0.27	0.33		
2015-06	0.05	0.39	0.50		
2015-07	0.14	0.42	0.50		
2015-08	0.31	0.49	0.56		
2015-09	0.33	0.52	0.65		
2015-10	0.21	0.39	0.57		
2015-11	0.40	0.55	0.69		
2015-12	0.46	0.59	0.73		
2016-01	0.33	0.49	0.67	TIPS-30	
2016-02	0.14	0.30	0.47		
2016-03	-0.03	0.16	0.34		
2016-04	-0.22	-0.03	0.19		
2016-05	-0.22	-0.04	0.21		
2016-06	-0.27	-0.07	0.17		
2016-07	-0.32	-0.16	0.04		
2016-08	-0.17	-0.06	0.09		
2016-09	-0.17	-0.05	0.12		
2016-10	-0.26	-0.10	0.10		
2016-11	-0.07	0.11	0.32		
2016-12	0.15	0.36	0.56		

Monthly					
UST-05m	5	Year	H.15 ID		RIFLGFCY05_N.M
UST-07m	7				RIFLGFCY07_N.M
UST-10m	10				RIFLGFCY10_N.M
UST-20m	20				RIFLGFCY20_N.M
UST-30m	30				RIFLGFCY30_N.M

Month	UST-05m	UST-07m	UST-10m	UST-20m	UST-30m	
2003-01	3.05	3.60	4.05	5.02		
2003-02	2.90	3.45	3.90	4.87		
2003-03	2.78	3.34	3.81	4.82		
2003-04	2.93	3.47	3.96	4.91		
2003-05	2.52	3.07	3.57	4.52		
2003-06	2.27	2.84	3.33	4.34		
2003-07	2.87	3.45	3.98	4.92		
2003-08	3.37	3.96	4.45	5.39		
2003-09	3.18	3.74	4.27	5.21		
2003-10	3.19	3.75	4.29	5.21		
2003-11	3.29	3.81	4.30	5.17		
2003-12	3.27	3.79	4.27	5.11		
2004-01	3.12	3.65	4.15	5.01		
2004-02	3.07	3.59	4.08	4.94		
2004-03	2.79	3.31	3.83	4.72		
2004-04	3.39	3.89	4.35	5.16		
2004-05	3.95	4.31	4.72	5.46		
2004-06	3.83	4.35	4.73	5.45		
2004-07	3.69	4.11	4.50	5.24		
2004-08	3.47	3.90	4.28	5.07		
2004-09	3.36	3.75	4.13	4.89		
2004-10	3.35	3.75	4.10	4.85		
2004-11	3.53	3.98	4.19	4.89		
2004-12	3.60	3.93	4.23	4.88		
2005-01	3.71	3.97	4.22	4.77		
2005-02	3.77	3.97	4.17	4.61		
2005-03	4.17	4.33	4.50	4.89		
2005-04	4.00	4.16	4.34	4.75		
2005-05	3.85	3.94	4.14	4.56		
2005-06	3.77	3.86	4.00	4.35		
2005-07	3.98	4.06	4.18	4.48		
2005-08	4.12	4.18	4.26	4.53		
2005-09	4.01	4.08	4.20	4.51		
2005-10	4.33	4.38	4.46	4.74		
2005-11	4.45	4.48	4.54	4.83		
2005-12	4.39	4.41	4.47	4.73		
2006-01	4.35	4.37	4.42	4.65	UST-30	
2006-02	4.57	4.56	4.57	4.73		
2006-03	4.70	4.71	4.72	4.91	4.73	
2006-04	4.92	4.94	4.95	5.22	5.06	
2006-05	5.00	5.03	5.11	5.28	5.25	
2006-06	5.07	5.08	5.11	5.29	5.15	
2006-07	5.04	5.05	5.09	5.25	5.13	
2006-08	4.82	4.83	4.88	5.08	5.00	
2006-09	4.67	4.68	4.72	4.93	4.85	
2006-10	4.69	4.69	4.73	4.94	4.85	
2006-11	4.58	4.58	4.60	4.78	4.69	
2006-12	4.53	4.54	4.56	4.78	4.68	
2007-01	4.75	4.75	4.76	4.95	4.85	
2007-02	4.71	4.71	4.72	4.93	4.82	
2007-03	4.48	4.50	4.56	4.81	4.72	
2007-04	4.59	4.62	4.69	4.95	4.87	
2007-05	4.67	4.69	4.75	4.98	4.90	
2007-06	5.03	5.05	5.10	5.29	5.20	
2007-07	4.88	4.93	5.00	5.19	5.11	
2007-08	4.43	4.53	4.67	5.00	4.93	
2007-09	4.20	4.33	4.52	4.84	4.79	
2007-10	4.20	4.33	4.53	4.83	4.77	
2007-11	3.67	3.87	4.15	4.56	4.52	
2007-12	3.49	3.74	4.10	4.57	4.53	
2008-01	2.98	3.31	3.74	4.35	4.33	
2008-02	2.78	3.21	3.74	4.49	4.52	
2008-03	2.48	2.93	3.51	4.36	4.39	
2008-04	2.84	3.19	3.68	4.44	4.44	
2008-05	3.15	3.46	3.88	4.60	4.60	
2008-06	3.49	3.73	4.10	4.74	4.69	
2008-07	3.30	3.60	4.01	4.62	4.57	
2008-08	3.14	3.46	3.89	4.53	4.50	
2008-09	2.88	3.25	3.69	4.32	4.27	
2008-10	2.73	3.19	3.81	4.45	4.17	
2008-11	2.29	2.82	3.53	4.27	4.00	
2008-12	1.52	1.89	2.42	3.18	2.87	
2009-01	1.60	1.98	2.52	3.46	3.13	
2009-02	1.87	2.30	2.87	3.83	3.59	
2009-03	1.82	2.42	2.82	3.78	3.64	
2009-04	1.86	2.47	2.93	3.84	3.76	
2009-05	2.13	2.81	3.29	4.22	4.22	
2009-06	2.71	3.37	3.72	4.51	4.53	
2009-07	2.46	3.14	3.56	4.38	4.41	
2009-08	2.57	3.21	3.59	4.33	4.37	
2009-09	2.37	3.02	3.40	4.14	4.19	
2009-10	2.33	2.96	3.39	4.16	4.19	
2009-11	2.23	2.92	3.40	4.24	4.31	
2009-12	2.34	3.07	3.59	4.40	4.49	
2010-01	2.48	3.21	3.73	4.50	4.60	
2010-02	2.36	3.12	3.69	4.48	4.62	
2010-03	2.43	3.16	3.73	4.49	4.64	
2010-04	2.58	3.28	3.85	4.53	4.69	
2010-05	2.18	2.86	3.42	4.11	4.29	
2010-06	2.00	2.66	3.20	3.95	4.13	
2010-07	1.76	2.43	3.01	3.80	3.99	
2010-08	1.47	2.10	2.70	3.52	3.80	
2010-09	1.41	2.05	2.65	3.47	3.77	
2010-10	1.11	1.85	2.54	3.52	3.87	
2010-11	1.35	2.02	2.76	3.82	4.19	
2010-12	1.93	2.66	3.29	4.17	4.52	
2011-01	1.99	2.72	3.39	4.28	4.52	
2011-02	2.26	2.96	3.58	4.42	4.65	
2011-03	2.11	2.80	3.41	4.27	4.51	
2011-04	2.17	2.84	3.46	4.28	4.50	
2011-05	1.84	2.51	3.17	4.01	4.29	
2011-06	1.58	2.29	3.00	3.91	4.23	
2011-07	1.54	2.28	3.00	3.95	4.27	
2011-08	1.02	1.63	2.30	3.24	3.65	
2011-09	0.90	1.42	1.98	2.83	3.18	
2011-10	1.06	1.62	2.15	2.87	3.13	
2011-11	0.91	1.45	2.01	2.72	3.02	
2011-12	0.89	1.43	1.98	2.67	2.98	
2012-01	0.84	1.38	1.97	2.70	3.03	
2012-02	0.83	1.37	1.97	2.75	3.11	
2012-03	1.02	1.56	2.17	2.94	3.28	
2012-04	0.89	1.43	2.05	2.82	3.18	
2012-05	0.76	1.21	1.80	2.53	2.93	
2012-06	0.71	1.08	1.62	2.31	2.70	
2012-07	0.62	0.98	1.53	2.22	2.59	
2012-08	0.71	1.14	1.68	2.40	2.77	
2012-09	0.67	1.12	1.72	2.49	2.88	
2012-10	0.71	1.15	1.75	2.51	2.90	
2012-11	0.67	1.08	1.65	2.39	2.80	
2012-12	0.70	1.13	1.72	2.47	2.88	
2013-01	0.81	1.30	1.91	2.68	3.08	
2013-02	0.85	1.35	1.98	2.78	3.17	
2013-03	0.82	1.32	1.96	2.78	3.16	
2013-04	0.71	1.15	1.76	2.55	2.93	
2013-05	0.84	1.31	1.93	2.73	3.11	
2013-06	1.20	1.71	2.30	3.07	3.40	
2013-07	1.40	1.99	2.58	3.31	3.61	
2013-08	1.52	2.15	2.74	3.49	3.76	
2013-09	1.60	2.22	2.81	3.53	3.79	
2013-10	1.37	1.99	2.62	3.38	3.68	
2013-11	1.37	2.07	2.72	3.50	3.80	
2013-12	1.58	2.29	2.90	3.63	3.89	
2014-01	1.65	2.29	2.86	3.52	3.77	
2014-02	1.52	2.15	2.71	3.38	3.66	
2014-03	1.64	2.23	2.72	3.35	3.62	
2014-04	1.70	2.27	2.71	3.27	3.52	
2014-05	1.59	2.12	2.56	3.12	3.39	
2014-06	1.68	2.19	2.60	3.15	3.42	
2014-07	1.70	2.17	2.54	3.07	3.33	
2014-08	1.63	2.08	2.42	2.94	3.20	
2014-09	1.77	2.22	2.53	3.01	3.26	
2014-10	1.55	1.98	2.30	2.77	3.04	
2014-11	1.62	2.03	2.33	2.76	3.04	
2014-12	1.64	1.98	2.21	2.55	2.83	
2015-01	1.37	1.67	1.88	2.20	2.46	
2015-02	1.47	1.79	1.98	2.34	2.57	
2015-03	1.52	1.84	2.04	2.41	2.63	
2015-04	1.35	1.69	1.94	2.33	2.59	
2015-05	1.54	1.93	2.20	2.69	2.96	
2015-06	1.68	2.10	2.36	2.85	3.11	
2015-07	1.63	2.04	2.32	2.77	3.07	
2015-08	1.54	1.91	2.17	2.55	2.86	
2015-09	1.49	1.88	2.17	2.62	2.95	
2015-10	1.39	1.76	2.07	2.50	2.89	
2015-11	1.67	2.02	2.26	2.69	3.03	
2015-12	1.70	2.04	2.24	2.61	2.97	
2016-01	1.52	1.85	2.09	2.49	2.86	
2016-02	1.22	1.53	1.78	2.20	2.62	
2016-03	1.38	1.68	1.89	2.28	2.65	
2016-04	1.26	1.57	1.81	2.21	2.62	
2016-05	1.30	1.60	1.81	2.22	2.63	
2016-06	1.17	1.44	1.64	2.02	2.45	
2016-07	1.07	1.33	1.50	1.82	2.23	
2016-08	1.13	1.40	1.56	1.89	2.26	
2016-09	1.18	1.46	1.63	2.02	2.35	
2016-10	1.27	1.56	1.76	2.17	2.50	
2016-11	1.60	1.93	2.14	2.54	2.86	
2016-12	1.96	2.29	2.49	2.84	3.11	

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 204

Staff Historical GDP Analysis with BEA Data

**U.S. Bureau of Economic Analysis (BEA)
Gross Domestic Product (GDP)**

**Exhibits in Support
of Direct Testimony**

January 4, 2018

Bureau of Economic Analysis (BEA)						Staff Accessed	
Current-Dollar and "Real" Gross Domestic Product (GDP)						January 6, 2017	
Annual			Quarterly			1980 through 2016 Q3	
http://www.bea.gov/national/index.htm			(Seasonally adjusted annual rates)			Average	5.46% Nominal
Yr	GDP in billions of current dollars	GDP in billions of chained 2009 dollars	Quarter	GDP in billions of current dollars	GDP in billions of chained 2009 dollars	Qtr#	
1929	104.6	1,056.6	1947q1	243.1	1,934.5	1	
1930	92.2	966.7	1947q2	246.3	1,932.3	2	
1931	77.4	904.8	1947q3	250.1	1,930.3	3	
1932	59.5	788.2	1947q4	260.3	1,960.7	4	
1933	57.2	778.3	1948q1	266.2	1,989.5	5	
1934	66.8	862.2	1948q2	272.9	2,021.9	6	
1935	74.3	939.0	1948q3	279.5	2,033.2	7	
1936	84.9	1,060.5	1948q4	280.7	2,035.3	8	
1937	93.0	1,114.6	1949q1	275.4	2,007.5	9	
1938	87.4	1,077.7	1949q2	271.7	2,000.8	10	
1939	93.5	1,163.6	1949q3	273.3	2,022.8	11	
1940	102.9	1,266.1	1949q4	271.0	2,004.7	12	
1941	129.4	1,490.3	1950q1	281.2	2,084.6	13	
1942	166.0	1,771.8	1950q2	290.7	2,147.6	14	
1943	203.1	2,073.7	1950q3	308.5	2,230.4	15	
1944	224.6	2,238.4	1950q4	320.3	2,273.4	16	
1945	228.2	2,217.8	1951q1	336.4	2,304.5	17	
1946	227.8	1,960.9	1951q2	344.5	2,344.5	18	
1947	249.9	1,939.4	1951q3	351.8	2,392.8	19	
1948	274.8	2,020.0	1951q4	356.6	2,399.1	20	
1949	272.8	2,008.9	1952q1	360.2	2,423.5	21	
1950	300.2	2,184.0	1952q2	361.4	2,428.5	22	
1951	347.3	2,360.0	1952q3	368.1	2,446.1	23	
1952	367.7	2,456.1	1952q4	381.2	2,526.4	24	
1953	389.7	2,571.4	1953q1	388.5	2,573.4	25	
1954	391.1	2,556.9	1953q2	392.3	2,593.5	26	
1955	426.2	2,739.0	1953q3	391.7	2,578.9	27	
1956	450.1	2,797.4	1953q4	386.5	2,539.8	28	
1957	474.9	2,856.3	1954q1	385.9	2,528.0	29	
1958	482.0	2,835.3	1954q2	386.7	2,530.7	30	
1959	522.5	3,031.0	1954q3	391.6	2,559.4	31	
1960	543.3	3,108.7	1954q4	400.3	2,609.3	32	
1961	563.3	3,188.1	1955q1	413.8	2,683.8	33	
1962	605.1	3,383.1	1955q2	422.2	2,727.5	34	
1963	638.6	3,530.4	1955q3	430.9	2,764.1	35	
1964	685.9	3,734.0	1955q4	437.8	2,780.8	36	
1965	743.7	3,976.7	1956q1	440.5	2,770.0	37	
1966	815.0	4,238.9	1956q2	446.8	2,792.9	38	
1967	861.7	4,355.2	1956q3	452.0	2,790.6	39	
1968	942.5	4,569.0	1956q4	461.3	2,836.2	40	
1969	1,019.9	4,712.5	1957q1	470.6	2,854.5	41	
1970	1,075.9	4,722.0	1957q2	472.8	2,846.2	42	
1971	1,167.8	4,877.6	1957q3	480.3	2,875.9	43	
1972	1,282.4	5,134.3	1957q4	475.7	2,846.4	44	
1973	1,428.5	5,424.1	1958q1	468.4	2,772.7	45	
1974	1,548.8	5,396.0	1958q2	472.8	2,790.9	46	
1975	1,688.9	5,386.4	1958q3	486.7	2,855.5	47	
1976	1,877.6	5,675.4	1958q4	500.4	2,922.3	48	
1977	2,086.0	5,937.0	1959q1	511.1	2,976.6	49	
1978	2,356.6	6,267.2	1959q2	524.2	3,049.0	50	
1979	2,632.1	6,466.2	1959q3	525.2	3,043.1	51	
1980	2,862.5	6,450.4	1959q4	529.3	3,055.1	52	
1981	3,211.0	6,617.7	1960q1	543.3	3,123.2	53	
1982	3,345.0	6,491.3	1960q2	542.7	3,111.3	54	
1983	3,638.1	6,792.0	1960q3	546.0	3,119.1	55	
1984	4,040.7	7,285.0	1960q4	541.1	3,081.3	56	
1985	4,346.7	7,593.8	1961q1	545.9	3,102.3	57	
1986	4,590.2	7,860.5	1961q2	557.4	3,159.9	58	
1987	4,870.2	8,132.6	1961q3	566.2	3,212.6	59	
1988	5,252.6	8,474.5	1961q4	581.6	3,277.7	60	
1989	5,657.7	8,786.4	1962q1	595.2	3,336.8	61	
1990	5,979.6	8,955.0	1962q2	602.6	3,372.7	62	
1991	6,174.0	8,946.4	1962q3	609.6	3,404.8	63	
1992	6,539.3	9,266.6	1962q4	613.1	3,418.0	64	
1993	6,878.7	9,521.0	1963q1	622.7	3,456.1	65	
1994	7,308.8	9,905.4	1963q2	631.8	3,501.1	66	
1995	7,664.1	10,174.8	1963q3	645.0	3,569.5	67	
1996	8,100.2	10,561.0	1963q4	654.8	3,595.0	68	
1997	8,608.5	11,034.9	1964q1	671.1	3,672.7	69	
1998	9,089.2	11,525.9	1964q2	680.8	3,716.4	70	
1999	9,660.6	12,065.9	1964q3	692.8	3,766.9	71	
2000	10,284.6	12,559.7	1964q4	698.4	3,780.2	72	
2001	10,621.8	12,682.2	1965q1	719.2	3,873.5	73	
2002	10,977.5	12,908.8	1965q2	732.4	3,926.4	74	
2003	11,510.7	13,271.1	1965q3	750.2	4,006.2	75	
2004	12,274.9	13,773.5	1965q4	773.1	4,100.6	76	
2005	13,093.7	14,234.2	1966q1	797.3	4,201.9	77	
2006	13,855.9	14,613.8	1966q2	807.2	4,219.1	78	
2007	14,477.6	14,873.7	1966q3	820.8	4,249.2	79	
2008	14,718.6	14,830.4	1966q4	834.9	4,285.6	80	
2009	14,418.7	14,418.7	1967q1	846.0	4,324.9	81	
2010	14,964.4	14,783.8	1967q2	851.1	4,328.7	82	
2011	15,517.9	15,020.6	1967q3	866.6	4,366.1	83	
2012	16,155.3	15,354.6	1967q4	883.2	4,401.2	84	
2013	16,691.5	15,612.2	1968q1	911.1	4,490.6	85	
2014	17,393.1	15,982.3	1968q2	936.3	4,566.4	86	
2015	18,036.6	16,397.2	1968q3	952.3	4,599.3	87	
			1968q4	970.1	4,619.8	88	
			1969q1	995.4	4,691.6	89	
			1969q2	1,011.4	4,706.7	90	
			1969q3	1,032.0	4,736.1	91	
			1969q4	1,040.7	4,715.5	92	
			1970q1	1,053.5	4,707.1	93	
			1970q2	1,070.1	4,715.4	94	
			1970q3	1,088.5	4,757.2	95	
			1970q4	1,091.5	4,708.3	96	
			1971q1	1,137.8	4,834.3	97	
			1971q2	1,159.4	4,861.9	98	
			1971q3	1,180.3	4,900.0	99	
			1971q4	1,193.6	4,914.3	100	
			1972q1	1,233.8	5,002.4	101	
			1972q2	1,270.1	5,118.3	102	
			1972q3	1,293.8	5,165.4	103	
			1972q4	1,332.0	5,251.2	104	
			1973q1	1,380.7	5,380.5	105	
			1973q2	1,417.6	5,441.5	106	
			1973q3	1,436.8	5,411.9	107	
			1973q4	1,479.1	5,462.4	108	
			1974q1	1,494.7	5,417.0	109	
			1974q2	1,534.2	5,431.3	110	
			1974q3	1,563.4	5,378.7	111	
			1974q4	1,603.0	5,357.2	112	
			1975q1	1,619.6	5,292.4	113	
			1975q2	1,656.4	5,333.2	114	
			1975q3	1,713.8	5,421.4	115	
			1975q4	1,765.9	5,494.4	116	
			1976q1	1,824.5	5,618.5	117	
			1976q2	1,856.9	5,661.0	118	
			1976q3	1,890.5	5,689.8	119	
			1976q4	1,938.4	5,732.5	120	
			1977q1	1,992.5	5,799.2	121	
			1977q2	2,060.2	5,913.0	122	
			1977q3	2,122.4	6,017.6	123	
			1977q4	2,168.7	6,018.2	124	
			1978q1	2,208.7	6,039.2	125	
			1978q2	2,336.6	6,274.0	126	
			1978q3	2,398.9	6,335.3	127	
			1978q4	2,482.2	6,420.3	128	
			1979q1	2,531.6	6,433.0	129	
			1979q2	2,595.9	6,440.8	130	
			1979q3	2,670.4	6,487.1	131	
			1979q4	2,730.7	6,503.9	132	
			1980q1	2,796.5	6,524.9	133	
			1980q2	2,799.9	6,392.6	134	
			1980q3	2,860.0	6,382.9	135	
			1980q4	2,993.5	6,501.2	136	
			1981q1	3,131.8	6,535.7	137	
			1981q2	3,187.3	6,587.3	138	
			1981q3	3,261.2	6,662.9	139	
			1981q4	3,285.5	6,585.1	140	
			1982q1	3,273.8	6,475.0	141	
			1982q2	3,331.3	6,510.2	142	
			1982q3	3,367.1	6,486.8	143	
			1982q4	3,407.8	6,493.1	144	
			1983q1	3,480.3	6,578.2	145	
			1983q2	3,583.8	6,728.3	146	
			1983q3	3,692.3	6,860.0	147	

OLS Regression

Annualized Real LN GDP Q
2.80%

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.987369563
R Square	0.974898655
Adjusted R Square	0.974725542
Standard Error	0.047411547
Observations	147

ANOVA

	df	SS	MS	F	Significance F
Regression	1	12.65898051	12.65898051	5631.582812	6.3677E-118
Residual	145	0.325938947	0.002247855		
Total	146	12.98491946			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	8.790216674	0.00786095	1118.213012	3.02E-287	8.774679824	8.805753524	8.774679824	8.805753524
X Variable 1	0.006915507	9.21529E-05	75.04387258	6.3677E-118	0.006733371	0.007097644	0.006733371	0.007097644

1983q4	3,795.1	7,001.5	148
1984q1	3,912.8	7,140.6	149
1984q2	4,015.0	7,266.0	150
1984q3	4,087.4	7,337.5	151
1984q4	4,147.6	7,396.0	152
1985q1	4,237.0	7,469.5	153
1985q2	4,302.3	7,537.9	154
1985q3	4,394.6	7,655.2	155
1985q4	4,453.1	7,712.6	156
1986q1	4,515.3	7,784.1	157
1986q2	4,555.2	7,819.8	158
1986q3	4,619.6	7,898.6	159
1986q4	4,669.4	7,939.5	160
1987q1	4,736.2	7,995.0	161
1987q2	4,821.5	8,064.7	162
1987q3	4,900.5	8,158.0	163
1987q4	5,022.7	8,292.7	164
1988q1	5,090.6	8,339.3	165
1988q2	5,207.7	8,449.5	166
1988q3	5,299.5	8,498.3	167
1988q4	5,412.7	8,610.9	168
1989q1	5,527.4	8,697.7	169
1989q2	5,628.4	8,766.1	170
1989q3	5,711.6	8,831.5	171
1989q4	5,763.4	8,850.2	172
1990q1	5,890.8	8,947.1	173
1990q2	5,974.7	8,981.7	174
1990q3	6,029.5	8,983.9	175
1990q4	6,023.3	8,907.4	176
1991q1	6,054.9	8,865.6	177
1991q2	6,143.6	8,934.4	178
1991q3	6,218.4	8,977.3	179
1991q4	6,279.3	9,016.4	180
1992q1	6,380.8	9,123.0	181
1992q2	6,492.3	9,223.5	182
1992q3	6,586.5	9,313.2	183
1992q4	6,697.6	9,406.5	184
1993q1	6,748.2	9,424.1	185
1993q2	6,829.6	9,480.1	186
1993q3	6,904.2	9,526.3	187
1993q4	7,032.8	9,653.5	188
1994q1	7,136.3	9,748.2	189
1994q2	7,269.8	9,881.4	190
1994q3	7,352.3	9,939.7	191
1994q4	7,476.7	10,052.5	192
1995q1	7,545.3	10,086.9	193
1995q2	7,604.9	10,122.1	194
1995q3	7,706.5	10,208.8	195
1995q4	7,799.5	10,281.2	196
1996q1	7,893.1	10,348.7	197
1996q2	8,061.5	10,529.4	198
1996q3	8,159.0	10,626.8	199
1996q4	8,267.1	10,739.1	200
1997q1	8,402.1	10,820.9	201
1997q2	8,551.9	10,984.2	202
1997q3	8,691.8	11,124.0	203
1997q4	8,788.3	11,210.3	204
1998q1	8,889.7	11,321.2	205
1998q2	8,994.7	11,431.0	206
1998q3	9,145.5	11,580.6	207
1998q4	9,325.7	11,770.7	208
1999q1	9,447.1	11,864.7	209
1999q2	9,557.0	11,962.5	210
1999q3	9,712.3	12,113.1	211
1999q4	9,926.1	12,323.3	212
2000q1	10,031.0	12,359.1	213
2000q2	10,278.3	12,592.5	214
2000q3	10,357.4	12,607.7	215
2000q4	10,472.3	12,679.3	216
2001q1	10,508.1	12,643.3	217
2001q2	10,638.4	12,710.3	218
2001q3	10,639.5	12,670.1	219
2001q4	10,701.3	12,705.3	220
2002q1	10,834.4	12,822.3	221
2002q2	10,934.8	12,893.0	222
2002q3	11,037.1	12,955.8	223
2002q4	11,103.8	12,964.0	224
2003q1	11,230.1	13,031.2	225
2003q2	11,370.7	13,152.1	226
2003q3	11,625.1	13,372.4	227
2003q4	11,816.8	13,528.7	228
2004q1	11,988.4	13,606.5	229
2004q2	12,181.4	13,706.2	230
2004q3	12,367.7	13,830.8	231
2004q4	12,562.2	13,950.4	232
2005q1	12,813.7	14,099.1	233
2005q2	12,974.1	14,172.7	234
2005q3	13,205.4	14,291.8	235
2005q4	13,381.6	14,373.4	236
2006q1	13,648.9	14,546.1	237
2006q2	13,799.8	14,589.6	238
2006q3	13,908.5	14,602.6	239
2006q4	14,068.4	14,716.9	240
2007q1	14,233.2	14,726.0	241
2007q2	14,422.3	14,838.7	242
2007q3	14,569.7	14,938.5	243
2007q4	14,685.3	14,991.8	244
2008q1	14,668.4	14,889.5	245
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2009q3	14,384.1	14,402.5	251
2009q4	14,566.5	14,541.9	252
2010q1	14,681.1	14,604.8	253
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2015q3	18,141.9	16,454.9	275
2015q4	18,222.8	16,490.7	276
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2016q2	18,450.1	16,583.1	276
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Bureau of Economic Analysis (BEA)			Staff Accessed						
Current-Dollar and "Real" Gross Domestic Product (GDP)			January 6, 2017						
Annual			Quarterly						
http://www.bea.gov/national/index.htm			(Seasonally adjusted annual rates)						
			1980 through 2016 Q3						
			Average 5.46% Nominal						
Yr	GDP in billions of current dollars	GDP in billions of chained 2009 dollars	Quarter	GDP in billions of current dollars	GDP in billions of chained 2009 dollars	Qtr#	Average	2.63%	Real
1929	104.6	1,056.6	1947q1	243.1	1,934.5	1	1	8.783381	1980
1930	92.2	966.7	1947q2	246.3	1,932.3	2	2	8.762896	
1931	77.4	904.8	1947q3	250.1	1,930.3	3	3	8.761378	
1932	59.5	788.2	1947q4	260.3	1,960.7	4	4	8.779742	
1933	57.2	778.3	1948q1	266.2	1,989.5	5	5	8.800219	1981
1934	66.8	862.2	1948q2	272.9	2,021.9	6	6	8.792899	
1935	74.3	939.0	1948q3	279.5	2,033.2	7	7	8.804310	
1936	84.9	1,060.5	1948q4	280.7	2,035.3	8	8	8.792565	
1937	93.0	1,114.6	1949q1	275.4	2,007.5	9	9	8.775704	1982
1938	87.4	1,077.7	1949q2	271.7	2,000.8	10	10	8.781125	
1939	93.5	1,163.6	1949q3	273.3	2,022.8	11	11	8.777525	
1940	102.9	1,266.1	1949q4	271.0	2,004.7	12	12	8.778495	
1941	129.4	1,490.3	1950q1	281.2	2,084.6	13	13	8.791516	1983
1942	166.0	1,771.8	1950q2	290.7	2,147.6	14	14	8.814078	
1943	203.1	2,073.7	1950q3	308.5	2,230.4	15	15	8.833463	
1944	224.6	2,239.4	1950q4	320.3	2,273.4	16	16	8.853880	
1945	228.2	2,217.8	1951q1	336.4	2,304.5	17	17	8.873552	1984
1946	227.8	1,960.9	1951q2	344.5	2,344.5	18	18	8.890961	
1947	249.9	1,939.4	1951q3	351.8	2,392.8	19	19	8.900753	
1948	274.8	2,020.0	1951q4	356.6	2,398.1	20	20	8.908695	
1949	272.8	2,008.9	1952q1	360.2	2,423.5	21	21	8.918583	1985
1950	300.2	2,184.0	1952q2	361.4	2,428.5	22	22	8.927699	
1951	347.3	2,360.0	1952q3	368.1	2,446.1	23	23	8.943140	
1952	367.7	2,456.1	1952q4	381.2	2,526.4	24	24	8.950611	
1953	389.7	2,571.4	1953q1	388.5	2,573.4	25	25	8.959838	1986
1954	391.1	2,556.9	1953q2	392.3	2,593.5	26	26	8.964414	
1955	426.2	2,739.0	1953q3	391.7	2,578.9	27	27	8.974441	
1956	450.1	2,797.4	1953q4	386.5	2,539.8	28	28	8.979606	
1957	474.9	2,856.3	1954q1	385.9	2,528.0	29	29	8.986572	1987
1958	482.0	2,835.3	1954q2	386.7	2,530.7	30	30	8.997729	
1959	522.5	3,031.0	1954q3	391.6	2,559.4	31	31	9.006754	
1960	543.3	3,108.7	1954q4	400.3	2,609.3	32	32	9.023131	
1961	563.3	3,188.1	1955q1	413.8	2,683.8	33	33	9.028735	1988
1962	605.1	3,383.1	1955q2	422.2	2,727.5	34	34	9.041863	
1963	638.6	3,530.4	1955q3	430.9	2,764.1	35	35	9.047621	
1964	685.8	3,734.0	1955q4	437.8	2,780.8	36	36	9.060784	
1965	743.7	3,976.7	1956q1	440.5	2,770.0	37	37	9.070814	1989
1966	815.0	4,238.9	1956q2	446.8	2,792.9	38	38	9.078647	
1967	861.7	4,355.2	1956q3	452.0	2,790.6	39	39	9.086080	
1968	942.5	4,569.0	1956q4	461.3	2,836.2	40	40	9.088195	
1969	1,019.9	4,712.5	1957q1	470.6	2,854.5	41	41	9.099085	1990
1970	1,075.9	4,722.0	1957q2	472.8	2,848.2	42	42	9.102944	
1971	1,167.8	4,877.6	1957q3	480.3	2,875.9	43	43	9.103189	
1972	1,282.4	5,134.3	1957q4	475.7	2,846.4	44	44	9.094638	
1973	1,428.5	5,424.1	1958q1	468.4	2,772.7	45	45	9.089934	1991
1974	1,548.8	5,396.0	1958q2	472.8	2,790.9	46	46	9.097664	
1975	1,688.9	5,385.4	1958q3	486.7	2,855.5	47	47	9.102454	
1976	1,877.6	5,675.4	1958q4	500.4	2,922.3	48	48	9.106800	
1977	2,086.0	5,937.0	1959q1	511.1	2,976.6	49	49	9.118554	1992
1978	2,356.6	6,267.2	1959q2	524.2	3,049.0	50	50	9.129510	
1979	2,632.1	6,466.2	1959q3	525.2	3,043.1	51	51	9.139188	
1980	2,862.5	6,450.4	1959q4	529.3	3,055.1	52	52	9.149156	
1981	3,211.0	6,617.7	1960q1	543.3	3,123.2	53	53	9.151026	1993
1982	3,345.0	6,491.3	1960q2	542.7	3,111.3	54	54	9.156950	
1983	3,638.1	6,792.0	1960q3	546.0	3,119.1	55	55	9.161812	
1984	4,040.7	7,285.0	1960q4	541.1	3,081.3	56	56	9.175076	
1985	4,346.7	7,593.8	1961q1	545.9	3,102.3	57	57	9.184838	1994
1986	4,590.2	7,860.5	1961q2	557.4	3,159.9	58	58	9.198409	
1987	4,870.2	8,132.6	1961q3	568.2	3,212.6	59	59	9.204292	
1988	5,252.6	8,474.5	1961q4	581.6	3,277.7	60	60	9.215577	
1989	5,657.7	8,786.4	1962q1	595.2	3,336.8	61	61	9.218993	1995
1990	5,979.6	8,955.0	1962q2	602.6	3,372.7	62	62	9.222476	
1991	6,174.0	8,948.4	1962q3	609.6	3,404.8	63	63	9.231005	
1992	6,539.3	9,266.6	1962q4	613.1	3,418.0	64	64	9.238072	
1993	6,878.7	9,521.0	1963q1	622.7	3,456.1	65	65	9.244616	1996
1994	7,308.8	9,905.4	1963q2	631.8	3,501.1	66	66	9.261927	
1995	7,664.1	10,174.8	1963q3	645.0	3,569.5	67	67	9.271134	
1996	8,100.2	10,561.0	1963q4	654.8	3,595.0	68	68	9.281647	
1997	8,608.5	11,034.9	1964q1	671.1	3,672.7	69	69	9.289235	1997
1998	9,089.2	11,525.9	1964q2	680.8	3,716.4	70	70	9.304213	
1999	9,660.6	12,065.9	1964q3	692.8	3,766.9	71	71	9.316860	
2000	10,284.8	12,559.7	1964q4	698.4	3,780.2	72	72	9.324588	
2001	10,621.8	12,682.2	1965q1	719.2	3,873.5	73	73	9.334432	1998
2002	10,977.5	12,908.8	1965q2	732.4	3,926.4	74	74	9.344084	
2003	11,510.7	13,271.1	1965q3	750.2	4,006.2	75	75	9.357087	
2004	12,274.9	13,773.5	1965q4	773.1	4,100.6	76	76	9.373369	
2005	13,093.7	14,234.2	1966q1	797.3	4,201.9	77	77	9.381323	1999
2006	13,855.9	14,613.8							

1982q4	3,407.8	6,493.1	144	144	9.710552	
1983q1	3,480.3	6,578.2	145	145	9.712630	2016
1983q2	3,583.8	6,728.3	146	146	9.716139	
1983q3	3,692.3	6,860.0	147	147	9.724779	

1983q4	3,796.1	7,001.5	148
1984q1	3,912.8	7,140.6	149
1984q2	4,015.0	7,266.0	150
1984q3	4,087.4	7,337.5	151
1984q4	4,147.6	7,396.0	152
1985q1	4,237.0	7,469.5	153
1985q2	4,302.3	7,537.9	154
1985q3	4,394.6	7,655.2	155
1985q4	4,453.1	7,712.6	156
1986q1	4,516.3	7,784.1	157
1986q2	4,555.2	7,819.8	158
1986q3	4,619.6	7,898.6	159
1986q4	4,669.4	7,939.5	160
1987q1	4,736.2	7,995.0	161
1987q2	4,821.5	8,084.7	162
1987q3	4,900.5	8,158.0	163
1987q4	5,022.7	8,292.7	164
1988q1	5,090.6	8,339.3	165
1988q2	5,207.7	8,449.5	166
1988q3	5,299.5	8,498.3	167
1988q4	5,412.7	8,610.9	168
1989q1	5,527.4	8,697.7	169
1989q2	5,628.4	8,766.1	170
1989q3	5,711.6	8,831.5	171
1989q4	5,763.4	8,850.2	172
1990q1	5,890.8	8,947.1	173
1990q2	5,974.7	8,981.7	174
1990q3	6,029.5	8,983.9	175
1990q4	6,023.3	8,907.4	176
1991q1	6,054.9	8,865.6	177
1991q2	6,143.6	8,934.4	178
1991q3	6,218.4	8,977.3	179
1991q4	6,279.3	9,016.4	180
1992q1	6,380.8	9,123.0	181
1992q2	6,492.3	9,223.5	182
1992q3	6,586.5	9,313.2	183
1992q4	6,697.6	9,406.5	184
1993q1	6,748.2	9,424.1	185
1993q2	6,829.6	9,480.1	186
1993q3	6,904.2	9,526.3	187
1993q4	7,032.8	9,653.5	188
1994q1	7,136.3	9,748.2	189
1994q2	7,269.8	9,881.4	190
1994q3	7,352.3	9,939.7	191
1994q4	7,476.7	10,052.5	192
1995q1	7,545.3	10,086.9	193
1995q2	7,604.9	10,122.1	194
1995q3	7,706.5	10,208.8	195
1995q4	7,799.5	10,281.2	196
1996q1	7,893.1	10,348.7	197
1996q2	8,061.5	10,529.4	198
1996q3	8,159.0	10,626.8	199
1996q4	8,287.1	10,739.1	200
1997q1	8,402.1	10,820.9	201
1997q2	8,551.9	10,984.2	202
1997q3	8,691.8	11,124.0	203
1997q4	8,788.3	11,210.3	204
1998q1	8,889.7	11,321.2	205
1998q2	8,994.7	11,431.0	206
1998q3	9,146.5	11,580.6	207
1998q4	9,325.7	11,770.7	208
1999q1	9,447.1	11,864.7	209
1999q2	9,557.0	11,962.5	210
1999q3	9,712.3	12,113.1	211
1999q4	9,926.1	12,323.3	212
2000q1	10,031.0	12,359.1	213
2000q2	10,278.3	12,592.5	214
2000q3	10,357.4	12,607.7	215
2000q4	10,472.3	12,679.3	216
2001q1	10,508.1	12,643.3	217
2001q2	10,638.4	12,710.3	218
2001q3	10,639.5	12,670.1	219
2001q4	10,701.3	12,705.3	220
2002q1	10,834.4	12,822.3	221
2002q2	10,934.8	12,893.0	222
2002q3	11,037.1	12,955.8	223
2002q4	11,103.8	12,964.0	224
2003q1	11,230.1	13,031.2	225
2003q2	11,370.7	13,152.1	226
2003q3	11,625.1	13,372.4	227
2003q4	11,816.8	13,528.7	228
2004q1	11,988.4	13,606.5	229
2004q2	12,181.4	13,706.2	230
2004q3	12,367.7	13,830.8	231
2004q4	12,562.2	13,950.4	232
2005q1	12,813.7	14,099.1	233
2005q2	12,974.1	14,172.7	234
2005q3	13,205.4	14,291.8	235
2005q4	13,381.6	14,373.4	236
2006q1	13,648.9	14,546.1	237
2006q2	13,799.8	14,589.6	238
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CASE: UW 172
WITNESS: MATT MULDOON

**PUBLIC UTILITY COMMISSION
OF
OREGON**

STAFF EXHIBIT 205

**Value Line (VL)
Water Utility Profiles**

**Exhibits in Support
of Direct Testimony**

January 4, 2018

October 13, 2017

WATER UTILITY INDUSTRY

1782

Stocks in the Water Utility Industry have performed well of late. This is unusual as the equities in the group have historically been considered defensive investments. Demand would mostly come from conservative, income-oriented accounts seeking high yields, low volatility, well-defined earnings, and healthy dividend growth prospects. Typically, shares of these companies would lag the broader market averages during bull markets and outperform when equities were under pressure. We attribute part of the strong showing to the small market capitalization of the industry as a whole. There are only nine members of this group and four of the companies are very small. Hence, we think demand for these stocks outweighs the supply. Consequently, investors have to pay a premium to be owners of water equities.

The Industry is ranked in the bottom quartile of the almost 100 industries followed by *Value Line*.

Are Water Stocks Still A Yield Play?

Much like electric utilities, water utility stocks have long drawn the interest of investors seeking high current income and the potential for dividend growth. (This is an attraction held by equities that traditional bonds with fixed coupons do not possess.) Over the past few years, however, the value of the stocks in this industry have performed well, despite the bull market. Indeed, the yield on the eight regulated water utilities (excludes *Consolidated Water*) has declined to such an extent that the average yield is now less than the *Value Line* median. Treasury notes and bonds compete with stocks that pay good dividends for funds from income-oriented investors. Shorter maturities on the yield curve have seen their yields rise steadily as the Federal Reserve seeks to end its nearly decade-long accommodative monetary policy. The yield on the longer-maturities bonds has also been moving up. Though the 10-year bond has backed up almost 30 basis points in the last month alone, it still remains at a low historical level of about 2.35%. We urge investors to monitor this bond as high-yielding stocks may not perform well should the rate on this bond move higher.

Profits And Dividends

Water companies are posting decent annual increases in share earnings and what they are paying out to investors. While the current yields have plummeted, cash generation should be sufficient to support yearly dividend hikes from 4% to 10%, with the average somewhere around 6%-7%.

Growth Through Acquisition

The water utility industry in the U.S. is extremely fragmented. There are over 100,000 different entities providing water services to Americans. Almost all of these districts are municipally owned. For the most part, they are also undercapitalized and inefficient. With the condition of the country's water infrastructure being considered poor, many of these water districts don't have the financial wherewithal required to replace old pipes and other equipment. This benefits the major publicly traded companies, namely *American Water Works* and

INDUSTRY TIMELINESS: 79 (of 97)

Aqua America. All of the larger concerns will most likely continue to absorb many small water authorities. There are a great amount of redundancies in this sector and many of the smaller players are inefficient. By purchasing these entities, the bigger companies are able to expand their customer base and wring more profits from the acquired assets.

Constructive Regulatory Treatment

One of the most positive attributes of the water industry is that companies and regulatory authorities usually work together reasonably well. This isn't always the case in other domestic regulated markets, such as electricity. In general, regulators realize that the U.S. went decades without plowing enough capital back into the pipelines and wastewater facilities. Now they realize that a huge amount of funds have to be directed toward fixing their systems.

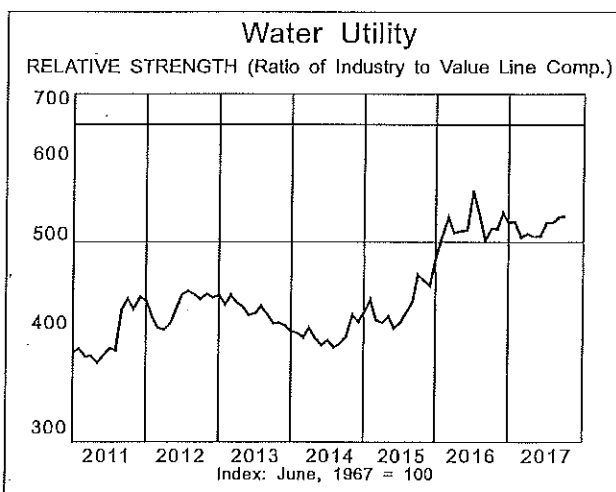
We cannot underestimate the importance of a positive regulatory climate. Essentially, they determine a utility's allowed return on equity. Should there be a sea change in this area, it would greatly impact this group, in our opinion.

Conclusion

The only stock in this sector expected to outperform the broader market averages in the year ahead is *California Water*. All of the remaining equities are either neutrally ranked or untimely. There are no stocks that have attractive total return potential out to 2020-2022, even on a risk-adjusted basis. True, the regulated companies have very predictable earnings, but it appears that all of the good news is currently priced into the stocks. The sole exception remains *Consolidated Water*. A proposed new desalination plant in Mexico offers great promise. However, we have seen the can't miss facility built in the water-deprived island of Bali fail. Thus, despite its attractive return potential, its prospects remain hazy.

As always, we advise all subscribers to read each individual report before investing to have a better understanding of the risks associated with each particular company.

James A. Flood



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<p>(A) Diluted earnings. Excludes nonrecurring losses: '08, \$4.62; '09, \$2.63; '11, \$0.07. Discontinued operations: '06, \$(0.04); '11, \$0.03; '12, \$(0.10); '13, \$(0.01). GAAP used as of</p>	<p>2014. Next earnings report due mid-November. Quarterly earnings do not sum in '16 due to rounding. (B) Dividends paid in March, June, September, and December. ■ Div. reinvest-</p>	<p>ment available. (C) In millions. (D) Includes intangibles. On 6/30/17: \$1.373 billion, \$7.70/share. (E) Pro forma numbers for '06 & '07.</p>	<p>Company's Financial Strength B+ Stock's Price Stability 100 Price Growth Persistence 85 Earnings Predictability 90</p>
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AQUA AMERICA NYSE-WTR				RECENT PRICE	33.77	P/E RATIO	24.3	(Trailing: 25.8) Median: 22.0	RELATIVE P/E RATIO	1.21	DIV'D YLD	2.5%	VALUE LINE																								
TIMELINESS	3	Lowered 8/26/16		High: 23.8	21.3	17.6	17.2	18.4	19.0	21.5	28.1	28.2	31.1	35.8	34.7		Target Price Range	2020	2021	2022																	
SAFETY	2	Raised 4/20/12		Low: 16.1	15.1	9.8	12.3	13.2	15.4	16.8	20.6	22.4	24.4	28.0	29.4																						
TECHNICAL	1	Raised 10/13/17		LEGENDS 1.60 x Dividends p sh divided by Interest Rate Relative Price Strength 4-for-3 split 12/05 5-for-4 split 9/13 Options: Yes Shaded area indicates recession																																	
BETA	.70	(1.00 = Market)																																			
2020-22 PROJECTIONS				Price	Gain	Return																															
High	45	(+35%)	10%																																		
Low	35	(+5%)	4%																																		
Insider Decisions				D	J	F	M	A	M	J	J	A																									
to Buy	0	0	0	0	0	0	0	0	0	0	0	0																									
Options	0	7	6	7	7	0	1	7	0																												
to Sell	0	0	0	0	0	0	2	0	0																												
Institutional Decisions				Q4 2016	Q4 2017	Q4 2017																															
to Buy	182	179	172	Percent	15	10														5																	
to Sell	171	180	155	shares	15	10														5																	
Hits(000)	88558	103594	104564	traded	15	10														5																	
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC		20-22																	
2.16	2.28	2.38	2.78	3.08	3.23	3.61	3.71	3.93	4.21	4.10	4.32	4.32	4.37	4.61	4.62	4.65	4.95	Revenues per sh		6.05																	
.69	.76	.77	.87	.97	1.01	1.10	1.14	1.29	1.42	1.45	1.51	1.82	1.89	1.87	2.07	2.15	2.25	"Cash Flow" per sh		2.75																	
.41	.43	.46	.51	.57	.56	.57	.58	.62	.72	.83	.87	1.16	1.20	1.14	1.32	1.36	1.45	Earnings per sh ^		1.85																	
.24	.26	.28	.29	.32	.35	.38	.41	.44	.47	.50	.54	.58	.63	.69	.74	.80	.85	Div'd Decl'd per sh ^		1.15																	
.87	.96	1.06	1.23	1.47	1.64	1.43	1.58	1.66	1.89	1.90	1.98	1.73	1.84	2.07	2.16	2.55	2.45	Cap'l Spending per sh		2.25																	
3.32	3.49	4.27	4.71	5.04	5.57	5.85	6.26	6.50	6.81	7.21	7.90	8.63	9.27	9.78	10.43	11.10	11.75	Book Value per sh		14.85																	
142.47	141.49	154.31	158.97	161.21	165.41	166.75	169.21	170.81	172.46	173.60	175.43	177.93	178.59	178.54	177.39	178.00	178.50	Common Shs Outst'g ^		180.00																	
23.6	23.6	24.5	25.1	31.8	34.7	32.0	24.9	23.1	21.1	21.3	21.9	21.2	20.8	23.5	23.9	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio		21.0																	
1.21	1.29	1.40	1.33	1.69	1.87	1.70	1.50	1.54	1.34	1.34	1.39	1.19	1.09	1.18	1.26			Relative P/E Ratio		1.30																	
2.5%	2.5%	2.5%	2.3%	1.8%	1.8%	2.1%	2.8%	3.1%	3.1%	2.8%	2.8%	2.4%	2.5%	2.6%	2.3%			Avg Ann'l Div'd Yield		2.9%																	
CAPITAL STRUCTURE as of 6/30/17				602.5	627.0	670.5	726.1	712.0	757.8	768.6	779.9	814.2	819.9	830	880	880	880	Revenues (\$mill)		1085																	
Total Debt \$2093.6 mill. Due in 5 Yrs \$430.5 mill.				95.0	97.9	104.4	124.0	144.8	153.1	205.0	213.9	201.8	234.2	245	260	260	260	Net Profit (\$mill)		335																	
LT Debt \$1882.6 mill. LT Interest \$76.3 mill.				38.9%	39.7%	39.4%	39.2%	32.9%	39.0%	10.0%	10.5%	6.9%	8.2%	9.0%	9.0%	9.0%	9.0%	Income Tax Rate		10.0%																	
(51% of Cap'l)				---	---	---	---	---	---	---	---	1.1%	2.4%	3.1%	3.8%	3.5%	3.0%	AFUDC % to Net Profit		3.5%																	
Pension Assets-12/16 \$242.4 mill.				55.4%	54.1%	55.6%	56.6%	52.7%	52.7%	48.9%	48.5%	50.3%	48.4%	47.0%	49.0%	49.0%	49.0%	Long-Term Debt Ratio		51.0%																	
Oblig. \$308.2 mill.				44.6%	45.9%	44.4%	43.4%	47.3%	47.3%	51.1%	51.5%	49.7%	51.6%	53.0%	51.0%	51.0%	51.0%	Common Equity Ratio		49.0%																	
Pfd Stock None				2191.4	2308.6	2495.5	2706.2	2646.8	2929.7	3003.6	3216.0	3469.5	3587.7	3735	4100	4100	4100	Total Capital (\$mill)		5500																	
Common Stock 177,651,543 shares as of 7/24/17				2792.8	2997.4	3227.3	3469.3	3612.9	3936.2	4167.3	4402.0	4688.9	5001.6	5080	5275	5275	5275	Net Plant (\$mill)		5800																	
				5.9%	5.7%	5.6%	5.9%	6.9%	6.6%	8.0%	7.8%	6.9%	7.6%	7.5%	7.5%	7.5%	7.5%	Return on Total Cap'l		7.5%																	
				9.7%	9.3%	9.4%	10.6%	11.6%	11.0%	13.4%	12.9%	11.7%	12.7%	12.5%	12.5%	12.5%	12.5%	Return on Shr. Equity		12.5%																	
				9.7%	9.3%	9.4%	10.6%	11.6%	11.0%	13.4%	12.9%	11.7%	12.7%	12.5%	12.5%	12.5%	12.5%	Return on Com Equity		12.5%																	
MARKET CAP: \$6.0 billion (Large Cap)				3.2%	2.8%	2.7%	3.7%	4.6%	4.3%	6.7%	6.1%	4.7%	5.6%	5.5%	5.0%	5.0%	5.0%	Retained to Com Eq		4.5%																	
CURRENT POSITION				67%	70%	72%	65%	60%	61%	50%	52%	60%	56%	58%	59%	59%	59%	All Div's to Net Prof		62%																	
(MILL.)																																					
Cash Assets				3.2	3.7	7.8																															
Receivables				99.1	97.4	98.9																															
Inventory (AvgCst)				12.4	13.0	16.8																															
Other				13.7	14.6	14.6																															
Current Assets				128.4	128.7	138.1																															
Accts Payable				56.5	59.9	46.4																															
Debt Due				52.3	157.2	221.0																															
Other				84.4	84.4	65.1																															
Current Liab.				193.2	301.5	332.5																															
ANNUAL RATES				Past	Past	Est'd																															
of change (per sh)				10 Yrs.	5 Yrs.	to '20-'22																															
Revenues				4.0%	2.0%	5.0%																															
"Cash Flow"				7.5%	7.0%	6.0%																															
Earnings				8.5%	11.0%	7.0%																															
Dividends				8.0%	8.0%	9.0%																															
Book Value				7.0%	7.5%	6.5%																															
Cal-endar	QUARTERLY REVENUES (\$ mill.)					Full Year																															
	Mar.31	Jun.30	Sep.30	Dec.31																																	
2014	182.7	195.3	210.5	191.4	779.9																																
2015	190.3	205.8	221.0	197.1	814.2																																
2016	192.6	203.9	226.6	196.8	819.9																																
2017	187.8	203.4	233.8	205	830																																
2018	200	220	245	215	880																																
Cal-endar	EARNINGS PER SHARE ^					Full Year																															
	Mar.31	Jun.30	Sep.30	Dec.31																																	
2014	.24	.31	.38	.27	1.20																																
2015	.27	.32	.38	.17	1.14																																
2016	.29	.34	.41	.28	1.32																																
2017	.28	.34	.43	.31	1.36																																
2018	.31	.36	.47	.31	1.45																																
Cal-endar	QUARTERLY DIVIDENDS PAID ^					Full Year																															
	Mar.31	Jun.30	Sep.30	Dec.31																																	
2013	.14	.14	.152	.152	.58																																
2014	.152	.152	.165	.165	.63																																
2015	.165	.165	.178	.178	.69																																
2016	.168	.178	.1913	.1913	.74																																
2017	.1913	.1913	.205																																		
BUSINESS: Aqua America, Inc. is the holding company for water and wastewater utilities that serve approximately three million residents in Pennsylvania, Ohio, North Carolina, Illinois, Texas, New Jersey, Florida, Indiana, and five other states. Has 1,551 employees. Acquired AquaSource, 7/13; North Maine Utilities, 7/15; and others. Water supply revenues '2016: residential, 59%; commercial, 16%; industrial, wastewater & other, 25%. Off. & dir. own less than 1% of the common stock; Vanguard Group, 8.9%; Blackrock, Inc. 8.1%; State Street Capital, 6.0% (3/17 Proxy). President & Chief Executive Officer: Christopher Franklin. Incorporated: Pennsylvania. Address: 762 West Lancaster Avenue, Bryn Mawr, Pennsylvania 19010. Tel: 610-525-1400. Internet: www.aquaamerica.com .																																					
A large percentage of Aqua America's future growth will likely come via acquisitions. Similar to other large publicly traded water utilities, Aqua has been a continual buyer of small local water districts. Indeed, most of the 100,000-plus water systems in the U.S. do not have the financial wherewithal to replace their aging infrastructures. By constantly purchasing these types of entities, Aqua can gradually increase its customer base. Moreover, since actual synergies do result from mergers in this industry, the new assets can be operated more efficiently.																																					
There's always something happening on the regulatory front. The company has received rate relief in Indiana, New Jersey, North Carolina, Ohio and Pennsylvania. Other rate cases are pending in Virginia and Illinois. Aqua has good relationships with its regulators, so we are not expecting any major negative surprises.																																					
Dividends should increase at a healthy rate for the foreseeable future. Last quarter, the payout was hiked by 7%. This is less than the company's five- and 10-year historical average of 8%. Nevertheless, we think Aqua's strong cash																																					
generation should enable its payouts to rise 8%-10% annually through 2020-2022.																																					
Capital outlays are large but manageable. Aqua increased this year's capital expenditure budget to approximately \$450 million. The majority of funds will be allocated to repair, maintain, and replace aged pipelines and equipment. We don't expect this figure to change much in 2018. In 2019, though, we think outlays should decline to the \$300 million-\$325 million range. Of the nine members included in the water group, Aqua is only one of two that rates a Financial Strength rating of at least an A. While the balance sheet may be more leveraged over the next couple of years, it should remain relatively healthy.																																					
The stock has a high yield for a water utility. WTR is yielding 2.5%, or about 50 basis points more than its peers. This is unusual considering the equity's strong projected dividend growth. As a result, even though we still think shares of water utilities are currently trading at too high a premium, WTR is probably the best selection for those investors who must own a stock in this industry.																																					
James A. Flood																																					
October 13, 2017																																					

CALIFORNIA WATER NYSE-CWT										RECENT PRICE	39.65	P/E RATIO	28.3	(Trailing: 33.0 Median: 28.0)	RELATIVE P/E RATIO	1.41	DIV'D YLD	1.8%	VALUE LINE								
TIMELINESS	2	Raised 9/1/17	High:	22.9	22.7	23.3	24.1	19.8	19.4	19.3	23.4	26.4	26.0	36.8	39.8				Target Price	Range							
SAFETY	3	Lowered 7/27/07	Low:	16.4	17.1	13.8	16.7	16.9	16.7	16.8	18.4	20.3	19.5	22.5	32.4				2020	2021							
TECHNICAL	2	Lowered 10/13/17	LEGENDS																	2022							
BETA	.80	(1.00 = Market)	1.33 x Dividends p sh divided by Interest Rate 2-for-1 split 6/11 Options: Yes Shaded area indicates recession																								
2020-22 PROJECTIONS																											
Price Gain Ann'l Total																											
High 50 (+25%) 8%																											
Low 30 (-25%) -4%																											
Insider Decisions																											
D J F M A M J J A																											
to Buy 1 1 1 1 1 1 1 1																											
Options 0 0 0 2 2 0 0 0																											
to Sell 0 0 0 1 0 1 1 0																											
Institutional Decisions																											
4Q2016 1Q2017 2Q2017																											
to Buy 93 97 88																											
to Sell 82 83 77																											
Hds(000) 34200 38886 38422																											
Percent shares traded																											
18																											
12																											
6																											
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018																											
8.13 8.67 8.18 8.59 8.72 8.10 8.88 9.90 10.82 11.05 12.00 13.34 12.23 12.50 12.29 12.70 13.45 13.90																				Revenues per sh							
1.10 1.32 1.26 1.42 1.52 1.36 1.56 1.86 1.93 1.93 2.07 2.32 2.21 2.47 2.22 2.34 2.65 2.80																				"Cash Flow" per sh							
.47 .63 .61 .73 .74 .67 .75 .95 .98 .91 .86 1.02 1.02 1.19 .94 1.01 1.35 1.45																				Earnings per sh A							
.56 .56 .56 .57 .57 .58 .58 .59 .59 .60 .62 .63 .64 .65 .67 .69 .72 .75																				Div'd Decl'd per sh B							
2.04 2.91 2.19 1.87 2.01 2.14 1.84 2.41 2.66 2.97 2.83 3.04 2.58 2.76 3.69 4.77 3.85 3.65																				Cap'l Spending per sh							
6.48 6.56 7.22 7.83 7.90 9.07 9.25 9.72 10.13 10.45 10.76 11.28 12.54 13.11 13.41 13.75 14.20 14.45																				Book Value per sh C							
30.36 30.36 33.86 36.73 36.78 41.31 41.33 41.45 41.53 41.67 41.82 41.98 47.74 47.81 47.88 47.97 48.25 48.50																				Common Shs Outst'g D							
27.1 19.8 22.1 20.1 24.9 29.2 26.1 19.8 19.7 20.3 21.3 17.9 20.1 19.7 24.8 29.6																				Avg Ann'l P/E Ratio							
1.39 1.08 1.26 1.06 1.33 1.58 1.39 1.19 1.31 1.29 1.34 1.14 1.13 1.04 1.25 1.56																				Relative P/E Ratio							
4.4% 4.5% 4.2% 3.9% 3.1% 2.9% 3.0% 3.1% 3.1% 3.2% 3.4% 3.5% 3.1% 2.8% 2.9% 2.3%																				Avg Ann'l Div'd Yield							
CAPITAL STRUCTURE as of 6/30/17																											
Total Debt \$746.1 mill. Due in 5 Yrs \$174.0 mill.																											
LT Debt \$519.9 mill. LT Interest \$35.0 mill.																											
(44% of Cap'l)																											
Pension Assets-12/16 \$376.5 mill.																											
Oblig. \$564.8 mill.																											
Pfd Stock None																											
Common Stock 48,018,000 shs.																											
MARKET CAP: \$1.9 billion (Mid Cap)																											
CURRENT POSITION																											
2015 2016 6/30/17																											
CASH ASSETS (\$MILL.)																											
Cash Assets 8.8 25.5 29.1																											
Other 118.8 116.6 141.5																											
Current Assets 127.6 142.1 170.6																											
Accts Payable 66.4 77.8 84.2																											
Debt Due 40.2 123.3 226.2																											
Other 41.9 49.1 50.6																											
Current Liab. 148.5 250.2 361.0																											
ANNUAL RATES Past Past Est'd '14-'16																											
of change (per sh) 10 Yrs. 5 Yrs. to '20-'22																											
Revenues 4.0% 2.0% 2.5%																											
"Cash Flow" 5.0% 3.5% 5.0%																											
Earnings 4.0% 3.0% 9.0%																											
Dividends 1.5% 2.0% 6.5%																											
Book Value 5.0% 5.0% 3.0%																											
BUSINESS: California Water Service Group provides regulated and nonregulated water service to 482,400 customers in 100 communities in the state of California. Accounts for over 94% of total customers. Also operates in Washington, New Mexico, and Hawaii. Main service areas: San Francisco Bay area, Sacramento Valley, Salinas Valley, San Joaquin Valley & parts of Los Angeles. Acquired Rio Grande Corp; West Hawaii Utilities (9/08). Revenue breakdown: '18: residential, 72%; business, 20%; industrial, 4%; public authorities, 3%; other 1%. Off. and dir. own 1% of common stock (4/17 proxy). Has 1,163 employees. Pres. and CEO: Martin A. Kropelnicki Inc. DE. Addr.: 1720 North First St., San Jose, CA 95112-4598. Tel.: 408-367-8200. Internet: www.calwatergroup.com.																											
California Water Service Group benefited from favorable rate activity in the second quarter. The regulated water provider saw revenues surge to \$171 million, a 12% annual improvement, and a 40% increase on a sequential basis. The advance can largely be attributed to recent rate changes by the California regulatory authority (effective earlier this year). Specifically, rate increases alone added more than \$17 million to the top line in the June period, with unbilled revenue accounting for the remainder of gains. Profits are on the right track. California Water earned \$0.39 a share in the second quarter, besting our \$0.35 call. Lower incremental drought costs were positive, but the real takeaway was the 280-basis-point decline in operating expenses, notably slimmer maintenance and administrative costs. Our 2017 bottom-line estimate of \$1.35 a share remains intact, equating to year-over-year growth of 34%. We are tacking \$10 million onto our current-year revenue estimate, to \$650 million. This is partly owing to the strong second-quarter showing, but also factors in the higher base rate going forward. Meanwhile, our 2018 top-line forecast is unchanged, at \$675 million. The long-term story hasn't changed much. Acquisitions and capital spending remain the main themes here. The company has ample funding to allocate to infrastructure upgrades and water system improvements. Year to date, CWT has spent just over \$100 million on investments, leaving approximately \$450 million-\$500 million at its disposal. Further, bolt-on acquisitions are a possible avenue to explore should management want to supplement organic growth. All this, along with continued inquiry into increased base rates, augurs well for business prospects into next decade. These shares are trading near all-time highs. No doubt, the market has rewarded the company for returning to growth in 2016, as the stock price is up nearly 75% from last year's lows. This issue is timely (2), and is slated to outperform the year-ahead broader market averages. However, due to the run-up in price, total return potential over the 3- to 5-year stretch is below average.																											
Nicholas P. Patrikis																											
October 13, 2017																											

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CONSOL. WATER CO., NDC-CWCO

RECENT PRICE 13.00

P/E RATIO 22.0

(Trailing: NMF Median: 25.0)

RELATIVE P/E RATIO 1.10

DIV'D YLD. 2.3%

VALUE LINE

5

Lowered 9/8/17

3

New 1/17/14

3

Lowered 10/13/17

1.00

(1.00 = Market)

2020-22 PROJECTIONS

Price 30

Gain (+130%)

Return 25%

13%

Insider Decisions

D

J

F

M

A

M

J

J

A

to Buy

0

0

0

0

0

0

0

0

Options

12

0

0

0

9

0

0

0

to Sell

6

0

0

0

1

0

0

0

Institutional Decisions

4Q2016

1Q2017

2Q2017

to Buy

40

37

39

to Sell

36

41

36

Hld's(\$000)

6885

8265

7511

Percent shares traded

24

16

8

% TOT. RETURN 9/17

THIS STOCK

13.0

16.4

3 yr.

18.3

31.5

5 yr.

75.2

88.9

2001

2002

2003

2004

2005

2006

2007

2008

2009

2010

2011

2012

2013

2014

2015

2016

2017

2018

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1.41

1.52

1.88

2.02

1.12

2.71

3.41

4.52

3.99

3.49

3.79

4.49

4.35

4.46

3.86

3.89

4.05

4.20

Revenues per sh

9.70

.52

.50

.63

.77

.37

.87

1.20

.95

1.18

.86

.83

1.17

.96

.80

.89

.95

1.05

1.20

"Cash Flow" per sh

1.85

.35

.32

.42

.49

.23

.59

.79

.50

.74

.43

.42

.64

.58

.42

.51

.27

.60

.70

Earnings per sh

1.25

.20

.21

.21

.23

.12

.24

.20

.33

.28

.30

.30

.30

.30

.30

.30

.30

.30

.30

Div'd Decl'd per sh

.40

.24

.39

.19

.24

.77

1.83

.54

.46

.18

.09

.98

.31

.29

.32

.21

.23

.25

.30

Cap'l Spending per sh

.40

2.45

2.64

3.89

4.20

2.54

7.49

8.21

8.36

8.53

8.69

8.83

9.20

9.44

9.58

9.81

9.79

10.35

11.00

Book Value per sh

11.90

7.84

7.99

11.37

11.51

23.46

14.13

14.40

14.53

14.54

14.55

14.57

14.59

14.69

14.72

14.78

14.87

15.00

15.00

Common Shs Outst'g

16.00

13.9

21.6

19.3

23.1

NMF

43.0

35.4

37.8

19.0

26.9

22.4

12.4

20.0

28.3

22.7

44.8

44.8

44.8

Avg Ann'l P/E Ratio

21.0

.71

1.18

1.10

1.22

NMF

2.32

1.88

2.27

1.27

1.71

1.41

.79

1.12

1.49

1.14

2.36

2.36

2.36

Relative P/E Ratio

1.30

4.2%

3.1%

2.6%

2.0%

.7%

.9%

.7%

1.7%

2.0%

2.6%

3.2%

3.8%

2.6%

2.5%

2.6%

2.5%

2.5%

2.5%

Avg Ann'l Div'd Yield

1.6%

CAPITAL STRUCTURE as of 6/30/17

49.2

65.7

58.0

50.7

55.2

65.5

63.8

65.6

57.1

57.9

61.0

63.0

63.0

Revenues (\$mill)

155

Total Debt \$0.4 mill. Due in 5 Yrs \$0.4 mill.

11.4

7.2

10.8

6.3

6.1

9.3

8.6

6.3

7.5

4.0

9.0

10.5

10.5

Net Profit (\$mill)

20.0

LT Debt None LT Interest None

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NMF

NMF

NMF

NMF

Income Tax Rate

NMF

Leases, Uncapitalized: Annual rentals \$8 mill.

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4.0%

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NMF

NMF

NMF

NMF

AFUDC % to Net Profit

NMF

No Defined Benefit Pension Plan

15.9%

14.8%

13.8%

11.8%

5.1%

3.7%

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3.7%

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3.7%

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Long-Term Debt Ratio

Nil

Pfd Stock NMF (45,087 shares out.) Div'd NMF

84.1%

85.2%

88.2%

88.2%

94.9%

96.3%

99.8%

99.8%

100.0%

100.0%

100%

100%

100%

100%

100%

100%

100%

Common Equity Ratio

100%

Common Stock 14,900,724 shs. as of 8/4/17

140.7

142.7

143.9

143.3

135.6

139.4

138.9

141.2

145.0

145.6

155

165

165

165

165

165

165

165

Total Capital (\$mill)

190

MARKET CAP: \$200 million (Small Cap)

65.0

65.1

61.2

56.2

64.3

61.6

59.6

56.4

53.7

53.1

50.0

52.0

52.0

52.0

52.0

52.0

52.0

Net Plant (\$mill)

125

CURRENT POSITION 2015 2016 6/30/17 (\$MILL.)

8.8%

5.7%

8.1%

4.9%

5.0%

7.0%

6.2%

4.4%

5.2%

2.7%

6.0%

6.5%

6.5%

6.5%

6.5%

6.5%

6.5%

Return on Total Cap'l

10.5%

ANNUAL RATES of change (per sh)

9.6%

5.9%

8.7%

5.0%

4.7%

6.9%

6.2%

4.4%

5.2%

2.7%

6.0%

6.5%

6.5%

6.5%

6.5%

6.5%

6.5%

Return on Shr. Equity

10.5%

Past 10 Yrs. Past 5 Yrs. Est'd '14-'16 to '20-'22

9.6%

5.9%

8.7%

5.0%

4.7%

6.9%

6.2%

4.4%

5.2%

2.7%

6.0%

6.5%

6.5%

6.5%

6.5%

6.5%

6.5%

Return on Com Equity

10.5%

Book Value

6.5%

2.8%

4.6%

1.5%

1.0%

3.6%

3.0%

1.2%

2.1%

NMF

3.0%

3.5%

3.5%

3.5%

3.5%

3.5%

3.5%

Retained to Com Eq

7.0%

CURRENT POSITION 2015 2016 6/30/17 (\$MILL.)

33%

52%

48%

69%

79%

48%

51%

73%

59%

112%

50%

46%

46%

46%

46%

46%

46%

All Div'ds to Net Prof

32%

BUSINESS: Consolidated Water Co. Ltd. develops and operates seawater desalination plants and water distribution systems in areas where naturally occurring supplies of potable water are scarce or nonexistent. Its desalination process involves reverse osmosis tech. It provides water in the Cayman Islands, Belize, the Bahamas, the British Virgin Islands, and Bali. At 12/31/16, it opera-

ted 13 plants with a capacity of 26.3 million gallons per day. Inc.: Cayman Islands. Has 117 employees. President & Chief Executive Officer: Frederick McTaggart. Off./Dir. own 2.9% of stock; (4/17 proxy). Address: Regatta Office Park Windward Three, 4th Floor, West Bay Road P.O. Box 1114 Grand Cayman, KYL-1102, Cayman Islands. Tel.: (345) 945-4277. Internet: www.cwco.com.

Consolidated Water has decided to exit the Asian market. The company, a builder and operator of desalination facilities, had completed the Nusa Dua plant with the production capacity of 790,000 gallons a day on the Indonesian island of Bali. Filled with many high-end resorts, Bali has a growing population and a strong need for drinkable water. Following completion of the plant, demand for the water never materialized for some reason. As a result, in the second quarter, Consolidated chose to classify the Nusa Dua project as a discontinued business. We now exclude its operations from our earnings presentation.

The Bulk segment is struggling. Though a subsidiary, Consolidated provides bulk water to the British Virgin Islands (BVI). Relations between the company and regulators have not been constructive in the past. Recently, authorities extended the existing contract for 14 years. The price paid for water was slashed by 31% in 2017, though. Since this investment is accounted for using the equity method, the value of the assets must be estimated every quarter. A loss was posted

in the June period. Litigation regarding the value of the Baugther Bay plant (that was transferred to the BVI) has been ongoing since earlier this decade.

Other operations are mixed. Profits rose in the Bahamas due to lower operating expenses, while earnings at the Retail segment were hurt by a rise in costs. Moreover, the Service and Manufacturing businesses continued to not do well.

Prospects for a new plant south of the border seem very promising. Mexico has a more stable business environment than most of the countries where Consolidated has assets located. Planning has been in progress for years and construction may finally begin before yearend on the large Rosalita project. Consolidated will be a partial owner of the plant in northern Baja that, if all goes well, could eventually produce 100 million gallons of potable water a day.

We would avoid these untimely shares: Although the Rosalita plant holds great potential, there is too much uncertainty with Consolidated's regulators to recommend the stock at this time.

James A. Flood

October 13, 2017

(A) Fully diluted earnings. Excludes losses from discontinued operations: '17, \$0.08 a share. Next earnings report due early November. (B) Includes historically paid in late January, April, July, and October. ■ Dividend reinvestment plan available. (C) In millions adjusted for stock split. (D) Includes Intangibles. As of 6/30/17, \$14.3 million/\$0.96 a share.

Company's Financial Strength

B+

Stock's Price Stability

30

Price Growth Persistence

30

Earnings Predictability

45

MIDDLESEX WATER NDQ-MSEX										RECENT PRICE	40.47	P/E RATIO	26.3 (Trailing: 30.4; Median: 20.0)	RELATIVE P/E RATIO	1.32	DIV YLD	2.1%	VALUE LINE										
TIMELINESS	4	Lowered 7/17/17	SAFETY	2	New 10/21/11	TECHNICAL	3	Raised 7/14/17	BETA	.80 (1.00 = Market)	High: 20.5	20.2	19.8	17.9	19.3	19.4	19.6	22.5	23.7	28.0	44.5	42.8	Target Price	Range				
2020-22 PROJECTIONS										Ann'l Total	50	Gain (+25%)	8%	35	(-15%)	-1%												
Insider Decisions										D J F M A M J J A	to Buy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Institutional Decisions										4Q2016	1Q2017	2Q2017	Percent shares traded	12	8	4												
										to Buy	40	45	60															
										to Sell	62	51	44															
										Hlds(000)	7874	9400	9201															
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	© VALUE LINE PUB. LLC 20-22										
5.87	5.98	6.12	6.25	6.44	6.16	6.50	6.79	6.75	6.60	6.50	6.98	7.19	7.26	7.77	8.16	8.30	8.65	Revenues per sh	9.40									
1.18	1.20	1.15	1.28	1.33	1.33	1.49	1.53	1.40	1.55	1.46	1.56	1.72	1.84	1.97	2.17	2.35	2.50	"Cash Flow" per sh	3.10									
.66	.73	.61	.73	.71	.82	.87	.89	.72	.96	.84	.90	1.03	1.13	1.22	1.38	1.48	1.60	Earnings per sh A	2.05									
.62	.63	.65	.66	.67	.68	.69	.70	.71	.72	.73	.74	.75	.76	.78	.81	.84	.87	Div'd Decl'd per sh B	1.02									
1.25	1.59	1.87	2.54	2.18	2.31	1.66	2.12	1.49	1.90	1.50	1.36	1.26	1.40	1.59	2.91	1.80	1.90	Cap'l Spending per sh	2.05									
7.11	7.39	7.60	8.02	8.26	9.52	10.05	10.03	10.33	11.13	11.27	11.48	11.82	12.24	12.74	13.40	13.95	14.35	Book Value per sh	16.45									
10.17	10.36	10.48	11.36	11.58	13.17	13.25	13.40	13.52	15.57	15.70	15.82	15.96	16.12	16.23	16.30	16.50	16.75	Common Shs Outst'g C	17.00									
24.6	23.5	30.0	26.4	27.4	22.7	21.6	19.8	21.0	17.8	21.7	20.8	19.7	18.5	19.1	25.6	Bold figures are Value Line estimates		Avg Ann'l P/E Ratio	21.0									
1.26	1.28	1.71	1.39	1.46	1.23	1.15	1.19	1.40	1.13	1.36	1.32	1.11	.97	.96	1.35			Relative P/E Ratio	1.30									
3.8%	3.7%	3.5%	3.4%	3.5%	3.7%	3.7%	4.0%	4.7%	4.2%	4.0%	4.0%	3.7%	3.7%	3.3%	2.3%			Avg Ann'l Div'd Yield	2.4%									
CAPITAL STRUCTURE as of 6/30/17										86.1	91.0	91.2	102.7	102.1	110.4	114.8	117.1	126.0	132.9	137	145	Revenues (\$mill)	160					
Total Debt \$159.6 mill. Due in 5 Yrs \$32.1 mill.										11.8	12.2	10.0	14.3	13.4	14.4	16.6	18.4	20.0	22.7	24.5	27.0	Net Profit (\$mill)	35.0					
LT Debt \$136.4 mill. LT Interest \$6.0 mill.										32.6%	33.2%	34.1%	32.1%	32.7%	33.9%	34.1%	35.0%	34.5%	34.0%	35.0%	36.0%	Income Tax Rate	37.0%					
(Total interest coverage: 8.6x)										--	--	--	6.8%	6.1%	3.4%	1.9%	1.7%	1.9%	2.7%	2.0%	2.0%	AFUDC % to Net Profit	2.5%					
Pension Assets-12/16 \$59.4 mill.										49.0%	45.6%	46.6%	43.1%	42.3%	41.5%	40.4%	40.5%	39.4%	37.9%	37.5%	37.5%	Long-Term Debt Ratio	37.5%					
Oblig. \$78.6 mill.										49.6%	51.8%	52.1%	55.8%	56.6%	57.4%	58.7%	58.8%	59.8%	61.5%	62.0%	62.0%	Common Equity Ratio	62.0%					
Pfd Stock \$2.4 mill. Pfd Div'd: \$1.1 mill.										268.8	259.4	267.9	310.5	312.5	316.5	321.4	335.8	345.4	355.4	370	385	Total Capital (\$mill)	455					
Common Stock 16,337,784 shs. as of 7/31/17										333.9	366.3	376.5	405.9	422.2	435.2	446.5	465.4	481.9	517.8	525	535	Net Plant (\$mill)	575					
										5.6%	5.8%	5.0%	5.7%	5.2%	5.4%	5.9%	6.3%	6.6%	7.1%	7.5%	7.5%	Return on Total Cap'l	8.0%					
										8.6%	8.6%	7.0%	8.1%	7.5%	7.8%	8.7%	9.2%	9.6%	10.3%	10.5%	11.0%	Return on Shr. Equity	12.5%					
										8.7%	8.9%	7.0%	8.2%	7.5%	7.8%	8.7%	9.3%	9.8%	10.3%	10.5%	11.0%	Return on Com Equity	12.5%					
										1.8%	2.0%	.1%	2.1%	1.0%	1.4%	2.4%	3.1%	3.5%	4.3%	4.5%	5.0%	Retained to Com Eq	6.0%					
MARKET CAP: \$650 million (Small Cap)										79%	78%	98%	75%	87%	83%	73%	67%	63%	58%	57%	54%	All Div'ds to Net Prof	50%					
CURRENT POSITION (\$MILL.)										2015	2016	6/30/17																
Cash Assets										3.5	3.9	3.7																
Other										20.9	22.8	26.0																
Current Assets										24.4	26.7	29.7																
Accts Payable										6.5	12.3	15.0																
Debt Due										8.7	18.2	23.2																
Other										13.1	16.6	17.2																
Current Liab.										28.3	47.1	55.4																
ANNUAL RATES of change (per sh)										Past 10 Yrs.	Past 5 Yrs.	Est'd '14-'16 to '20-'22																
Revenues										2.0%	3.0%	3.5%																
"Cash Flow"										4.5%	6.5%	7.5%																
Earnings										5.0%	8.0%	8.5%																
Dividends										1.5%	1.5%	4.5%																
Book Value										4.0%	3.0%	4.5%																
QUARTERLY REVENUES (\$mill.)										Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year													
2014										27.1	29.2	32.7	28.1	117.1														
2015										28.8	31.7	34.7	30.8	126.0														
2016										30.6	32.7	37.8	31.8	132.9														
2017										30.1	33.0	39.0	34.9	137														
2018										33.0	37.0	40.0	35.0	145														
EARNINGS PER SHARE A										Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year													
2014										.20	.29	.42	.22	1.13														
2015										.22	.31	.41	.28	1.22														
2016										.29	.36	.54	.19	1.38														
2017										.27	.33	.55	.33	1.48														
2018										.33	.38	.57	.32	1.60														
QUARTERLY DIVIDENDS PAID B										Cal-endar	Mar.31	Jun.30	Sep.30	Dec.31	Full Year													
2013										.1875	.1875	.1875	.19	.75														
2014										.19	.19	.19	.1925	.76														
2015										.1925	.1925	.1925	.19875	.78														
2016										.19875	.19875	.19875	.21125	.81														
2017										.21125	.21125	.21125																
BUSINESS:										Middlesex Water Company engages in the ownership and operation of regulated water utility systems in New Jersey, Delaware, and Pennsylvania. It also operates water and wastewater systems under contract on behalf of municipal and private clients in NJ and DE. Its Middlesex System provides water services to 61,000 retail customers, primarily in Middlesex County, New Jersey. In 2016, the Middlesex System accounted for 60% of operating revenues. At 12/31/16, the company had 309 employees. Incorporated: NJ. President, CEO, and Chairman: Dannis W. Doll. Officers & directors own 3.5% of the common stock; BlackRock Institutional Trust Co., 7.2% (4/17 proxy). Add.: 1500 Ronson Road, Iselin, NJ 08830. Tel.: 732-634-1500. Internet: www.middlesexwater.com.																		
Middlesex Water Company reported										ly established RENEW program and Water for Tomorrow initiative, the company aims to allocate nearly \$12 million in each of the next three years to bolster its water transmission capabilities by replacing old water mains, valves, and services lines throughout New Jersey. Total capital spending on its water distribution infrastructure (approximately \$200 million through next decade) ought to be closely monitored, with a portion of those corresponding investment costs being recovered by appropriate rate filings. Finally, a slow but sure pickup in consumption from New Jersey residents should provide an extra boost to the top line further out.																		
soft results for the second quarter.										Our Timeliness Ranking System pegs shares of Middlesex Water Company as year-ahead market laggards (4, Below Average). In the same breath, the issue offers unattractive total return potential over the 3- to 5-year pull, and its dividend yield, though average, pales in comparison to its historical norms. Therefore, we suggest investors stay on the sidelines, for now.																		
Following a somewhat colder (longer) winter season, customer water usage picked up only moderately through the late spring into early summer months. Indeed, the volatile Northeast region of the U.S. (MSEX's main area of operation) leaves the company subject to weather disruptions. First-quarter revenues came in roughly flat, year over year, at \$33.0 million. Delaware operations registered a modest gain thanks to new customer additions, while its New Jersey segment slipped due to a continued trend of weak water consumption. Similar to the first quarter, net income took a step back, compared to the year-earlier figure. Share net of \$0.33 missed our mark by \$0.04, with increased water production costs weighing on profits.										Our current-year top- and bottom-line estimates are being modestly reduced. We now expect Middlesex to earn \$1.48 a share (-\$0.02 less than our previous call), on \$137 million in revenues (-\$1 million). Infrastructure upgrades are still management's main focus. Under its recent-																		
Our current-year top- and bottom-line estimates are being modestly reduced.										Nicholas P. Patrikis October 13, 2017																		

<p>(A) Diluted earnings. Excludes nonrecurring losses: '03, \$1.97; '04, \$3.78; '05, \$1.09; '06, \$16.36; '08, \$1.22; '10, \$0.46. GAAP accounting as of 2013. Next earnings report due late</p>	<p>November. Quarterly earnings may not add due to rounding. (B) Dividends historically paid in early March, June, September, and December. ■ Divid rein-</p>	<p>vestment plan available. (C) In millions, adjusted for stock splits.</p>
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(A) Diluted earnings. Next earnings report due late November.	(C) In millions, adjusted for split.	Company's Financial Strength Stock's Price Stability Price Growth Persistence Earnings Predictability	B+ 60 55 95
(B) Dividends historically paid in late February, June, September, and December.		To subscribe call 1-800-VALUELINE	
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