State Plumbing Board

Meeting agenda

Meeting date: Thurs., April 17, 2025
Time: 9:30 a.m.
In-person attendance: Building Codes Division Salem office in Conference Room A
Virtual connection and online streaming: View the live meeting or access the connection information for the Zoom meeting at: Oregon.gov/bcd/Pages/bcd-video.aspx

I. Board business

A. Call to order
B. Roll call
C. Approval of agenda and order of business
D. Approval of the draft board meeting minutes of Feb. 13, 2025
E. Date of the next scheduled meeting: June 12, 2025, *(Holiday schedule)*
F. Formal farewell to leaving member Corey Frazier
G. Welcome new member Chris Amoah-Kusi

II. Public comment

The board will hear public testimony from individuals who have signed up in advance and for those connected virtually.

III. Reports and updates

A. Plumbing program update
B. Board vote on consent orders for cases proposed for resolution as outlined in the enforcement board report ***(Board action required)***
C. Final orders by default are outlined in the enforcement board report ***(No board action required)***

IV. Communications

This item is for the division to present advisory information.
2024 Annual Report

V. Appeals

There are no appeals for this meeting.

VI. Unfinished business

There is no unfinished business for this meeting

VII. New business

Board review request received from Duo Water Systems for approval to be training agent under OAR 918-695-0100

VIII. Announcements

The board chair or any of the board members may make announcements during this time.

IX. Adjournment

The board chair or vice-chair will adjourn the meeting announcing a specific time of adjournment.

The meeting location is accessible to persons with disabilities. For questions about accessibility or to request an accommodation, please contact Debi Woods at debra.j.woods@dcbs.oregon.gov
Requests should be made at least 48 hours prior to an event

1535 Edgewater St. NW
P.O. Box 14470
Salem, OR 97304
503-378-4133
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oregon.gov/bcd

State of Oregon
State Plumbing Board
Virtual only meeting minutes of Feb. 13, 2025

Agenda Item I.D.

Members attendance: Curtis Gillette, Chair - 10-year journeyman plumber
Tyrone Bergen, Vice-chair – Licensed plumbing inspector
Corey Frazier - Registered professional mechanical engineer
Molly Keller - Employee of the Oregon Health Authority
Josef Lebold - Member of the general public
Steven Matiaco – Building official
Christopher Nguyen – Registered plumbing business

Staff attendance: Alana Cox, Administrator of Building Codes Division
Todd Smith, manager, Policy and Technical Services (PTS)
Andy Skinner, plumbing program chief, PTS
Richard Donovan, senior policy advisor, PTS
Pierre Sabagh, policy analyst, PTS
Richard Rogers, chief building official, PTS
Andrea Simmons, manager, Licensing Compliance Section
Blaine Curry, manager operations, Field Services and Operations
Andy Boulton, senior policy advisor, PTS
Emily Roque, contested case representative (CCR), Licensing Compliance Section
Michael Mayorga-Hamilton, CCR, Licensing Compliance Section
Graham Roney, licensing manager, Licensing Compliance Section
Marcus Stovall, assistant plumbing program chief, PTS
Jamie Antonio, Field Services and Operations
Laura Burns, support coordinator, PTS
Kaydi Milton, policy development coordinator, PTS
Debi Barnes-Woods, board administrator/coordinator, PTS

Public connected: Jason Watson, gust
Craig Watkins, guest

I. Board business

A. Call to order
Chair Curtis Gillette called the State Plumbing Board meeting of Feb. 13, 2025, to order at 9:30 a.m.

B. Roll call
Chair Curtis Gillette; Vice-chair Tyrone Bergen; Corey Frazier; Molly Keller; Joe Lebold; and Christopher Nguyen were all connected virtually.

Although Steven Matiaco was not present during the roll call, he connected to the meeting at 9:45am and was able to vote during Agenda Item VII.B.

The State Plumbing Board is a seven-member board. Four members make a quorum. Currently, there are no vacant positions.

C. Approval of agenda and order of business
Chair Gillette ruled the agenda and order of business, approved.

D. Approval of the draft board meeting minutes
Chair Gillette ruled the draft meeting minutes of Dec. 19, 2024, final.

E. Date of the next regularly scheduled meeting: April 17, 2025.

II. Public comment

Analyst Pierre Sabagh addressed the virtual audience by asking if anyone would like to speak during general public comment. No one offered to speak.

III. Reports and updates

A. Plumbing program update

Andy Skinner, plumbing program chief, Policy and Technical Services, met with American Society of Plumbing Engineers in January to continue outreach to the plumbing industry and stakeholders and to share all recent developments in the plumbing program.

Any jurisdictions interested in the Chief's meetings that were held once-a-month in the past and would like to see those meetings continue, please contact Chief Skinner.

Chief Skinner continued his discussion by addressing the pathways to qualify for certifications. He used the following as an example: A journeymen plumber with four years of experience may qualify to sit for an A-Level Plumbing Inspector's certification license. The practicum pathway, used when a journeymen plumber having less than four years, such as two years of experience, recently changed. Instead of sitting for a test for the practicum pathway there is a series of steps by first having to take the CAP test, passing with 75-percent or more, which then qualifies the individual for the 12-week SPI course. After the 12-week period, the SPI test is administered requiring a passing score of 75-percent or more. That qualifies the individual to sit for the A-Level Plumbing Inspector certification.

B. Board vote on enforcement consent orders for cases proposed for resolution as outlined in the enforcement board report *(Board action required)*

Emily Roque, contested case representative (CCR), Licensing Compliance Section, discussed one consent order recently negotiated and agreed upon by the division on behalf of the board. She explained that a description of the order was included on the enforcement matrix and the consent order was included in the board packet as well. The board would need to take a vote on the proposed case.

Motion by Chair Gillette to adopt the one case proposed for resolution as outlined in the enforcement board report and issue a final order.
Roll call vote taken:
***Yea* –** Christopher Nguyen; Joe Lebold; Molly Keller; Corey Frazier; Vice-chair Tyrone Bergen; and Chair Curtis Gillette.
***Nay* –** None.
Motion carried unanimously.

C. **Summary of enforcement case previously resolved by the division as outlined in the enforcement board report *(No board action required)***
Contested Case Representative Roque continued with the enforcement discussion briefly explaining the one default order.

IV. Communications – None

V. Appeals - None

VI. Unfinished business - None

VII. New business

A. **Board review and approval of plumbing chief's recommendations regarding new continuing education course and instructor applications**
Analyst Sabagh said that the plumbing chief had evaluated courses and instructors on the board's behalf since the December meeting. For this meeting, Chief Skinner reviewed four applications from one organization. Chief Skinner recommended three courses for approval and one instructor was recommended for approval.

Analyst Sabagh said the details of the applications were outlined in the matrix located in the board packet. He said that a motion was needed from the board.

For informational purposes, all approved providers are listed on the division website.

Motion by Board Member Corey Frazier to approve the plumbing chief's recommendations for approval of the instructors and course applications as they are listed in the continuing education matrix in the board packet.

Roll call vote taken:
Yea – Christopher Nguyen; Joe Lebold; Molly Keller; Corey Frazier; Vice-chair Tyrone Bergen; and Chair Curtis Gillette.
Nay – None.
Motion carried unanimously.

B. **Board review request received from Gary Ford, Journeyman Plumber License No. 4623, for hardship extension under OAR-918-030-0240**
Analyst Sabagh introduced the item then turned the discussion over to Chief Skinner for details before a motion was needed from the board.

Chief Skinner said that each journeymen plumber has one year from expiration to complete the renewal requirements of the license before going into expired status. If those requirements have not been met on the due date of the license the licensee is given the opportunity to retest. Mr. Ford did not meet the renewal requirements of the license and he is now required to retest.

Following several questions of license requirements from members, Andrea Simmons, manager, Licensing Compliance Section, offered a detailed description of licensing requirements. She pointed to the Oregon Administrative Rule for the hardship extension that was linked on the agenda:

"(3) A hardship or illness extension will not be granted for:
(a) Failure or inability to pay renewal fees; or
(b) Renewal applications that are lost or otherwise are not delivered to the applicant."

Chair Curtis Gillette agreed with Manager Simmons explaining that he is an instructor of continuing education and is required to keep up on statute and rule requirements surrounding the license.

Member Frazier referred to the letter sent in by the applicant and asked if there is proof of the requestor completing the requirement of continuing education.

Graham Roney, assistant manager, Licensing Compliance Section, said Mr. Ford completed his required continuing education six days following the expiration of the license, but failed to pay the fee requirement.

Chair Gillette suggested that the board follow what is stated in rule.

Motion by Chair Gillette to disapprove the request for hardship extension from Gary Ford, Journeyman Plumber License No. 4623, because he had sufficient time to pay the renewal fee to reinstate the license.

Before roll was called, Board Member Steven Matiaco connected to the meeting. Chair Gillette brought Member Matiaco up to speed on what transpired on this item so he could participate in the vote.

Roll call vote taken:
***Yea* –** Christopher Nguyen; Steve Matiaco; Joe Lebold; Molly Keller; Corey Frazier; Vice-chair Tyrone Bergen; and Chair Curtis Gillette.
***Nay* –** None.
Motion carried unanimously.

VIII. Announcements

IX. Adjournment

Chair Curtis Gillette adjourned the meeting at 9:58 a.m.

These draft minutes were respectfully submitted and transcribed by Debi Barnes-Woods, division boards administrator/coordinator

Agenda Item III.B.

State of Oregon **Board memo**

Building Codes Division **April 17, 2025**

To: State Plumbing Board

From: Emily Roque, contested case representative, Licensing Compliance Section

Subject: Consent order for a case resolved on behalf of the Plumbing Board

Action requested:
For the Board to consider the adoption of a recent consent orders negotiated by the Division on their behalf and to issue final orders.

Background:
The Board, through Division staff, implemented a civil penalty matrix for plumbing violations, which establishes civil penalties based upon the type and number of violations committed by a company or individual. The penalty matrix further provides that a stay of some portion of a penalty is within the sole discretion of the Board or the Division acting on the Board's behalf for purposes of settling cases without having to go to hearing.

The Licensing Compliance Section, acting on behalf of the Board, has entered into consent agreements in three (3) cases since the Board's February 13, 2025, meeting. In these cases, the penalty amounts assessed, amounts suspended, and amounts due and payable are consistent with the Board's penalty matrix. A copy of the consent orders and a chart with a summary of the three cases for Board approval has been included for your review in your Board packet.

The consent orders contains the following standard conditions:

- Respondent agrees to fully cooperate with the Division's enforcement efforts.
- Respondent understands that further enforcement action may be taken for any other violations.
- Respondent understands that failure to comply with the consent order may be used as a basis for the denial, suspension, revocation, or conditioning of a license, certificate, or registration.

A chart with a summary of all final orders by default since the last Board meeting has also been included in your packet, but these final orders do not require a vote for approval.

All cases involve first time violators, unless otherwise noted in the chart.
Please let me know if you have any questions.

Plumbing Board Report for April 17, 2025

Summary Report of Consent Orders							
Case #	**Name**	**Violation relating to Plumbing Board**	**Location**	**Date of Violation**	**Civil Penalty**		**Other**
C2025-0005	Hector Tapia De Los Santos dba Emmanuel Services	● Advertised without a plumbing contractor's license.	Sheridan, OR	December 2024	Assessed: Imposed: Suspended:	$3,000 $250 $2,750	Respondent has a related electrical case. See Division case C2025-0004.
C2024-0130	Malmedal Enterprises, Inc.	Installation of a 90 degree fitting and an expansion ring onto PEX water line. ● Permitted or suffered unlicensed person to perform work as a journeyman plumber.	Beaverton, OR	June 2024	Assessed: Imposed: Suspended:	$2,000 $500 $1,500	
C2024-0131	Parker Viner	Installation of a 90 degree fitting and an expansion ring onto PEX water line. ●No journeyman plumber's license.	Beaverton, OR	June 2024	Assessed: Imposed: Suspended:	$2,000 $500 $1,500	

BEFORE THE STATE PLUMBING BOARD OF THE STATE OF OREGON

IN THE MATTER OF:	**CONSENT ORDER**
HECTOR TAPIA DE LOS SANTOS DBA EMMANUEL SERVICES, ASSUMED BUSINESS NAME,	
RESPONDENT.	**BCD CASE C2025-0005**

INTRODUCTION

The Building Codes Division ("Division") conducted an investigation on behalf of the State Plumbing Board of the State of Oregon ("Board") and determined that Hector Tapia De Los Santos dba Emmanuel Services ("Respondent") violated certain provisions of the Division's statutes and administrative rules as identified below.

The parties agree to resolve this matter without a hearing. Respondent understands that Respondent has the right to a contested case hearing under the Administrative Procedures Act, Oregon Revised Statutes ("ORS") chapter 183, and Respondent fully and finally waives the right to a hearing and any judicial review therefrom by the signing of this Consent Order.

FINDINGS OF FACT

1. On or about December 23, 2024, Respondent advertised on the side of his truck "Emmanuel Services…Electric, Plumbing, Painting, And More!!!."
2. At no relevant time did Respondent hold a Oregon plumbing contractor's license.

APPLICABLE LAW

1. Definitions for terms used in this Consent Order may be found in ORS 183.310, ORS 447.010, ORS 455.010, ORS 693.010, Oregon Administrative Rule ("OAR") 918-001-0005, OAR 918-030-0010, and OAR 918-690-0420.

2. Under ORS 447.010(6), plumbing is defined as the art of installing, altering, or repairing pipes, fixtures, and other apparatus for bringing in the water supply and removing liquid and water-carried waste.
3. Under ORS 447.040(1), a person may not work as a plumbing contractor, or advertise or purport to be a plumbing contractor, without having obtained a plumbing contractor license.
4. OAR 918-030-0010(8) states that for purposes of ORS 447.040, 479.620, 480.630, and any other license regulated by ORS chapter 455, "engaging in the business" means to advertise or solicit, contract or agree to perform, or to perform work for which a license or permit is required under Oregon law, including but not limited to a single instance.

CONCLUSIONS OF LAW

1. By advertising to perform plumbing services on the side of Respondent's truck, Respondent engaged in the business of an plumbing contractor as defined in OAR 918-030-0010(8).
2. By engaging in the business of a plumbing contractor, without an Oregon plumbing contractor license, Respondent violated ORS 447.040(1).

ORDER

1. The Board hereby assesses a total civil penalty of $3,000 against Respondent for violating ORS 447.040(1) as follows:
    a. $2,750.00 of the total civil penalty will be suspended for a period of five years if there is compliance with all other terms of this Consent Order.
    b. Respondent agrees to pay the remaining $250.00 of the civil penalty in a lump sum payment. Respondent's payment must be received no later than the 25th day of the month following the month in which this Consent Order is signed by both parties*(An invoice may be provided to Respondent after this Consent Order is signed by both parties. Respondent understands timely payments must be made even if no invoice is ever received.)* Checks should be made out to the Department of Consumer and

Business Services. **Payment shall be mailed to Department of Consumer and Business Services, Fiscal Services Section, P.O. Box 14610, Salem, OR 97309-0445**. **For payment questions and credit card payments call 503-947-7891.**

NOTE: If you fail to make your lump sum payment as stated in this signed Consent Order, this account may be assigned to the Department of Justice, Department of Revenue, or a private collection agency. You will be responsible for any court costs, attorney fees, any other necessary fees related to the collection of this debt, and any interest or penalties accrued. This debt may also appear on future credit reports.

c. Respondent understands the suspended civil penalty ($2,750.00) will be considered satisfied five years after this Consent Order becomes a final order, provided Respondent complies with its terms and has not committed any further violations of the Division's statutes and rules within that five-year period. Respondent understands and agrees that upon a showing that Respondent has not complied with the terms of this Consent Order or that Respondent has committed any further violations of the Division's statutes or rules within the five-year period, the entire civil penalty, including any suspended amount, will become due and payable. Failure to comply with this Consent Order includes, but is not limited to, failure to pay the civil penalty amount due by the due date.

2. Respondent has provided the Division with sufficient evidence that he removed the advertisement from his truck.
3. Respondent agrees to fully cooperate with the Division's enforcement efforts in other cases that rely on the facts underlying this case. Cooperation may include, but may not be limited to, making sworn statements or testifying in administrative hearings.
4. Respondent understands that further enforcement action may be taken for any violation of the Division's statutes or rules not alleged in this Consent Order, whether committed before or after the execution of this Consent Order, and for any violation of the terms of this Consent Order.

5. Respondent understands that failure to comply with this Consent Order may be used as a basis for the denial of future license, certificate, registration, or other applications, or for the refusal to renew the same; for the suspension, revocation, or conditioning of a license, certificate, or registration issued by the Division or other state agencies; and/or for any other reason provided for in law.
6. Respondent understands that this Consent Order is a public record.
7. Respondent has read and fully understands the terms of this Consent Order, freely and voluntarily consents to the entry of this Consent Order without any force or duress, and expressly waives all rights to hearing or judicial review in this matter.
8. Respondent understands that, upon signature of all parties, this Consent Order will be a Final Order.

_____ It is so agreed this 28 day of February, 2025.
Hector Tapia De Los Santos dba Emmanuel Services

_____for It is so agreed this ____ day of _____, 2025.
Chair
State Plumbing Board
State of Oregon

BEFORE THE STATE PLUMBING BOARD OF THE STATE OF OREGON

IN THE MATTER OF:	**CONSENT ORDER**
MALMEDAL ENTERPRISES, INC. **A DOMESTIC BUSINESS CORPORATION,**	
RESPONDENT.	**BCD CASE C2024-0130**

INTRODUCTION

The Building Codes Division ("Division") conducted an investigation on behalf of the State Plumbing Board of the State of Oregon ("Board") and determined that Malmedal Enterprises, Inc. ("Respondent") violated certain provisions of the Division's statutes and administrative rules as identified below.

The parties agree to resolve this matter without a hearing. Respondent understands that Respondent has the right to a contested case hearing under the Administrative Procedures Act, Oregon Revised Statutes ("ORS") chapter 183, and Respondent fully and finally waives the right to a hearing and any judicial review therefrom by the signing of this Consent Order.

FINDINGS OF FACT

1. On or about September 12, 2000, Respondent registered with the Oregon Secretary of State ("SOS") as a domestic business corporation.
2. At all relevant times, Kris Malmedal, was registered with the SOS as Respondent's president.
3. Since on or about October 11, 1994, Respondent has been licensed with the Oregon Construction Contractors Board.
4. Respondent has held Oregon plumbing contractor license number 34-276PB with the Division since on or about November 30, 2005.

5. At all relevant times, Parker Viner ("Viner")[1] was employed as a laborer by Respondent.
6. On or about June 21, 2024, Viner, on behalf of Respondent, installed a 90 degree fitting and an expansion ring onto the PEX waterline at a property located at 12795 Southwest Trask Street in Beaverton, Oregon ("property").
7. At no relevant time did Viner hold an Oregon journeyman plumber license.

APPLICABLE LAW

1. Definitions for terms used in this Consent Order may be found in ORS 183.310, ORS 447.010, ORS 455.010, ORS 693.010, Oregon Administrative Rule ("OAR") 918-001-0005, OAR 918-030-0010, and OAR 918-690-0420.
2. Under ORS 447.010(6), plumbing is defined as the art of installing, altering, or repairing pipes, fixtures, and other apparatus for bringing in the water supply and removing liquid and water-carried waste.
3. Under ORS 693.030(1), a person may not engage in the trade of journeyman plumber without a journeyman plumber license.
4. Under ORS 693.030(2)(a), a licensed plumbing contractor or a person required under ORS 447.010 to 447.156 to be licensed as a plumbing contractor may not permit or suffer any person to work as a journeyman plumber who does not hold a valid journeyman plumber license.

CONCLUSIONS OF LAW

1. Installing a 90 degree fitting and an expansion ring onto PEX waterlines constitutes plumbing under ORS 447.010(6).
2. By performing plumbing the foregoing plumbing installations at the property, without a journeyman plumber license, Viner violated ORS 693.030(1).

[1] See related Division case C2024-0131 against Viner.

3. As a licensed plumbing contractor, by permitting or suffering Viner to perform the aforementioned plumbing installations at the property on its behalf, Respondent violated ORS 693.030(2)(a).

ORDER

1. The Board hereby assesses a total civil penalty of $2,000.00 against Respondent for violating ORS 693.030(2)(a) as follows:
   a. $1,500.00 of the total civil penalty will be suspended for a period of five years if there is compliance with all other terms of this Consent Order.
   b. Respondent agrees to pay the remaining $500.00 of the civil penalty in a lump sum payment. Respondent's payment must be received no later than the 25th day of the month following the month in which this Consent Order is signed by both parties*(An invoice may be provided to Respondent after this Consent Order is signed by both parties. Respondent understands timely payments must be made even if no invoice is ever received.)* Checks should be made out to the Department of Consumer and Business Services. **Payment shall be mailed to Department of Consumer and Business Services, Fiscal Services Section, P.O. Box 14610, Salem, OR 97309-0445. For payment questions and credit card payments call 503-947-7891.**

      NOTE: If you fail to make your lump sum payment as stated in this signed Consent Order, this account may be assigned to the Department of Justice, Department of Revenue, or a private collection agency. You will be responsible for any court costs, attorney fees, any other necessary fees related to the collection of this debt, and any interest or penalties accrued. This debt may also appear on future credit reports.
   c. Respondent understands the suspended civil penalty ($1,500.00) will be considered satisfied five years after this Consent Order becomes a final order, provided Respondent complies with its terms and has not committed any further violations of the Division's statutes and rules within that five-year period. Respondent understands and agrees that upon a showing that Respondent has not complied with

the terms of this Consent Order or that Respondent has committed any further violations of the Division's statutes or rules within the five-year period, the entire civil penalty, including any suspended amount, will become due and payable. Failure to comply with this Consent Order includes, but is not limited to, failure to pay the civil penalty amount due by the due date.

2. Respondent agrees to fully cooperate with the Division's enforcement efforts in other cases that rely on the facts underlying this case. Cooperation may include, but may not be limited to, making sworn statements or testifying in administrative hearings.
3. Respondent understands that further enforcement action may be taken for any violation of the Division's statutes or rules not alleged in this Consent Order, whether committed before or after the execution of this Consent Order, and for any violation of the terms of this Consent Order.
4. Respondent understands that failure to comply with this Consent Order may be used as a basis for the denial of future license, certificate, registration, or other applications, or for the refusal to renew the same; for the suspension, revocation, or conditioning of a license, certificate, or registration issued by the Division or other state agencies; and/or for any other reason provided for in law.
5. Respondent understands that this Consent Order is a public record.
6. Respondent has read and fully understands the terms of this Consent Order, freely and voluntarily consents to the entry of this Consent Order without any force or duress, and expressly waives all rights to hearing or judicial review in this matter.

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7. Respondent understands that, upon signature of all parties, this Consent Order will be a Final Order.

Kris Malmedal It is so agreed this 1st day of April, 2025.
Kris Malmedal
on behalf of Malmedal Enterprises, Inc.

_____for It is so agreed this ____ day of _____, 2025.
Chair
State Plumbing Board
State of Oregon

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BEFORE THE STATE PLUMBING BOARD OF THE STATE OF OREGON

IN THE MATTER OF: **PARKER VINER** **AN INDIVIDUAL,** **RESPONDENT.**	**CONSENT ORDER** **BCD CASE C2024-0131**

INTRODUCTION

The Building Codes Division ("Division") conducted an investigation on behalf of the State Plumbing Board of the State of Oregon ("Board") and determined that Parker Viner ("Respondent") violated certain provisions of the Division's statutes and administrative rules as identified below.

The parties agree to resolve this matter without a hearing. Respondent understands that Respondent has the right to a contested case hearing under the Administrative Procedures Act, Oregon Revised Statutes ("ORS") chapter 183, and Respondent fully and finally waives the right to a hearing and any judicial review therefrom by the signing of this Consent Order.

FINDINGS OF FACT

1. On or about September 12, 2000, Malmedal Enterprises, Inc.("Malmedal")[1] registered with the Oregon Secretary of State as a domestic business corporation.
2. Malmedal has held Oregon plumbing contractor license number 34-276PB with the Division since on or about November 30, 2005.
3. At all relevant times, Respondent was employed as a laborer by Malmedal.
4. On or about June 21, 2024, Respondent, on behalf of Malmedal, installed a 90 degree fitting and an expansion ring onto the PEX waterline at a property located at 12795 Southwest Trask Street in Beaverton, Oregon ("property").

[1] See related Division case C2024-0130 against Malmedal.

5. At no relevant time did Respondent hold an Oregon journeyman plumber license.

APPLICABLE LAW

1. Definitions for terms used in this Consent Order may be found in ORS 183.310, ORS 447.010, ORS 455.010, ORS 693.010, Oregon Administrative Rule ("OAR") 918-001-0005, OAR 918-030-0010, and OAR 918-690-0420.
2. Under ORS 447.010(6), plumbing is defined as the art of installing, altering, or repairing pipes, fixtures, and other apparatus for bringing in the water supply and removing liquid and water-carried waste.
3. Under ORS 693.030(1), a person may not engage in the trade of journeyman plumber without a journeyman plumber license.

CONCLUSIONS OF LAW

1. Installing a 90 degree fitting and an expansion ring onto PEX waterlines constitutes plumbing under ORS 447.010(6).
2. By performing plumbing the foregoing plumbing installations at the property, without a journeyman plumber license, Respondent violated ORS 693.030(1).

ORDER

1. The Board hereby assesses a total civil penalty of $2,000.00 against Respondent for violating ORS 693.030(1) as follows:
    a. $1,500.00 of the total civil penalty will be suspended for a period of five years if there is compliance with all other terms of this Consent Order.
    b. Respondent agrees to pay the remaining $500.00 of the civil penalty in a lump sum payment. Respondent's payment must be received no later than the 25th day of the month following the month in which this Consent Order is signed by both parties*(An invoice may be provided to Respondent after this Consent Order is signed by both parties. Respondent understands timely payments must be made even if no invoice is*

ever received.) Checks should be made out to the Department of Consumer and Business Services. **Payment shall be mailed to Department of Consumer and Business Services, Fiscal Services Section, P.O. Box 14610, Salem, OR 97309-0445. For payment questions and credit card payments call 503-947-7891.**

NOTE: If you fail to make your lump sum payment as stated in this signed Consent Order, this account may be assigned to the Department of Justice, Department of Revenue, or a private collection agency. You will be responsible for any court costs, attorney fees, any other necessary fees related to the collection of this debt, and any interest or penalties accrued. This debt may also appear on future credit reports.

c. Respondent understands the suspended civil penalty ($1,500.00) will be considered satisfied five years after this Consent Order becomes a final order, provided Respondent complies with its terms and has not committed any further violations of the Division's statutes and rules within that five-year period. Respondent understands and agrees that upon a showing that Respondent has not complied with the terms of this Consent Order or that Respondent has committed any further violations of the Division's statutes or rules within the five-year period, the entire civil penalty, including any suspended amount, will become due and payable. Failure to comply with this Consent Order includes, but is not limited to, failure to pay the civil penalty amount due by the due date.

2. Respondent agrees to fully cooperate with the Division's enforcement efforts in other cases that rely on the facts underlying this case. Cooperation may include, but may not be limited to, making sworn statements or testifying in administrative hearings.
3. Respondent understands that further enforcement action may be taken for any violation of the Division's statutes or rules not alleged in this Consent Order, whether committed before or after the execution of this Consent Order, and for any violation of the terms of this Consent Order.
4. Respondent understands that failure to comply with this Consent Order may be used as a

basis for the denial of future license, certificate, registration, or other applications, or for the refusal to renew the same; for the suspension, revocation, or conditioning of a license, certificate, or registration issued by the Division or other state agencies; and/or for any other reason provided for in law.

5. Respondent understands that this Consent Order is a public record.
6. Respondent has read and fully understands the terms of this Consent Order, freely and voluntarily consents to the entry of this Consent Order without any force or duress, and expressly waives all rights to hearing or judicial review in this matter.
7. Respondent understands that, upon signature of all parties, this Consent Order will be a Final Order.

_____ It is so agreed this 1st day of April, 2025.
Parker Viner

_____for It is so agreed this ____ day of _____, 2025.
Chair
State Plumbing Board
State of Oregon

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Agenda Item III.C.

Plumbing Board Report for April 17, 2025

Summary Report of Final Orders by Default							
Case #	**Name**	**Violation relating to Plumbing Board**	**Location**	**Date of Violation**	**Civil Penalty**		**Other**
C2023-0161	NW Sundance Services, Inc.	Replacement of an extendable hose on a kitchen faucet. ● Permitted or suffered an unlicensed person to perform work as a journeyman plumber.	Grants Pass	August 2023	Assessed:	$2,000	
C2024-0050	Atlas Plumbing LLC	Installed water supply and waste lines. ● Permitted or suffered an unlicensed person to perform work as a journeyman plumber.	Hillsboro	March 2024	Assessed:	$2,000	
C2024-0098	Lawrence Marvin Dalton	Installed two exterior hose bib water faucets. ● No plumbing contractor's license. ● No journeyman plumber's license.	Newport	September 2023	Assessed:	$5,000	Respondent has a related electrical case. See Division case C2023-0192.
C2024-0140	Tapani Inc.	Installed potable water lines. ● Permitted or suffered an unlicensed person to perform work as a journeyman plumber.	Wilsonville	July 2024	Assessed:	$2,000	

Summary Report of Final Orders by Default							
Case #	**Name**	**Violation relating to Plumbing Board**	**Location**	**Date of Violation**	**Civil Penalty**		**Other**
C2024-0157	Lad Uskoski	Installed potable water lines. ● Procured or assisted an unlicensed person to perform plumbing installations.	Wilsonville	July 2024	Assessed:	$2,000	
C2024-0158	Preston Bentley	Installed potable water lines. ● No journeyman plumber license.	Wilsonville	July 2024	Assessed	$2,000	
C2024-0187	Spencer Kirby	Installed water supply and waste lines. ● No journeyman plumber license.	Hillsboro	March 2024	Assessed:	$2,000	

Agenda Item VII.

State of Oregon **Board memo**

Building Codes Division **April 17, 2025**

To: State Plumbing Board

From: Pierre Sabagh, policy analyst, Policy and Technical Services

Subject: Water Treatment Installer Program

Action requested:
State Plumbing Board consideration of external request from Duo Water Systems for their Water Treatment Installer Program under OAR 918-695-0100.

Background:
OAR 918-695-0100 defines requirements and procedures for submitting training proposals for limited specialty plumbers. Duo Water Systems is requesting that the board review and approve their in-house training curriculum for water treatment installers. If approved, a trainee would be able to sit for the state water treatment installer test once they have completed the program. Aden Aerni with Duo Water Systems is present to give a presentation to the board about their in-house water treatment installer program.

A motion will be needed to approve, amend, or deny the external request from Duo Water Systems, examples of which are below.

Options:

- Approve Duo Water Systems water treatment installer program under OAR 918-695-0100.
- Amend and approve Duo Water Systems water treatment installer program under OAR 918-695-0100.
- Disapprove Duo Water Systems water treatment installer program.

Duo Water Systems

Elevate Academy

Duration: 18-24 months
Structure: 9 Chapters (i.e. 1 Chapter per 2 months)
Format: Weekly class sessions (minimum 1 class per week and depending on the section, 2 classes per week). This is in order to meet/exceed the minimum required 210 hours in *General Items* and teach in depth other specific training aspects. Each class would be designed for a 2-3 hour duration. Homework assignments and hands-on training within a 30-40hr work week.
Training Materials: Estimated sourcing: 50% OSPC, 10% WQA, 10% OHA, 10% OWRD, and 20% Duo Water Systems Textbook (outlined below).
Assessments: End-of-Chapter quizzes, hands on tests, and final assessment.
Certifications: General first aid, CPR, and AED certification. A backflow and cross connection prevention license is not required but is a bonus.
Instructor Criteria: A licensed WTI or Journeyman Plumber. Should also have a current CPR certification.
Field Trainer Criteria: Should match the criteria required of an instructor.

Field Hours Tracking Procedure

Filed Workday Hours - January

Minimum Total Hours Required	Category	Hours Collected to Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	Hours Brought Forward	Total Hours
(A) General Items - These hours may overlap specific training categories.	Field hours in addition to the required 210 total hours covered in class																									0
100	Boom Truck or Pul-a-Pump Operation																									0
200	Media Extraction/ Maintenance																									0
200	Water Testing																									0
1000	PVC, CPVC, ABS, Galvanized, Copper, Stainless, Brass, and Pex Plumbing																									0
300	Pump/Motor System Design																									0
(B) Specific Training	Mostly in field training but also covered in class sessions																									0
(i) 250	Indirect Waste Piping (sump pump drain or water treatment backwash)																									0
(ii) 500	Pressure Tank Install/ Replacement																									0
(ii) 300	Water Line Install/ Replacement																									0
(ii) 200	Valves, Meters, and Misc. Install/Replacement																									0
(iii) 100	Pipe Sizing for Well/ Municipal Pump Install/ Replacement																									0
(iv) 100	Fixture Unit Calculations for Filtration, Pump, and Pipe Sizing																									0
(v) 200	Pump System Install/ Replacement																									0
(vi) 100	Create and Bid System Design																									0
(vii) 1750	Water Treatment Installation/Replacement/ Maintenance																									0
(viii)	Approved Backflow Installation/Replacement																									0
(ix)	Air Gap Installation for Reliefs and Indirect Waste																									0
																									Collective Total =	0

Info

Trainee Name	Aden Aerni
Start Date	xx/xx/xxxx
Current Date	xx/xx/xxxx
Trainee Signature	–––––
Instructor Signature	–––––

Covered in Class Sessions

210 Minimum Total Hours Required	General Items	Specific Training
	Types of tools	Indirect waste piping
	Industry specific equipment	Water supply, services, and appurtenances
	Material types , brands, and construction	Fixture unit calculations, pipe, and pump sizing
	Pump sizing	Pump system design, best practices, and process
	Motor sizing	Types of water treatment, minerals, chemicals, bacteria
	Understanding aquifers and other water sources	Water Treatment system design, best practices, and process
	Standard principles and formulas	Water treatment maintenance
	CPR, AED, and first aid	Types of backflow assemblies and cross connection prevention
	Safety regulations overview	
	Safety regulations in plumbing	
	Safety regulations in electrical	
	Electrical codes	
	Plumbing codes	
	Pipe sizing, fixture mapping, and blueprint interpretation	
	Components of municipal systems	
	Components of well systems	
	Direct/indirect waste piping overview	

Description of Implementation

This program will be designed with a minimum schedule of one day a week class time led by an already certified instructor. Class time is meant to create a planned and controlled environment. The textbook is written with nine chapters and eight individual sections per chapter. It is structured in a way to give the trainee an overview of what will be the focus of that week's lessons and hands-on training. Each section of each chapter will normally take about one week to get through. Some will be slightly shorter, others are expected to take longer. This is to allow room for questions, input, and to create easily digestible information. As the course progresses, each section compounds and expands more in depth on the previous sections and chapters.

Outside of class time the trainees are expected to work a standard 30-40 hour work week. They will actively keep track of the hours worked and in which category they were collected. During this field work, they will accompany a certified technician and actively implement what they've learned through homework and class time with hands-on practice. All hours will meet or exceed the existing minimum requirement to sit for the water treatment installer exam.

At the completion of each chapter, a written quiz and hands-on scenario will be given to each trainee. These will test academic knowledge and physical ability to perform different aspects of pumps, water treatment, and plumbing techniques. Before moving on to the next chapter and section of the curriculum, a certified technician must approve their results.

During regular work hours and throughout class training, this textbook will not be the only resource available. Resources such as Oregon code books, readily available manuals, product specific charts, explanatory videos, seminars/workshops, guest speakers, and possible industry specific shows (i.e. the National Groundwater Show) will be provided and/or recommended.

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Chapter 1: Foundations of Water Systems (Months 1-2)

1.1 Hydrology & Groundwater Basics

Understanding the hydrologic cycle is fundamental for managing water resources effectively. The cycle begins with evaporation, where water vapor rises into the atmosphere. Condensation follows, forming clouds that eventually lead to precipitation, replenishing surface water bodies and groundwater systems. Upon reaching the ground, precipitation infiltrates the soil, contributing to groundwater recharge, or flows overland to rivers, lakes, and oceans as runoff. Groundwater, accumulating beneath the surface in aquifers, is a critical freshwater resource, supplying households, agriculture, and industry. Aquifers vary in characteristics, categorized primarily as confined or unconfined. Confined aquifers, sandwiched between impermeable layers, often contain water under pressure, creating artesian conditions. Conversely, unconfined aquifers are directly open to infiltration from the surface. Recharge areas, where water enters an aquifer, and discharge areas, where water exits, significantly influence groundwater availability, necessitating careful assessment for sustainable water management.

1.2 Well Types & Construction

Wells serve various purposes, from residential water supply to large-scale industrial and agricultural applications. Residential wells typically provide drinking water to individual households, requiring modest flow rates and simpler construction. Commercial and industrial wells, however, must deliver higher volumes reliably, demanding robust construction standards and deeper drilling to access ample water sources. Community wells supply multiple households or small communities and require careful consideration of both volume and regulatory compliance. Well construction involves critical steps, including selecting the appropriate drilling method—such as rotary drilling, cable tool drilling, or air percussion drilling—based on geological conditions and water requirements. Essential components like casing protect the well structure from collapse, while screens and gravel packs enhance water entry and filtration. Proper well development, through procedures like surging and jetting, maximizes yield, improves water quality, and prolongs the well's productive lifespan.

1.3 Water Movement & Flow Dynamics

Effective water system management requires understanding how water moves underground and interacts with wells. Static water level—the depth to groundwater without pumping—and pumping water level—the level during active water withdrawal—indicate aquifer responsiveness and sustainability. The difference between

these levels, known as drawdown, and the subsequent recovery rates, are key metrics of aquifer productivity and health. Aquifers may exhibit artesian conditions, where groundwater rises naturally above the aquifer's top due to geological pressure. Numerous factors, including geology, seasonal variations, and human activities, influence well yield. Comprehensive aquifer tests help identify sustainable extraction rates, inform well placement, and guide water management practices to ensure reliable and long-term water supply.

1.4 Municipal & Community Water Systems

Municipal water systems deliver water to large populations, requiring complex infrastructure and stringent compliance with health regulations. Water treatment plants remove contaminants and pathogens, ensuring water safety and quality before storage and distribution. Infrastructure components such as water towers maintain pressure within distribution networks, booster stations manage flow across varying elevations, and extensive pipelines transport water efficiently to end-users. In contrast, community water systems serve smaller populations, necessitating tailored designs that balance scale, cost-efficiency, and regulatory compliance. Differences between municipal and community systems include scale, infrastructure complexity, management requirements, and regulatory oversight. Effective operation and maintenance ensure reliability, safety, and regulatory adherence, essential for public health protection.

1.5 Understanding Plumbing & Blueprint Reading

Mastering blueprint interpretation is crucial for water system technicians, enabling accurate installation, maintenance, and troubleshooting. Blueprints illustrate the layout of plumbing systems, indicating pipe routes, fixture locations, and equipment placements through standardized symbols and scales. Understanding these symbols and scales allows technicians to precisely estimate materials, labor requirements, and project timelines. Calculating fixture unit loads ensures adequate sizing of pipes to accommodate water demand without compromising pressure or flow efficiency. Proper pipe sizing avoids issues such as excessive pressure loss, insufficient flow, or system noise, promoting smooth operation and longevity of the plumbing system. Technicians proficient in blueprint reading can diagnose issues efficiently, execute installations accurately, and communicate effectively across project teams.

1.6 Basic Water Quality & Testing

Water quality testing identifies various contaminants, ensuring water safety and compliance with health standards. Common contaminants include minerals such as iron, manganese, hardness-causing calcium and magnesium, arsenic, nitrates, bacteria, and sulfur compounds. Each contaminant impacts water usability differently,

necessitating targeted treatment methods. For instance, excessive iron and manganese cause staining, hardness leads to scale buildup, and nitrates pose health risks. Measuring parameters such as pH, total dissolved solids (TDS), and conductivity provides insights into water's chemical characteristics, guiding appropriate treatment methods. Accurate water sampling is critical; improper sampling can yield inaccurate diagnoses and ineffective treatments. Technicians trained in proper sampling procedures can ensure reliable laboratory results, effective treatment planning, and consistent water quality.

1.7 Introduction to Plumbing Code

Compliance with plumbing codes, such as the Oregon Plumbing Code, is essential for safe, reliable, and lawful water system installations. Plumbing codes specify rules governing pipe sizing, ensuring adequate water pressure and flow for residential, commercial, and industrial applications. Pipe diameter, fixture loads, and pipe routing must meet specific standards to avoid system malfunctions, pressure loss, or contamination risks. Cross-connection control and backflow prevention measures safeguard potable water supplies from contamination through unintended reversal of flow. Drain and vent sizing ensures efficient wastewater removal and proper ventilation of plumbing systems. Technicians knowledgeable in plumbing codes ensure regulatory compliance, system safety, and optimal operational efficiency, reducing liability and promoting public health.

1.8 Introduction to Electrical Code

Adherence to electrical codes, particularly the Oregon Electrical Code, is vital for safely operating pump and water treatment systems. Electrical systems in water applications require precise installation, involving correct wire sizing, protective components such as circuit breakers or fuses, and grounding and bonding practices. Proper grounding protects against electrical shock and equipment damage, especially in wet environments typical of water systems. Differentiating between single-phase and three-phase systems, and understanding the appropriate use of 120V versus 240V power supplies, ensures correct equipment performance and efficiency. Compliance with electrical standards minimizes safety hazards, reduces the risk of equipment failure, and ensures reliability and safety for users and technicians alike.

Chapter 2: Water Treatment Fundamentals (Months 3-4)

2.1 Water Treatment System Overview

Water treatment systems are designed to enhance water quality by removing contaminants that may pose health risks or negatively affect taste and odor. Whole-house systems treat all water entering a residence, typically addressing hardness, sediment, chlorine, iron, manganese, and bacteria. These systems often use filters, water softeners, and disinfection methods like UV lights or chemical injection. Point-of-use (POU) systems are installed at specific fixtures, such as kitchen sinks or showers, targeting contaminants like chlorine, heavy metals, and specific chemical pollutants. Well water often requires comprehensive treatment for contaminants like iron, manganese, arsenic, sulfur odors, bacteria, and hardness, whereas city water commonly needs chlorine reduction and taste improvement. Treatment system selection should comply with NSF/ANSI standards, ensuring performance and safety as defined by EPA regulations.

2.2 Water Contaminants & Chemistry

Water contaminants originate from natural geological processes, agricultural runoff, industrial activity, and plumbing corrosion. Common contaminants include arsenic, causing severe health issues; nitrates, primarily harmful to infants causing methemoglobinemia (blue baby syndrome); fluoride, beneficial in small amounts but harmful at higher concentrations; and lead and mercury, causing neurological damage. Microbiological contaminants like E. coli and coliform bacteria indicate fecal contamination and present severe gastrointestinal health risks. Chemical processes used in treating these contaminants include oxidation (transforming dissolved iron and manganese to a particulate form), ion exchange (removal of hardness and some metals), and adsorption (activated carbon removing organic compounds and chlorine). Detailed water testing is essential to select appropriate treatments effectively.

2.3 Filtration & Sediment Control

Filtration systems remove suspended solids and particulates from water. Filters are categorized by micron ratings, where smaller micron ratings capture finer particles. For instance, a 5-micron filter effectively removes sand and rust, while a 0.5-micron filter addresses cysts and certain bacteria. Media filters, such as sand or activated carbon filters, remove chlorine, sediment, and organic compounds. Backwashing filters periodically reverse water flow to cleanse accumulated sediment, extending filter life and maintaining flow rates. Cartridge filters, however, require periodic replacement but

offer simplicity and lower upfront costs. Proper sizing based on water flow rates (gallons per minute) and the nature of the contaminants ensures optimal filtration performance.

2.4 Water Softeners & Ion Exchange

Water softeners remove hardness (calcium and magnesium ions) through ion exchange, significantly reducing scale buildup on plumbing fixtures and appliances. Inside softeners, resin beads loaded with sodium ions exchange sodium for hardness minerals, effectively softening water. Salt-based softeners provide reliable hardness removal, while salt-free conditioners (crystallization systems) do not remove hardness minerals but prevent them from forming scale. Regeneration cycles are crucial, periodically replenishing sodium ions in the resin. Correctly sizing water softeners involves calculating household water use and hardness levels (measured in grains per gallon), ensuring effective and economical operation.

2.5 Reverse Osmosis & Membrane Filtration

Reverse Osmosis (RO) systems use semipermeable membranes that remove dissolved contaminants by applying pressure to force water through the membrane, leaving contaminants behind. RO effectively reduces total dissolved solids (TDS), nitrates, heavy metals (lead, mercury, arsenic), and fluoride. RO systems generally include multiple filtration stages—sediment pre-filters, carbon pre-filters, an RO membrane, and post-carbon filters—to enhance purity and taste. Maintenance involves regularly replacing pre- and post-filters (every 6-12 months) and membranes (every 2-4 years), ensuring high-quality drinking water. Troubleshooting common issues like low water output or reduced water quality often involves checking membrane integrity, system pressure, and storage tank conditions.

2.6 Chemical Injection & Disinfection

Chemical injection systems introduce precise chemical doses to address specific water problems. Chlorination systems effectively disinfect water by neutralizing pathogens like bacteria and viruses through oxidation, making water microbiologically safe. Hydrogen peroxide and ozone systems provide alternative methods, breaking down organic contaminants without leaving chemical residues, improving water taste and safety. pH adjustment systems and acid neutralizers correct corrosive water conditions (low pH), protecting plumbing from damage. Proper installation involves ensuring accurate chemical dosing, continuous monitoring, and maintenance to achieve consistent water treatment outcomes, particularly when handling hazardous chemicals like chlorine and acid solutions.

2.7 UV Purification & Advanced Filtration

Ultraviolet (UV) purification systems disinfect water by exposing pathogens to UV light at a specific wavelength (254 nm), effectively damaging microorganism DNA and rendering them harmless. Proper UV system sizing matches required water flow rates (gallons per minute) to ensure sufficient UV exposure. Pre-filtration is critical, as turbidity and sediment can shield pathogens from UV light. Advanced filtration methods, including ultrafiltration (UF), remove fine suspended particles, bacteria, and viruses, while nanofiltration (NF) selectively removes dissolved solids, hardness, and some organic compounds. Routine UV maintenance includes replacing UV lamps annually, cleaning quartz sleeves regularly, and verifying UV intensity for optimal disinfection performance.

2.8 Code Compliance & Water Treatment Standards

Water treatment installations must comply with state-specific standards and codes designed to protect public health and ensure safe, effective systems. Oregon regulations outline requirements for system sizing, proper backflow prevention to avoid contamination risks, and standards for materials and equipment (NSF/ANSI certified). Installation best practices include correct pipe sizing, adequate system venting, proper drain connections, and adherence to electrical safety guidelines, ensuring optimal functionality and safety. Maintaining comprehensive records—covering system design, installation specifics, maintenance schedules, and water testing results—facilitates compliance with regulatory inspections and demonstrates professionalism, accountability, and due diligence.

Chapter 3: Advanced Pump & Well System Design (Months 5-6)

3.1 Well & Booster Pump Systems

Well and booster pump systems play vital roles in delivering water effectively from the source to the point of use. Jet pumps, typically used for shallow wells (less than 25 feet), employ suction to draw water, making them suitable for limited residential applications. Submersible pumps, installed within the well below water level, efficiently push water to the surface, ideal for deeper wells. Centrifugal pumps move water using rotational force, commonly applied in surface-mounted applications. Booster pumps enhance water pressure in systems where existing pressure is insufficient. Proper pump sizing involves calculating total dynamic head (TDH) and required flow rate (GPM), ensuring adequate water delivery and system efficiency.

3.2 VFD vs. Conventional Pumps

Variable Frequency Drives (VFDs) offer significant benefits over conventional pumps by adjusting pump speed to match water demand precisely. This capability reduces energy consumption, operational costs, and equipment wear. VFDs are particularly beneficial in water treatment applications where consistent water pressure is essential for accurate chemical dosing, such as chlorination or pH control, enhancing treatment effectiveness and reducing chemical waste. Additionally, VFDs minimize pump cycling, reducing maintenance costs and prolonging equipment lifespan. Conventional pumps operate at fixed speeds, are simpler, and initially less costly but offer limited control over pressure and flow, leading to energy inefficiencies and increased maintenance due to frequent cycling. Choosing between VFD and conventional systems depends on system complexity, energy efficiency goals, accuracy of water treatment requirements, and operational reliability.

3.3 Municipal & Community Water System Pumping

Pumping systems for municipal and community water supplies must reliably deliver water at consistent pressures and volumes, requiring careful system design. High-pressure pumping systems, including vertical turbine pumps and booster stations, ensure water reaches distant or elevated locations. Fire protection pumps must meet stringent pressure and flow criteria for emergency use, often requiring dedicated pumps with separate power sources. Pressure zones in distribution networks, defined by elevation differences and geographic distances, require precise pump sizing and system configuration. Adequate redundancy, backup power systems, and comprehensive maintenance schedules ensure uninterrupted water service, essential for community safety and health.

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3.4 Pipe & Drain Sizing

Accurate pipe and drain sizing is critical to effective pump system operation, minimizing energy loss and ensuring sufficient water flow. Calculating total dynamic head (TDH)—the total vertical distance, friction losses, and pressure requirements—guides proper pump selection. Pipe friction loss, determined by pipe diameter, length, material type, and flow velocity, significantly impacts system efficiency. Selecting appropriately sized pipes reduces friction losses, lowers pumping costs, and extends equipment life. Drain sizing, specifically referring to stormwater, effluent, or non-potable pump systems, involves ensuring pipes can handle system discharge effectively. Properly sized drainage systems prevent flooding, backflow, or other drainage issues during the operation and maintenance of stormwater, sump, or wastewater pumps.

3.5 Stormwater & Sump Pump Systems

Stormwater and sump pump systems manage groundwater and surface water runoff, protecting buildings from water damage. Submersible sump pumps remove accumulated water from basements or low areas, typically equipped with float switches that automatically activate pumps based on water levels. Pedestal sump pumps, easier to maintain, offer effective solutions for less severe flooding risks. Proper sump pit design and installation prevent clogging and maximize pump efficiency. Regular inspections and maintenance, including pump cleaning and testing float switches, ensure reliability. Stormwater drainage systems, incorporating properly sized pipes, basins, and discharge points, divert water safely away from structures and foundations.

3.6 Specialty Pumps & Controls

Specialty pumps and controls address specific applications and demanding operational requirements. High-capacity industrial pumps handle large-scale water delivery or wastewater management, often featuring robust construction and specialized materials for corrosion and abrasion resistance. Booster pump control panels integrate electrical and mechanical components, including pressure sensors, variable frequency drives, and protective devices, optimizing system performance and safety. Smart controllers incorporate automation, remote monitoring, and diagnostic capabilities, enabling precise management of pump operation, reducing downtime, and enhancing energy efficiency. Selecting suitable specialty pumps and advanced control systems requires thorough understanding of application requirements, operating environments, and desired performance outcomes.

3.7 Energy Efficiency in Pump Systems

Improving energy efficiency in pumping systems reduces operational costs, minimizes environmental impact, and enhances system sustainability. Selecting energy-efficient motors, specifically premium-efficiency motors, significantly lowers electrical consumption. Evaluating pump curves—graphical representations of flow rate, pressure (head), and efficiency—facilitates choosing pumps operating at optimal efficiency points. Variable Frequency Drives (VFDs) offer substantial energy savings by matching pump output to real-time demand, minimizing wasted energy from unnecessary pumping. Proper pump sizing avoids oversizing issues, preventing excess energy use and reducing wear and tear. Conducting energy audits identifies inefficiencies, informing practical solutions for municipal and commercial pump systems, achieving substantial long-term energy savings.

3.8 Regulatory Considerations for Pump Systems

Pump system installations must adhere to stringent safety and regulatory requirements to ensure public safety and environmental protection. OSHA standards specify safety

protocols for handling electrical and mechanical equipment during installation, maintenance, and operation, minimizing risk to technicians and users. Compliance with the National Electrical Code (NEC) ensures safe electrical wiring, grounding, and equipment usage, critical for wet environments typical in pump installations. State licensing requirements mandate qualified personnel oversee installations, ensuring professional competence and regulatory adherence. Regulations governing backflow prevention and cross-connection control protect potable water systems from contamination. Environmental regulations oversee water withdrawal volumes and discharge quality, safeguarding natural water resources. Meticulous documentation, record-keeping, and regular inspections demonstrate compliance, accountability, and professional diligence.

Chapter 4: Electrical Systems for Pump Systems (Months 7-8)

4.1 Electrical Basics for Pump Systems

Understanding basic electrical concepts is crucial for pump system technicians. Electrical systems for pump installations typically operate on alternating current (AC), suitable for running pumps and motors, whereas direct current (DC) is commonly used in control circuits or solar-powered pump applications. Single-phase systems, typically utilizing two-wire setups, often serve smaller residential pumps and related equipment. Three-phase systems traditionally serve larger commercial or industrial pump installations due to their efficiency and smooth motor operation. However, advancements in Variable Frequency Drive (VFD) technology now allow residential customers to use single-phase input power converted to three-phase output, especially advantageous for residential submersible pump applications. Fundamental electrical terminology includes volts (electric potential), amperes (current flow), watts (power consumption), and ohms (resistance), essential knowledge for accurate installation, maintenance, and troubleshooting of pump systems.

4.2 Motor Controls & Power Distribution

Effective motor control and power distribution are essential for reliable pump operation. Common electric motor types used in pump applications include induction motors, known for durability and reliability; synchronous motors, which maintain constant speed under varying loads; and permanent magnet motors, valued for their efficiency. Motor controls, such as contactors and relays, remotely manage pump operations, automatically starting and stopping pumps based on system demands. Circuit breakers and fuses protect motors and equipment by preventing overloads and short circuits.

Organized power distribution with clearly labeled panels and wiring diagrams simplifies maintenance, troubleshooting, and ensures safe, efficient pump system operation.

4.3 Megging & Ohming Motors

Regular motor testing through insulation resistance testing (megging) and resistance measurements (ohming) ensures reliability and longevity of pump motors. Megging involves applying high voltage to motor windings to detect insulation deterioration that may lead to premature motor failures. Technicians disconnect motors from power sources, measure insulation resistance values in megohms, and interpret these readings to gauge motor condition. Higher resistance values generally indicate healthy insulation. Ohming involves measuring winding resistance using an ohmmeter, identifying internal shorts or breaks within the motor windings. Regular testing allows early detection of motor issues, preventing unexpected downtime and costly replacements.

4.4 Troubleshooting Electrical Failures

Efficient troubleshooting of electrical failures in pump systems requires systematic procedures and specialized diagnostic tools. Common electrical problems encountered include motor overheating, frequent circuit breaker trips, incorrect voltage levels, phase imbalance, and grounding issues. Diagnostic instruments such as voltmeters, ammeters, clamp meters, and insulation testers enable accurate fault detection. Systematic circuit isolation, performed by disconnecting and individually testing each component, facilitates precise identification of faults. Familiarity with pump system wiring diagrams, motor specifications, and electrical standards significantly improves troubleshooting efficiency, reducing downtime and ensuring rapid restoration of operations.

4.5 Variable Frequency Drives (VFDs) & Control Panels

Variable Frequency Drives (VFDs) precisely control pump motor speed by adjusting electrical frequency and voltage, significantly enhancing pump performance and energy efficiency. Key benefits include reduced energy consumption, minimized mechanical stress, precise pressure management, and longer equipment lifespan. Programming VFDs involves configuring parameters such as frequency limits, acceleration and deceleration times, and protective settings to prevent motor overload or damage. Troubleshooting common VFD issues includes addressing overheating, incorrect parameter configurations, harmonics, and electromagnetic interference (EMI). Control panels incorporating VFDs should provide adequate cooling, grounding, and shielding to ensure optimal performance and reliability.

4.6 Generator Backup & Emergency Power Systems

Reliable generator backup systems ensure uninterrupted pump operation during electrical outages. Standby generators automatically activate during power interruptions, sustaining continuous pump performance. Automatic transfer switches safely transition between utility power and backup generators, preventing disruptions. Proper generator sizing considers startup currents, continuous load demands, and critical operational needs. Regular maintenance, such as battery checks, fuel management, load testing, and routine service, ensures generator reliability. Emergency power system designs should incorporate sufficient capacity, robust protective measures, and clearly defined operating procedures, ensuring consistent performance under outage conditions.

4.7 Electrical Code & Safety Compliance

Strict adherence to electrical codes, particularly the National Electrical Code (NEC), ensures safe and compliant pump system installations. NEC requirements cover wiring practices, grounding and bonding methods, labeling standards, and protective device applications. Overcurrent protections, including properly rated circuit breakers and fuses, prevent damage and hazardous conditions. Correct grounding methods safely redirect fault currents, protecting personnel and equipment from electrical shock hazards. Regular inspections ensure continuous compliance, reliability, and operational safety. Technicians must remain current with code revisions, adhere to best practices, and maintain detailed records to demonstrate compliance and promote safe pump operations.

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4.8 Municipal & Commercial Electrical Considerations

Municipal and commercial pump systems present specialized electrical considerations due to their complexity, scale, and critical operational requirements. High-capacity pump stations demand robust electrical infrastructures capable of consistently handling large power loads. Supervisory Control and Data Acquisition (SCADA) systems facilitate centralized monitoring and control, enabling efficient pump system management, rapid response to issues, and effective maintenance scheduling. Electrical safety measures, including comprehensive grounding, lightning protection, robust circuit protection, and reliable emergency power systems, ensure continuous, secure operations. Effective collaboration among engineers, installation technicians, operators, and regulatory personnel ensures compliant, efficient, and reliable municipal and commercial pump system installations.

Chapter 5: Plumbing & Code Compliance (Months 9-10)

5.1 Plumbing Code Overview

The Oregon Plumbing Specialty Code (OPSC) establishes essential standards for plumbing installations, emphasizing safety, reliability, and public health protection. Key sections include OPSC Chapter 1, covering administration and enforcement, and Chapter 3, detailing general regulations for materials, connections, and installation practices. Familiarity with these foundational guidelines helps ensure compliance and effective plumbing practices.

5.2 Backflow Prevention & Cross-Connection Control

Understanding backflow prevention and cross-connection control is vital for safeguarding potable water. Relevant regulations include OPSC Chapter 6, specifically Section 603, which addresses backflow prevention assemblies and required installations. Additionally, Oregon Administrative Rules (OAR) 333-061-0070 and OAR 333-061-0071 define cross-connection control requirements and standards for installing and maintaining backflow prevention devices. Knowledge of these guidelines helps identify potential hazards and promotes effective management of water safety.

5.3 Drainage & Wastewater Considerations

Proper drainage and wastewater management are regulated by OPSC Chapters 7, 8, and 11. Chapter 7 outlines sanitary drainage design and installation standards, Chapter 8 covers indirect waste requirements, and Chapter 11 provides guidelines for storm drainage management. Compliance with these codes ensures environmental protection, prevents system failures, and maintains effective wastewater handling.

5.4 Municipal & Commercial Plumbing

Municipal and commercial plumbing installations are guided by OPSC Chapter 4, detailing plumbing fixtures and fittings, and Chapter 6, covering water supply and distribution systems. These sections specify requirements for fixture quality, installation, system sizing, and pipe distribution methods. Proper adherence ensures plumbing reliability, regulatory compliance, and safe operations within large-scale or public water systems.

5.5 Pipe Materials & Fittings

Selecting appropriate pipe materials and fittings is guided by OPSC Chapters 6 and 7. Specifically, Sections 604 and 605 outline approved materials for water service and distribution piping, while Section 701.2 defines acceptable materials for drain, waste, and vent (DWV) systems. Understanding these requirements ensures material compatibility, system reliability, and compliance with plumbing standards.

5.6 Fixture Installation & Layout

Fixture installation and layout must comply with OPSC Chapter 4, which provides detailed standards on fixture spacing, load calculations, and accessibility. Accurate calculations for fixture demands and proper installation practices help ensure efficient water distribution, compliance with accessibility standards, and overall functionality of plumbing systems.

5.7 Code Compliance & Documentation

Maintaining compliance involves adherence to OPSC Chapter 1, specifically Section 103, which outlines the roles and responsibilities related to permitting, inspections, and enforcement by building officials. Accurate record-keeping, documentation of installations, inspections, and ongoing maintenance activities support compliance, facilitate effective inspections, and demonstrate accountability and transparency.

5.8 Customer Education on Plumbing Maintenance

Educating customers about plumbing maintenance aligns with OAR 333-061-0070, emphasizing cross-connection control and routine backflow prevention maintenance requirements. Informing customers about regular inspections, recognizing signs of plumbing issues, and adhering to preventive maintenance practices helps maintain system reliability, regulatory compliance, and customer satisfaction.

Chapter 6: Troubleshooting & Diagnostics (Months 11-12)

6.1 Pump System Failures

Diagnosing common pump system failures involves understanding typical symptoms and their causes. Issues such as insufficient water pressure, frequent cycling, or complete pump failure often stem from electrical problems, mechanical wear, improper sizing, or well-related factors. Technicians should systematically evaluate symptoms, starting with basic checks like power supply verification, pressure switch function, and tank condition, before progressing to detailed inspections of pump motors, impellers, and well conditions.

6.2 Water Treatment Equipment Issues

Identifying and troubleshooting water treatment equipment failures requires familiarity with equipment functionality and typical signs of malfunctions. Common issues include media exhaustion in filtration systems, ineffective softening due to resin degradation, or RO membrane fouling. Technicians must understand each system's operational parameters and perform systematic checks, including water testing, pressure monitoring, and inspecting equipment conditions, to accurately identify and resolve issues.

6.3 Electrical Troubleshooting

Effective electrical troubleshooting involves systematic diagnostics to identify issues such as circuit overloads, faulty wiring, or failing components. Technicians should utilize diagnostic tools like multimeters, clamp meters, and insulation testers to verify voltage, current, and continuity. Proper procedures include isolating circuits, testing motor windings, and verifying correct installation of protective devices, facilitating prompt identification and resolution of electrical problems.

6.4 Diagnostic Tools Usage

Proper use of diagnostic tools enhances troubleshooting effectiveness. Technicians should master the operation of essential tools like pressure gauges, multimeters, megohmmeters (meggers), and flow meters. Accurate interpretation of readings from these instruments helps identify issues like insufficient flow rates, electrical faults, or deteriorating equipment conditions. Regular calibration and proper maintenance of these diagnostic tools ensure accuracy and reliability during troubleshooting.

6.5 Flow & Pressure Testing

Conducting accurate flow and pressure tests is crucial for evaluating system performance. Technicians should use pressure gauges and flow meters to measure static and dynamic conditions accurately. Interpreting test results involves comparing measured values against manufacturer specifications or expected system performance. Understanding these readings guides necessary adjustments or indicates repairs needed to maintain optimal system operation.

6.6 Water Quality Testing Interpretation

Interpreting water quality test results accurately identifies water treatment requirements. Technicians must understand test parameters such as hardness, iron, manganese, pH, and microbiological contaminants, interpreting results to determine necessary treatment approaches. Effective communication of these findings to customers is crucial, enabling

informed decisions regarding appropriate water treatment solutions and equipment maintenance.

6.7 Repair vs. Replacement Decisions

Determining whether to repair or replace system components involves analyzing factors such as cost-effectiveness, component age, repair complexity, and overall system reliability. Technicians should assess short-term repair costs versus long-term replacement benefits, considering equipment lifespan, warranty coverage, and customer preferences. Clear guidelines based on systematic assessments help technicians make informed recommendations, balancing cost, performance, and reliability.

6.8 Emergency Response Procedures

Effective emergency response requires clearly defined procedures for immediate action during system failures or water-related emergencies. Technicians should understand essential safety protocols, promptly secure affected areas, isolate electrical circuits, and quickly diagnose the cause of failure. Comprehensive documentation of emergency incidents, including actions taken and repair details, supports regulatory compliance, insurance claims, and future system improvements.

Chapter 7: Installation Best Practices (Months 13-14)

7.1 Well Pump Installation Procedures

Effective well pump installation procedures begin with thorough site assessments, proper pump selection, and precise equipment sizing based on calculated Total Dynamic Head (TDH) and desired flow rates. Installation involves careful placement and securing of pumps, electrical connections according to NEC guidelines, proper pipe sizing, and thorough system testing. Understanding typical mistakes such as incorrect depth settings, improper electrical grounding, or inadequate pipe support helps technicians avoid common issues, ensuring reliable and efficient system operation.

7.2 Water Treatment Installation Methods

Installing water treatment equipment requires following detailed guidelines specific to each type of system. Technicians must understand proper media handling, placement of filters, softeners, and chemical injection systems, and ensure correct connections and calibration. System-specific requirements, such as maintaining proper flow rates,

ensuring correct backwash intervals, and precise chemical dosing, must be meticulously followed to meet water quality standards and ensure reliable performance.

7.3 Piping System Layout & Efficiency

Optimal piping system layout maximizes efficiency by minimizing friction losses, maintaining adequate water velocity, and facilitating ease of maintenance. Technicians should select pipe materials compatible with water chemistry and flow conditions, size pipes accurately based on anticipated demands, and strategically place fittings, valves, and unions. Proper routing reduces pressure loss, ensures efficient water delivery, and simplifies future maintenance tasks.

7.4 Safety Protocols for Installation

Adhering to established safety protocols during installations ensures technician safety and system reliability. Key practices include utilizing appropriate personal protective equipment (PPE), following correct electrical safety standards (NEC compliance), proper lifting techniques, and maintaining clear, safe work areas. Technicians should proactively identify and mitigate hazards such as electrical shock risks, confined space dangers, and equipment handling risks, promoting a safe installation environment.

7.5 Customer Communication & Training

Clear and effective customer communication enhances satisfaction and understanding of installed systems. Technicians should thoroughly explain system operation, routine maintenance requirements, and emergency procedures. Demonstrating essential maintenance tasks, addressing customer questions, and setting realistic performance expectations helps customers confidently manage their systems, leading to greater satisfaction and reduced callbacks.

7.6 Preventative Maintenance Scheduling

Implementing structured preventative maintenance schedules ensures ongoing system reliability and performance. Technicians should provide clear guidelines for regular system inspections, filter replacements, pressure checks, and water quality assessments. Effective scheduling includes periodic follow-ups, detailed record-keeping, and customer reminders, promoting proactive system care and significantly reducing the likelihood of system failures or downtime.

7.7 System Testing & Commissioning

Commissioning new installations involves comprehensive system testing to verify performance, reliability, and compliance with design specifications. Technicians should

conduct thorough inspections of electrical connections, pump operation, pressure settings, water quality parameters, and system controls. A detailed commissioning checklist ensures all components function correctly, enabling confident customer handover and minimizing post-installation issues.

7.8 Compliance & Inspection Procedures

Ensuring regulatory compliance requires strict adherence to installation standards and thorough inspection procedures. Technicians must understand local and state plumbing codes, environmental regulations, and electrical requirements, conducting installations accordingly. Using detailed inspection checklists, performing regular compliance verification, and promptly resolving identified issues help ensure ongoing system compliance, reliability, and public safety.

Chapter 8: Business & Professional Skills (Months 15-16)

8.1 Customer Service Excellence

Providing excellent customer service involves clear communication, prompt responses, professionalism, and courtesy. Technicians should actively listen to customer concerns, respond empathetically, and clearly communicate the solutions and expectations. Handling complaints effectively includes acknowledging the issue, providing timely resolutions, and following up to ensure customer satisfaction. Building positive relationships with customers enhances reputation, encourages repeat business, and generates valuable referrals.

8.2 Record-Keeping & Documentation

Efficient record management and thorough documentation are critical for successful business operations. Technicians should maintain accurate, detailed records of customer interactions, job specifications, equipment installations, maintenance activities, and regulatory compliance. Effective documentation practices include clear, organized, and secure record storage, accessible retrieval systems, and consistent updating. Accuracy in documentation ensures compliance, facilitates efficient operations, and supports long-term business success.

8.3 Job Pricing & Estimations

Accurate job pricing and estimation are essential for maintaining profitability and competitiveness. Technicians must understand how to calculate labor costs, materials expenses, overhead, and profit margins. Developing clear, transparent estimates and

presenting them professionally to customers enhances trust and reduces misunderstandings. Competitive bidding involves evaluating market rates, assessing competitor pricing, and strategically positioning services to balance profitability and market competitiveness.

8.4 Insurance & Liability Management

Understanding insurance basics and effectively managing liability risk are essential components of a successful business. Technicians should be knowledgeable about different types of insurance coverage, including general liability, workers' compensation, vehicle insurance, and professional liability. Regularly reviewing and updating policies ensures adequate protection against potential risks. Proactive risk management practices, such as thorough documentation, safety training, and compliance with regulatory standards, further minimize liability exposures.

8.5 Warranty & Service Contracts

Creating effective warranty and service agreements enhances customer confidence and clarifies expectations. Technicians should clearly define warranty terms, specifying coverage details, duration, limitations, and procedures for filing claims. Service contracts should outline maintenance schedules, responsibilities, response times, and associated costs. Clear, transparent contracts reduce misunderstandings, improve customer satisfaction, and encourage ongoing business relationships.

8.6 Effective Communication Techniques

Clear, effective communication skills are vital in professional interactions, facilitating understanding, reducing conflict, and improving operational efficiency. Technicians should practice active listening, maintain clarity and professionalism in verbal and written communications, and adapt communication styles to meet customer preferences and technical comprehension levels. Effective conflict resolution involves remaining calm, seeking mutual understanding, and collaboratively identifying solutions to disputes.

8.7 Ethical Sales & Business Practices

Ethical business practices and integrity in sales are foundational for building trust and long-term success. Technicians should provide honest, transparent information about products and services, avoiding misleading statements or undue pressure. Upholding professional ethics includes fair pricing, honoring commitments, responsibly managing customer data, and adhering to regulatory and industry standards.

8.8 Continued Education & Growth

Commitment to ongoing education and professional growth ensures long-term business success and industry leadership. Technicians should actively pursue learning opportunities through industry certifications, workshops, seminars, and manufacturer trainings. Staying current with technological advancements, evolving standards, and emerging trends positions technicians as knowledgeable professionals capable of delivering high-quality, cutting-edge services. Investing in continuous education promotes career advancement, business growth, and sustained competitive advantage.

Chapter 9: Final Review & Certification Prep (Months 17-18)

9.1 Comprehensive Topic Review

A thorough review of all course material reinforces essential concepts, ensuring technicians grasp critical aspects of pump systems, water treatment methods, plumbing codes, electrical practices, and troubleshooting procedures. Revisiting key topics such as pump installation methods, flow dynamics, water quality testing, electrical safety standards, plumbing code regulations, and diagnostic techniques solidifies understanding and readiness for certification exams.

9.2 Mock Licensing Exam

Practicing with realistic mock licensing exams prepares technicians for the certification process by simulating actual testing conditions. These exams should cover critical areas, including hydrology basics, pump types, water treatment equipment, electrical troubleshooting, plumbing code compliance, and safety regulations. Technicians should utilize these practice tests to identify knowledge gaps, enhance time management skills, and improve test-taking strategies.

9.3 Hands-On Skills Evaluation

Practical skills assessments measure technician competency in real-world scenarios, evaluating the ability to apply theoretical knowledge effectively. Hands-on evaluations may include tasks such as pump installation, electrical wiring diagnostics, plumbing fixture setup, system troubleshooting, and conducting water quality tests. Regular practical assessments help identify skill gaps, allowing targeted improvement prior to final certification.

9.4 Practical Installation Test

The practical installation test evaluates technicians' capabilities in accurately completing comprehensive pump and water treatment system installations according to code standards. Technicians must demonstrate proficiency in selecting appropriate components, executing correct installation techniques, verifying operational efficiency, and ensuring compliance with relevant codes and safety guidelines. This test validates practical proficiency and readiness for professional certification.

9.5 Licensing Exam Preparation

Effective preparation strategies for licensing exams include reviewing critical course materials, mastering key concepts, practicing diagnostic scenarios, and regularly completing mock exams. Technicians should focus on exam-taking strategies such as time management, question interpretation, and logical problem-solving techniques. Preparing thoroughly enhances confidence, improves performance, and increases the likelihood of successful certification.

9.6 Certification & Graduation Procedures

Understanding certification and graduation procedures ensures technicians navigate the final steps successfully. Requirements typically include passing written and practical exams, submitting documented evidence of completed training hours, and meeting professional experience criteria. Technicians must follow established procedures for submitting applications, scheduling exams, and maintaining accurate records to facilitate efficient certification processes and graduation.

9.7 Job Placement Strategies

Effective job placement strategies help technicians transition smoothly into professional roles. Technicians should utilize methods such as networking within industry associations, attending career fairs, leveraging online job platforms, and pursuing apprenticeships or internships. Creating professional resumes highlighting certifications, practical skills, and experience, along with developing effective interview techniques, significantly enhances employment opportunities and successful career entry.

9.8 Professional Networking & Advancement

Building strong professional networks supports career advancement and ongoing development. Technicians should engage actively with industry groups, attend conferences, participate in continuing education opportunities, and cultivate professional relationships. Networking facilitates access to mentorship, advanced training, career opportunities, and industry insights, fostering long-term professional growth and success.