# DIVIDER PAGE

# MINUTES AND FINANCIALS

**RAINBOW WATER DISTRICT BOARD MEETING**

Date: September 13, 2023
Time: 5:30 PM
Place: Rainbow Water District Office/Virtual

| | |
|---|---|
| BOARD MEMBERS PRESENT IN PERSON: | Marla Casley, Jim McLaughlin, Doug Keeler, Mindy Kephart, and Lou Allocco |
| STAFF PRESENT: | Jamie Porter, Jodi Sanders, and Eric Carlson |

Doug Keeler opened the Board Meeting at 6:20 pm.

**AGENDA REVIEW**
No new items

**REVIEW ITEMS**

1. The minutes from the August 9, 2023, Rainbow Board Meeting were presented for approval. Marla noted the date of the minutes was incorrect and that Jim McLaughlin was not listed as attending the meeting. Marla Casley moved to approve the minutes as amended. Lou Allocco seconded the motion. Motion passed 5-0.
2. The financial reports for August 2023 were presented for approval. Jim McLaughlin moved to accept the financial reports and pay the bills. Mindy Kephart seconded the motion. Motion passed 5-0.
3. August 2023 Financial Report Review: Doug Keeler reviewed 8 transactions and approved the August 2023 audit trail report. The missing checks report for August 2023 was reviewed and approved, check numbers are 17006-17072 and there were no breaks in sequence. There were no new vendors.

**BUSINESS FROM THE AUDIENCE**
None

**BUSINESS FROM THE BOARD**
1. Jim McLaughlin reported that LCOG was at the City of Springfield Block Party.
2. Doug Keeler would like staff and the board to consider installing a gate across the entrance of the driveway for security. Doug also noted that he would like a professional security audit performed to assess the security of the RWD office location.

**BUSINESS FROM THE SUPERINTENDENT**
1. Jamie shared that Consor is putting together a survey to send to our customers to gather information that would be used in a 75th Anniversary calendar. He asked the Board for input on the questions and style of the survey.

**RAINBOW WATER DISTRICT BOARD MEETING**

Date: September 13, 2023
Time: 5:30 PM
Place: Rainbow Water District Office/Virtual

2. Jamie asked the Board for input on a 75th Anniversary block party or Customer Appreciation Day in August 2024. Marla and Mindy volunteered to work on a party planning subcommittee.
3. Jamie presented several options for a micro logo that will be used as a tab marker when looking up Rainbow online.
4. Eric reviewed the requirements of the Lead and Copper Service Line Inventory project that is underway nationwide. Rainbow has started gathering information and the first reports are due to the State of Oregon in the Fall of 2024.
5. Eric reviewed the progress of the leak detection survey being performed by a SUB contracted employee. They have found several potential leaks that Eric and staff will follow up on to fix, if necessary.
6. The City of Springfield is still considering a mural proposal for the Kelly Reservoir.
7. Jamie asked for the Board's approval to run for the position of Treasurer for the Pacific Northwest Section of the AWWA. The application process includes the Board President signing a letter of support so there is no conflict with him attending several meetings and a yearly conference. The Board gave their approval.

The Board discussed extending an invitation to SUB's Board President to participate in a joint work session regarding the operational changes that have been proposed. President Keeler will draft a letter to be mailed tomorrow.

The next board meeting will be held on October 11, 2023.

Meeting adjourned at 7:19 pm

**RAINBOW WATER DISTRICT BOARD MEETING**

Date: September 20, 2023
Time: 12:00 PM
Place: Rainbow Water District Office/Virtual

BOARD MEMBERS PRESENT: Marla Casley, Doug Keeler, and Mindy Kephart,
STAFF PRESENT: Jamie Porter and Jodi Sanders

Doug Keeler opened the Board Meeting at 12:00 pm.

**BUSINESS FROM THE SUPERINTENDENT**

1. Jamie presented resolution No. 2023-18, A Resolution Declaring Surplus Vehicles. There are two trucks that are going to be auctioned at the Lane County Auction. Marla Casley moved to approve Resolution No. 2023-18. Mindy Kephart seconded the motion. Motion passed 3-0.
2. The Blue River Water District has lost their licensed operator and has requested that Eric be their temporary Direct Responsible Charge (DRC) while they are looking for a replacement. Jamie requested Board approval to amend the IGA to include temporary DRC services, as well as updating the office support that we are already providing. The Board is in support of amending the IGA to include these services. Board approved by consensus.

Doug Keeler adjourned the meeting at 12:05 pm.

| RAINBOW WATER DISTRICT | | | |
|---|---|---|---|
| September 30, 2023 | | | |
| VENDOR | PURPOSE | Water & Fire Fund | PAID/ACH |
| AT&T | Hot spots for on call serviceman | 43.23 | * |
| Alarm Solutions | Quarterly alarm monitoring for office and Chase WTP | 267.00 | |
| Amazon | Hazard signs and office supplies | 110.27 | |
| AnSer | Answering service | 90.00 | |
| Century Link | Fax line | 76.98 | * |
| Comcast Business | Cable, Internet and phone service | 476.38 | * |
| Commercial Air | HVAC quarterly maintenance | 294.00 | |
| Consolidated Supply | Curb and corp stops | 640.28 | |
| Consor | Professional consulting services | 6,422.00 | |
| Core & Main | 8 - 3/4" radio read registers | 2,360.00 | |
| Dennis Murphy | Refund credit balance | 6.44 | * |
| Edge Analytical | Water testing and DBP's | 969.80 | |
| EWEB | I5 pump power | 11,646.59 | |
| Ferguson | Inventory restock and Service line supplies | 2,014.08 | |
| Galardi Rothstein Group | SDC consultant - final project billing | 555.00 | |
| Internal Revenue Service | Payroll withholding and taxes - September 2023 | 14,718.88 | * |
| Jan Cabaniss | Refund credit balance | 104.65 | * |
| Jerry's | Supplies for Chase painting and maintenance | 336.46 | |
| Jill Lindsay | Mileage | 53.06 | |
| Justin Wittmer | Chase field mowing | 1,500.00 | |
| Keller America | Drying tube assembly | 306.33 | |
| Kelley Connect | Copier invoice | 152.70 | |
| Key Bank | Mastercard Charges | 1,412.62 | |
| Lane Forest Products | Landscaping materials | 71.98 | |
| MW Coffee | Coffee for office | 21.50 | |
| NAPA Auto Parts | Truck maintenance supplies | 15.38 | |
| Nash Janitorial | Office cleaning | 320.00 | |
| One Call Concepts | UNC tickets | 154.00 | |
| Oregon Department of Rev | Payroll withholding and taxes - September 2023 | 3,727.51 | * |
| Oregon Treasury Dept. | WBF Quarterly assessment | 0.24 | * |
| PacificSource Administrators | FSA fees - September 2023 | 805.00 | * |
| Paramount Supply | Inventory restock and Service line supplies | 258.46 | |
| PERS | Pers voluntary contributions - September 2023 | 479.80 | * |
| PERS | PERS Withholding and expense - June 2023 | 16,880.23 | * |
| Rebecca Beltran Brown | Refund credit balance | 130.95 | * |
| SDIS | Employee insurance - October 2023 | 10,874.79 | * |
| SDIS | FY 2022-23 Workman's comp audited premium | 1,261.94 | |
| Sherwin Williams | Chase wellfield paint | 1,994.54 | |
| Springbrook | Civic Pay Transaction fees for July 2023 | 1,283.50 | |
| Springfield Utility Board | Pump power and fiber optic | 12,050.16 | |
| Stoddard Power Systems | I5 Electrical Upgrades | 13,927.00 | * |
| Streamline | Website service | 260.00 | |
| Ttech Settle - Springbrook | ACH Services for September 2023 | 377.50 | |
| USPS | Permit 99 | 3,000.00 | |
| Valvoline | Oil change for #7 | 110.46 | |
| VOYA - ING | Deferred compensation program - September 2023 | 4,596.45 | * |
| | | 117,158.14 | |
| | | | |
| Approved by | | 10/11/2023 | |

RAINBOW WATER DISTRICT
KEY BANK CHARGES
BILLING CYCLE: 8/31/2023

| Employee | Date | Vendor | Purpose | Amount | GL No. | Receipt |
|---|---|---|---|---|---|---|
| Jamie Porter | | | | | | |
| | 8/2/2023 | Microsoft | Office Software | 62.50 | 5300 | X |
| | 8/3/2023 | Moi Poki Grill | SUB- City lunch | 19.20 | 5300 | X |
| | 8/7/2023 | Crash Plan | Office Software | 9.99 | 5300 | X |
| | 8/8/2023 | Adobe | Office Software | 29.99 | 5300 | X |
| | 8/14/2023 | Zoom | Office Software | 15.99 | 5300 | X |
| | 8/25/2023 | Microsoft | Office Software | 69.99 | 5300 | X |
| | 8/25/2023 | Newspapers.com | Temporary Register Guard Subscription | 74.90 | 5300 | X |
| | 8/10/2023 | OHA | MWD Refund | (248.00) | 9150 | X |
| | | | Sub Total | 34.56 | | |
| Eric Carlson | | | | | | |
| | 8/7/2023 | Sizzler | LUCC Lunch EC, BS, CP and WS | 74.72 | 5300 | X |
| | 8/10/2023 | Grainger | Supplies for DCWA and SDOAH | 106.13 | 9250/9450 | X |
| | 8/29/2023 | ABPA | Annual seminar for EC and BS | 280.00 | 5360 | X |
| | | | Sub Total | 460.85 | | |
| Brian Scott | | | | | | |
| | 8/8/2023 | McDonalds | Crane training meals/Per Diem | 8.05 | 5360 | X |
| | 8/8/2023 | Fred Meyer | Crane training meals/Per Diem | 40.66 | 5360 | X |
| | 8/8/2023 | Fred Meyer | Crane training meals/Per Diem | 105.78 | 5360 | X |
| | 8/9/2023 | Fred Meyer | Crane training meals/Per Diem | 15.83 | 5360 | X |
| | 8/9/2023 | Taqueria La Fuente | Crane training meals/Per Diem | 23.00 | 5360 | X |
| | | | Sub Total | 193.32 | | |
| Wyatt Sayles | | | | - | | |
| | 8/9/2023 | Sherwin Williams | Reservoir maintenance | 58.04 | 5285 | X |
| | | | Sub Total | 58.04 | | |
| Charles Petersen | | | | | | |
| | | No Charges | | | | |
| | | | Sub Total | - | | |
| Jodi Sanders | | | | | | |
| | 8/4/2023 | MOD Pizza | C2C Subsection Lunch | 11.48 | 5300 | X |
| | 8/10/2023 | The Flower market | Appreciation Dinner flowers | 475.00 | 5330 | X |
| | 8/11/2023 | Albertsons | Board and safety meeting snacks | 61.02 | 5300 | X |
| | 8/11/2023 | Jersey Mikes | Board meeting meal | 59.77 | 5300 | X |
| | 8/16/2023 | ABPA West | Eric Carlson chapter dues | 85.00 | 5300 | X |
| | 8/24/2023 | USPS | Stamp Rolls | 396.00 | 5290 | X |
| | | | | 1,088.27 | | |
| | | | Grand Total | 1,835.04 | | |

Rainbow Water District
Profit & Loss Budget vs Actual-YTD
September 2023

| | Sep 23 | Budget | % of Budget | Jul - Sep 23 | YTD Budget | % of Budget | Annual Budget |
|---|---|---|---|---|---|---|---|
| Ordinary Income/Expense | | | | | | | |
| Income | | | | | | | |
| 4010 · Water Sales - District | 126,450 | 120,750 | 105% | 390,787 | 368,000 | 106% | 1,169,964 |
| 4015 · Water Sales-SUB | 79,660 | 57,000 | 140% | 312,543 | 282,000 | 111% | 792,770 |
| 4020 · Service Connection Charges | 0 | 0 | 0% | 0 | 0 | 0% | 800 |
| 4030 · DRC's | 0 | 0 | 0% | 0 | 0 | 0% | 2,400 |
| 4040 · Interest Income-Water | 580 | 300 | 193% | 984 | 900 | 109% | 3,600 |
| 4050 · Reimbursed Labor | 4,080 | 500 | 816% | 4,840 | 1,500 | 323% | 2,000 |
| 4060 · Account Processing Fees | 305 | 250 | 122% | 780 | 750 | 104% | 3,050 |
| 4065 · Late Fees | 450 | 0 | 100% | 1,270 | 0 | 100% | 0 |
| 4070 · Reconnection Charges | 50 | 0 | 100% | 375 | 0 | 100% | 0 |
| 4080 · Gain/Loss on Sale of Assets | 0 | 0 | 0% | 0 | 0 | 0% | 4,000 |
| 4085 · Water Fund - Transfers In | 0 | 0 | 0% | 0 | 148,216 | 0% | 448,216 |
| 4090 · Miscellaneous Income | 937 | 0 | 100% | 1,948 | 0 | 100% | 19,500 |
| 4095 · Fire Hydrant Maintenance | 0 | 0 | 0% | 0 | 0 | 0% | 4,700 |
| 4100 · Bad Debts Recovered | 0 | 0 | 0% | 558 | 0 | 100% | 0 |
| 4120 · Marcola Contract Income | 2,229 | 2,000 | 111% | 7,193 | 6,000 | 120% | 18,000 |
| 4140 · Shangri La Contract Income | 498 | 500 | 100% | 1,346 | 1,500 | 90% | 6,000 |
| 4160 · DCWA Contract Income | 1,147 | 1,000 | 115% | 3,255 | 3,000 | 109% | 12,000 |
| 4180 · Shenandoah Income | 855 | 500 | 171% | 3,696 | 1,500 | 246% | 6,000 |
| 4190 · Blue River Contract Income | 1,153 | 500 | 231% | 2,404 | 1,500 | 160% | 7,000 |
| Total Income | 218,394 | 183,300 | 119% | 731,979 | 814,866 | 90% | 2,500,000 |
| Gross Profit | 218,394 | 183,300 | 119% | 731,979 | 814,866 | 90% | 2,500,000 |
| Expense | | | | | | | |
| 5000 · Personal Services | | | | | | | |
| 5001 · Staff Wages | | | | | | | |
| 5002 · Salary - Operations | 2,340 | | | 15,742 | | | 0 |
| 5004 · Salary - Admin | 26,910 | | | 72,407 | | | 0 |
| 5006 · Hourly - Operations | 17,344 | | | 52,806 | | | 0 |
| 5008 · Hourly - Admin | 2,601 | | | 9,573 | | | 0 |
| 5001 · Staff Wages - Other | 0 | 57,632 | 0% | 0 | 172,897 | 0% | 695,465 |
| Total 5001 · Staff Wages | 49,195 | 57,632 | 85% | 150,528 | 172,897 | 87% | 695,465 |
| 5010 · Deferred Comp Company Expense | 1,464 | 1,450 | 101% | 4,754 | 4,350 | 109% | 17,400 |
| 5016 · Extra Value Bonus | 0 | 0 | 0% | 20,420 | 18,000 | 113% | 18,000 |
| 5050 · Part Time & Emergency Pay | 2,193 | 2,500 | 88% | 6,160 | 7,500 | 82% | 30,000 |
| 5055 · Vacation Pay Expense | 6,098 | 0 | 100% | 17,715 | 0 | 100% | 0 |
| 5056 · Sick Pay Expense | 1,060 | 0 | 100% | 3,571 | 0 | 100% | 0 |
| 5057 · Sick Leave Buy Back | 0 | 0 | 0% | 0 | 0 | 0% | 17,500 |
| 5060 · Social Security Expense | 3,598 | 3,900 | 92% | 12,227 | 11,700 | 105% | 46,800 |
| 5065 · Medicare Expense | 841 | 875 | 96% | 2,860 | 2,875 | 99% | 10,750 |
| 5070 · Workers Compensation Expense | 0 | 0 | 0% | 0 | 5,000 | 0% | 7,500 |
| 5080 · Employee Insurance Expense | 9,177 | 12,000 | 76% | 27,530 | 59,411 | 46% | 167,411 |
| 5081 · Employee Life Insurance Expense | 433 | 0 | 100% | 1,298 | 0 | 100% | 0 |
| 5082 · FSA Fees | 80 | 0 | 100% | 540 | 0 | 100% | 0 |
| 5083 · OR-WBF Assessment Expense | 11 | 0 | 100% | 35 | 0 | 100% | 0 |
| 5100 · PERS Expense | 14,903 | 14,750 | 101% | 50,892 | 44,250 | 115% | 177,000 |
| 5110 · Unemployment Expense | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| 5120 · Payroll Advance | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| Total 5000 · Personal Services | 89,053 | 93,107 | 96% | 298,530 | 325,983 | 92% | 1,187,826 |
| 5200 · Materials & Services | | | | | | | |
| 5210 · Purification Expense | 8,095 | 10,000 | 81% | 11,178 | 30,000 | 37% | 120,000 |
| 5215 · Purification Exp-Source | 0 | 0 | 0% | 0 | 0 | 0% | 5,500 |
| 5220 · Telephone & Telemetry | 693 | 2,000 | 35% | 3,949 | 6,000 | 66% | 24,500 |
| 5230 · Pump Power & Electric | 24,842 | 20,000 | 124% | 49,836 | 60,000 | 83% | 240,000 |
| 5240 · Maintenance-Vehicles | 4,248 | 3,000 | 142% | 6,711 | 9,000 | 75% | 36,000 |
| 5245 · Maintenance - CWTP | 172 | 1,000 | 17% | 5,896 | 3,000 | 197% | 12,000 |
| 5247 · Maintenance - WCCP | 3,035 | 1,000 | 304% | 8,732 | 3,000 | 291% | 12,000 |
| 5250 · Maintenance-Pumps/Wells | 0 | 500 | 0% | 19 | 1,500 | 1% | 6,000 |
| 5260 · Maintenance-Mains | 1,090 | 500 | 218% | 2,276 | 1,500 | 152% | 6,000 |
| 5270 · Maintenance-Meters & Services | 1,678 | 500 | 336% | 2,006 | 1,500 | 134% | 6,000 |
| 5275 · Maintenance - Land | 0 | 0 | 0% | 0 | 3,000 | 0% | 9,000 |
| 5280 · Maintenance - Other | 1,759 | 500 | 352% | 4,952 | 1,500 | 330% | 6,000 |
| 5285 · Maintenance-Reservoirs | 94 | 0 | 100% | 6,604 | 0 | 100% | 3,000 |
| 5290 · Customer Postage | 175 | 1,250 | 14% | 2,384 | 3,750 | 64% | 15,000 |
| 5295 · Utility Billing Program Expense | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| 5300 · General Office Expense | 1,468 | 1,500 | 98% | 5,941 | 5,000 | 119% | 25,500 |
| 5305 · Transaction Fee Processing | 2,830 | 2,500 | 113% | 3,762 | 7,500 | 50% | 30,000 |
| 5310 · Special District Expense | 0 | 0 | 0% | 0 | 2,000 | 0% | 2,000 |
| 5320 · Bad Debt Expense | 0 | 125 | 0% | 309 | 375 | 82% | 1,500 |
| 5325 · Contract Workers | 0 | 0 | 0% | 0 | 0 | 0% | 10,000 |
| 5330 · Budget & Election Expense | 2,736 | 0 | 100% | 2,736 | 0 | 100% | 2,000 |
| 5340 · Community Outreach | 0 | 125 | 0% | 200 | 375 | 53% | 1,500 |
| 5360 · Dues, School & Convention Exp | 558 | 2,000 | 28% | 1,543 | 2,500 | 62% | 20,000 |
| 5365 · Emergency Preparedness | 0 | 0 | 0% | 950 | 0 | 100% | 0 |
| 5380 · Street Light Expense | 498 | 600 | 83% | 1,002 | 1,800 | 56% | 7,200 |
| 5200 · Materials & Services - Other | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| Total 5200 · Materials & Services | 53,971 | 47,100 | 115% | 120,986 | 143,300 | 84% | 600,700 |
| 5350 · CWTP - Loan / Interest Exp | 0 | 0 | 0% | 0 | 0 | 0% | 148,216 |
| 5400 · Contractual | | | | | | | |
| 5410 · Insurance Expense | 0 | 0 | 0% | 0 | 0 | 0% | 52,000 |
| 5420 · Legal Expense | 783 | 1,500 | 52% | 1,458 | 4,500 | 32% | 18,000 |
| 5425 · Network - IT | 0 | 2,500 | 0% | 0 | 3,500 | 0% | 10,000 |
| 5427 · IT - Subscriptions | 3,509 | 750 | 468% | 3,204 | 2,250 | 142% | 9,000 |
| 5430 · Audit & Accounting Expense | 0 | 0 | 0% | 0 | 0 | 0% | 15,660 |
| 5440 · Engineering Studies - PFAS | 1,543 | 3,000 | 51% | 1,543 | 9,000 | 17% | 54,500 |
| 5470 · Financial Advisor | 0 | 0 | 0% | 0 | 6,000 | 0% | 6,000 |
| 5480 · Engineering Studies | 0 | 0 | 0% | 0 | 13,000 | 0% | 23,000 |
| Total 5400 · Contractual | 5,835 | 7,750 | 75% | 6,205 | 38,250 | 16% | 188,160 |
| 5500 · Capital Outlay | | | | | | | |
| 5510 · Mains | 0 | 30,000 | 0% | 0 | 60,000 | 0% | 90,000 |
| 5520 · Service Lines | 0 | 0 | 0% | 0 | 2,000 | 0% | 5,000 |
| 5530 · Meters | 0 | 0 | 0% | 0 | 2,000 | 0% | 5,000 |
| 5540 · Hydrants | 0 | 5,000 | 0% | 0 | 10,000 | 0% | 20,000 |
| 5550 · Tools, Vehicles & Equipment | 0 | 1,000 | 0% | 0 | 3,000 | 0% | 16,200 |
| 5560 · Office Furniture & Equipment | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| 5570 · Well Rehabs | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| 5580 · Wells and Wellfield | 15,650 | 0 | 100% | 15,650 | 0 | 100% | 0 |
| 5585 · Telemetry & Control System | 0 | 0 | 0% | 0 | 0 | 0% | 5,000 |
| 5590 · Purification Equipment | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| 5595 · Streetlight Replacement | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| 5600 · Reservoirs | 0 | 0 | 0% | 0 | 25,000 | 0% | 25,000 |

Rainbow Water District
Profit & Loss Budget vs Actual-YTD
September 2023

| | Sep 23 | Budget | % of Budget | Jul - Sep 23 | YTD Budget | % of Budget | Annual Budget |
|---|---|---|---|---|---|---|---|
| 5610 · Chase Wellfield Development | 0 | 50,000 | 0% | 0 | 85,000 | 0% | 225,000 |
| 5620 · Building & Additions | 0 | 0 | 0% | 0 | 0 | 0% | 15,000 |
| 5640 · Weyerhaeuser Corrosion Control | 0 | 0 | 0% | 0 | 0 | 0% | 0 |
| Total 5500 · Capital Outlay | 15,650 | 86,000 | 18% | 15,650 | 187,000 | 8% | 406,200 |
| 7035 · Capital Res Capital - Vehicles | 0 | | | 0 | | | 0 |
| Total Expense | 164,509 | 233,957 | 70% | 441,371 | 694,533 | 64% | 2,531,102 |
| Net Ordinary Income | 53,885 | -50,657 | -106% | 290,608 | 120,333 | 242% | -31,102 |
| Other Income/Expense | | | | | | | |
| Other Income | | | | | | | |
| 70000 · CAPITAL RESERVE FUND | | | | | | | |
| 7010 · Capital Reserve - Interest | 2,103 | 1,000 | 210% | 6,086 | 3,000 | 203% | 15,000 |
| 7020 · Capital Reserve - Transfers In | 0 | 0 | 0% | 0 | 0 | 0% | 500,000 |
| Total 70000 · CAPITAL RESERVE FUND | 2,103 | 1,000 | 210% | 6,086 | 3,000 | 203% | 515,000 |
| 70500 · RESILIENCE FUND | | | | | | | |
| 7100 · Resilience Fund - Transfers In | 0 | | | 0 | | | 200,000 |
| 7110 · Resilience Fund - Interest | 1,795 | 500 | 359% | 5,193 | 1,500 | 346% | 7,000 |
| Total 70500 · RESILIENCE FUND | 1,795 | 500 | 359% | 5,193 | 1,500 | 346% | 207,000 |
| 8000 · Fire Protection-Income | | | | | | | |
| 8010 · Fire Protection - Tax Income | 2,377 | 6,000 | 40% | 7,125 | 13,000 | 55% | 1,715,000 |
| 8030 · Fire Protection - Interest | 1,733 | 250 | 693% | 4,984 | 750 | 665% | 15,000 |
| Total 8000 · Fire Protection-Income | 4,110 | 6,250 | 66% | 12,109 | 13,750 | 88% | 1,730,000 |
| Total Other Income | 8,008 | 7,750 | 103% | 23,388 | 18,250 | 128% | 2,452,000 |
| Other Expense | | | | | | | |
| 6550 · Water Fund - Transfers Out | 0 | | | 0 | | | 200,000 |
| 7030 · Capital Reserve - Transfers Out | 0 | 0 | 0% | 0 | 300,000 | 0% | 300,000 |
| 8500 · Fire Protection-Expense | | | | | | | |
| 8510 · Fire Protection-Contract Exp | 0 | 0 | 0% | 0 | 0 | 0% | 1,238,831 |
| 8545 · Fire Fund - Transfers Out | 0 | 0 | 0% | 0 | 148,216 | 0% | 648,216 |
| Total 8500 · Fire Protection-Expense | 0 | 0 | 0% | 0 | 148,216 | 0% | 1,887,047 |
| Total Other Expense | 0 | 0 | 0% | 0 | 448,216 | 0% | 2,387,047 |
| Net Other Income | 8,008 | 7,750 | 103% | 23,388 | -429,966 | -5% | 64,953 |
| Net Income | 61,893 | -42,907 | -144% | 313,996 | -309,633 | -101% | 33,851 |

**Rainbow Water District**
## Profit & Loss Prev Year Comparison
**September 2023**

| | Sep 23 | Sep 22 | $ Change | % Change |
|---|---|---|---|---|
| **Ordinary Income/Expense** | | | | |
| **Income** | | | | |
| **4010 · Water Sales - District** | 126,450 | 129,011 | -2,561 | -2% |
| **4015 · Water Sales-SUB** | 79,660 | 93,900 | -14,240 | -15% |
| **4020 · Service Connection Charges** | 0 | 1,827 | -1,827 | -100% |
| **4030 · DRC's** | 0 | 2,931 | -2,931 | -100% |
| **4040 · Interest Income-Water** | 580 | 179 | 401 | 224% |
| **4050 · Reimbursed Labor** | 4,080 | 49 | 4,031 | 8,227% |
| **4060 · Account Processing Fees** | 305 | 150 | 155 | 103% |
| **4065 · Late Fees** | 450 | 420 | 30 | 7% |
| **4070 · Reconnection Charges** | 50 | 200 | -150 | -75% |
| **4085 · Water Fund - Transfers In** | 0 | 148,216 | -148,216 | -100% |
| **4090 · Miscellaneous Income** | 937 | 68 | 869 | 1,278% |
| **4100 · Bad Debts Recovered** | 0 | 73 | -73 | -100% |
| **4120 · Marcola Contract Income** | 2,229 | 775 | 1,454 | 188% |
| **4140 · Shangri La Contract Income** | 498 | 48 | 450 | 938% |
| **4160 · DCWA Contract Income** | 1,147 | 663 | 484 | 73% |
| **4180 · Shenandoah Income** | 855 | 1,226 | -371 | -30% |
| **4190 · Blue River Contract Income** | 1,153 | 239 | 914 | 382% |
| **Total Income** | 218,394 | 379,975 | -161,581 | -43% |
| **Gross Profit** | 218,394 | 379,975 | -161,581 | -43% |
| **Expense** | | | | |
| **5000 · Personal Services** | | | | |
| **5001 · Staff Wages** | | | | |
| **5002 · Salary - Operations** | 2,340 | 0 | 2,340 | 100% |
| **5004 · Salary - Admin** | 26,910 | 0 | 26,910 | 100% |
| **5006 · Hourly - Operations** | 17,344 | 0 | 17,344 | 100% |
| **5008 · Hourly - Admin** | 2,601 | 0 | 2,601 | 100% |
| **5001 · Staff Wages - Other** | 0 | 48,465 | -48,465 | -100% |
| **Total 5001 · Staff Wages** | 49,195 | 48,465 | 730 | 2% |
| **5010 · Deferred Comp Company Expense** | 1,464 | 1,425 | 39 | 3% |
| **5050 · Part Time & Emergency Pay** | 2,193 | 2,225 | -32 | -1% |
| **5055 · Vacation Pay Expense** | 6,098 | 5,261 | 837 | 16% |
| **5056 · Sick Pay Expense** | 1,060 | 1,033 | 27 | 3% |
| **5057 · Sick Leave Buy Back** | 0 | 0 | 0 | 0% |
| **5060 · Social Security Expense** | 3,598 | 3,468 | 130 | 4% |
| **5065 · Medicare Expense** | 841 | 811 | 30 | 4% |
| **5080 · Employee Insurance Expense** | 9,177 | 10,604 | -1,427 | -13% |
| **5081 · Employee Life Insurance Expense** | 433 | 475 | -42 | -9% |
| **5082 · FSA Fees** | 80 | 80 | 0 | 0% |
| **5083 · OR-WBF Assessment Expense** | 11 | 14 | -3 | -21% |
| **5100 · PERS Expense** | 14,903 | 13,611 | 1,292 | 9% |
| **5110 · Unemployment Expense** | 0 | 0 | 0 | 0% |
| **5120 · Payroll Advance** | 0 | 0 | 0 | 0% |
| **Total 5000 · Personal Services** | 89,053 | 87,472 | 1,581 | 2% |
| **5200 · Materials & Services** | | | | |
| **5210 · Purification Expense** | 8,095 | 6,501 | 1,594 | 25% |
| **5220 · Telephone & Telemetry** | 693 | 1,259 | -566 | -45% |
| **5230 · Pump Power & Electric** | 24,842 | 23,993 | 849 | 4% |
| **5240 · Maintenance-Vehicles** | 4,248 | 5,063 | -815 | -16% |
| **5245 · Maintenance - CWTP** | 172 | 6,874 | -6,702 | -97% |
| **5247 · Maintenance - WCCP** | 3,035 | 5,762 | -2,727 | -47% |
| **5250 · Maintenance-Pumps/Wells** | 0 | 250 | -250 | -100% |
| **5260 · Maintenance-Mains** | 1,090 | 0 | 1,090 | 100% |
| **5270 · Maintenance-Meters & Services** | 1,678 | -261 | 1,939 | 743% |
| **5280 · Maintenance - Other** | 1,759 | 3,730 | -1,971 | -53% |
| **5285 · Maintenance-Reservoirs** | 94 | 0 | 94 | 100% |
| **5290 · Customer Postage** | 175 | 2,458 | -2,283 | -93% |
| **5300 · General Office Expense** | 1,468 | 778 | 690 | 89% |
| **5305 · Transaction Fee Processing** | 2,830 | 1,076 | 1,754 | 163% |
| **5330 · Budget & Election Expense** | 2,736 | 2,675 | 61 | 2% |
| **5360 · Dues, School & Convention Exp** | 558 | 2,052 | -1,494 | -73% |
| **5380 · Street Light Expense** | 498 | 490 | 8 | 2% |
| **Total 5200 · Materials & Services** | 53,971 | 62,700 | -8,729 | -14% |
| **5400 · Contractual** | | | | |
| **5420 · Legal Expense** | 783 | 0 | 783 | 100% |
| **5427 · IT - Subscriptions** | 3,509 | 0 | 3,509 | 100% |
| **5440 · Engineering Studies - PFAS** | 1,543 | 0 | 1,543 | 100% |
| **Total 5400 · Contractual** | 5,835 | 0 | 5,835 | 100% |
| **5500 · Capital Outlay** | | | | |
| **5510 · Mains** | 0 | 39,530 | -39,530 | -100% |
| **5580 · Wells and Wellfield** | 15,650 | 0 | 15,650 | 100% |
| **Total 5500 · Capital Outlay** | 15,650 | 39,530 | -23,880 | -60% |
| **Total Expense** | 164,509 | 189,702 | -25,193 | -13% |
| **Net Ordinary Income** | 53,885 | 190,273 | -136,388 | -72% |
| **Other Income/Expense** | | | | |
| **Other Income** | | | | |
| **70000 · CAPITAL RESERVE FUND** | | | | |
| **7010 · Capital Reserve - Interest** | 2,103 | 718 | 1,385 | 193% |
| **Total 70000 · CAPITAL RESERVE FUND** | 2,103 | 718 | 1,385 | 193% |
| **70500 · RESILIENCE FUND** | | | | |
| **7110 · Resilience Fund - Interest** | 1,795 | 511 | 1,284 | 251% |
| **Total 70500 · RESILIENCE FUND** | 1,795 | 511 | 1,284 | 251% |
| **8000 · Fire Protection-Income** | | | | |
| **8010 · Fire Protection - Tax Income** | 2,377 | 6,015 | -3,638 | -60% |
| **8030 · Fire Protection - Interest** | 1,733 | 574 | 1,159 | 202% |
| **Total 8000 · Fire Protection-Income** | 4,110 | 6,589 | -2,479 | -38% |
| **Total Other Income** | 8,008 | 7,818 | 190 | 2% |
| **Other Expense** | | | | |
| **8500 · Fire Protection-Expense** | | | | |
| **8545 · Fire Fund - Transfers Out** | 0 | 148,216 | -148,216 | -100% |
| **Total 8500 · Fire Protection-Expense** | 0 | 148,216 | -148,216 | -100% |
| **Total Other Expense** | 0 | 148,216 | -148,216 | -100% |
| **Net Other Income** | 8,008 | -140,398 | 148,406 | 106% |
| **Net Income** | **61,893** | **49,875** | **12,018** | **24%** |

# Rainbow Water District
## Profit & Loss
### September 2022 through September 2023

| | Sep 22 | Oct 22 | Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 | Jul 23 | Aug 23 | Sep 23 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ordinary Income/Expense | | | | | | | | | | | | | | |
| Income | | | | | | | | | | | | | | |
| 4010 · Water Sales - District | 129,011 | 89,821 | 72,436 | 67,739 | 64,756 | 66,546 | 66,013 | 68,625 | 72,258 | 191,718 | 104,468 | 159,869 | 126,450 | 1,279,711 |
| 4015 · Water Sales-SUB | 93,900 | 66,503 | 52,136 | 50,455 | 54,866 | 52,136 | 57,740 | 58,520 | 70,844 | 85,907 | 114,703 | 118,180 | 79,660 | 955,549 |
| 4020 · Service Connection Charges | 1,827 | 688 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,515 | 0 | 0 | 0 | 5,031 |
| 4030 · DRC's | 2,931 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2,931 |
| 4040 · Interest Income-Water | 179 | 548 | 665 | 645 | 657 | 348 | 302 | 387 | 652 | 507 | 226 | 178 | 580 | 5,873 |
| 4050 · Reimbursed Labor | 49 | 281 | 1,591 | 258 | 310 | 0 | 0 | 597 | 0 | 2,771 | 0 | 760 | 4,080 | 10,696 |
| 4060 · Account Processing Fees | 150 | 270 | 225 | 265 | 150 | 190 | 145 | 115 | 285 | 230 | 220 | 255 | 305 | 2,805 |
| 4065 · Late Fees | 420 | 410 | 330 | 520 | 430 | 420 | 410 | 450 | 420 | 430 | 470 | 350 | 450 | 5,510 |
| 4070 · Reconnection Charges | 200 | 100 | 0 | 525 | 25 | 50 | 95 | 200 | 150 | 150 | 200 | 125 | 50 | 1,870 |
| 4085 · Water Fund - Transfers In | 148,216 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128,740 | 0 | 0 | 0 | 0 | 276,956 |
| 4090 · Miscellaneous Income | 68 | 175 | -175 | -1,458 | 245 | -74 | 0 | 0 | 68 | 136 | 45 | 966 | 937 | 933 |
| 4095 · Fire Hydrant Maintenance | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,113 | 0 | 0 | 0 | 0 | 5,113 |
| 4100 · Bad Debts Recovered | 73 | 0 | 0 | 0 | 0 | 0 | 0 | 115 | 0 | 0 | 558 | 0 | 0 | 745 |
| 4120 · Marcola Contract Income | 775 | 1,194 | 822 | 1,755 | 1,756 | 1,008 | 1,879 | 3,212 | 2,783 | 7,303 | 1,479 | 3,486 | 2,229 | 29,680 |
| 4140 · Shangri La Contract Income | 48 | 681 | 1,550 | 770 | 249 | 402 | 314 | 596 | 459 | 321 | 276 | 572 | 498 | 6,735 |
| 4160 · DCWA Contract Income | 663 | 1,217 | 1,425 | 2,160 | 2,859 | 915 | 4,653 | 1,201 | 1,446 | 917 | 969 | 1,139 | 1,147 | 20,708 |
| 4180 · Shenandoah Income | 1,226 | 709 | 421 | 337 | 432 | 408 | 499 | 1,012 | 482 | 447 | 630 | 2,211 | 855 | 9,667 |
| 4190 · Blue River Contract Income | 239 | 705 | 487 | 628 | 770 | 1,317 | 543 | 706 | 3,559 | 901 | 635 | 617 | 1,153 | 12,258 |
| Total Income | 379,973 | 163,302 | 131,912 | 124,598 | 127,504 | 123,665 | 132,591 | 135,735 | 287,258 | 294,253 | 224,877 | 288,708 | 218,393 | 2,632,771 |
| Gross Profit | 379,973 | 163,302 | 131,912 | 124,598 | 127,504 | 123,665 | 132,591 | 135,735 | 287,258 | 294,253 | 224,877 | 288,708 | 218,393 | 2,632,771 |
| Expense | | | | | | | | | | | | | | |
| 5000 · Personal Services | 87,474 | 86,951 | 87,234 | 87,626 | 86,468 | 81,587 | 86,603 | 83,629 | 87,000 | 107,287 | 116,754 | 92,723 | 89,053 | 1,180,390 |
| 5200 · Materials & Services | 62,698 | 50,818 | 51,864 | 42,586 | 46,216 | 45,982 | 45,368 | 48,422 | 40,757 | 106,744 | 1,932 | 65,082 | 53,971 | 662,439 |
| 5350 · CWTP - Loan / Interest Exp | 0 | 0 | 148,216 | 0 | 0 | 0 | 0 | 0 | 0 | -106,958 | 0 | 0 | 0 | 41,258 |
| 5400 · Contractual | 0 | 0 | 0 | 10,608 | 58,878 | 141 | 9,424 | 3,498 | 10,921 | 21,749 | -152 | 522 | 5,835 | 121,427 |
| 5500 · Capital Outlay | 39,530 | 41,648 | 9,055 | 14,776 | 12,405 | 6,945 | 0 | 0 | 25,249 | 57,461 | 0 | 0 | 15,650 | 222,718 |
| 7035 · Capital Res Capital - Vehicles | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 116,798 | 0 | 0 | 0 | 116,798 |
| Total Expense | 189,702 | 179,417 | 296,368 | 155,596 | 203,967 | 134,655 | 141,396 | 135,549 | 163,927 | 303,080 | 118,535 | 158,328 | 164,509 | 2,345,028 |
| Net Ordinary Income | 190,271 | -16,114 | -164,456 | -30,998 | -76,463 | -10,989 | -8,805 | 186 | 123,331 | -8,827 | 106,343 | 130,380 | 53,885 | 287,742 |
| Other Income/Expense | | | | | | | | | | | | | | |
| Other Income | | | | | | | | | | | | | | |
| 70000 · CAPITAL RESERVE FUND | 718 | 821 | 1,049 | 301,742 | 2,230 | 2,236 | 2,495 | 2,423 | 2,324 | 2,047 | 1,915 | 2,067 | 2,103 | 324,171 |
| 70500 · RESILIENCE FUND | 511 | 584 | 747 | 849 | 975 | 977 | 1,092 | 1,060 | 1,100 | 122,190 | 1,634 | 1,764 | 1,795 | 135,279 |
| 8000 · Fire Protection-Income | 6,589 | 7,186 | 1,073,431 | 490,901 | 23,948 | 16,430 | 38,980 | 9,821 | 7,804 | 36,849 | 2,491 | 5,508 | 4,110 | 1,724,047 |
| Total Other Income | 7,819 | 8,591 | 1,075,227 | 793,493 | 27,153 | 19,644 | 42,567 | 13,303 | 11,228 | 161,085 | 6,041 | 9,338 | 8,008 | 2,183,496 |

| | Sep 22 | Oct 22 | Nov 22 | Dec 22 | Jan 23 | Feb 23 | Mar 23 | Apr 23 | May 23 | Jun 23 | Jul 23 | Aug 23 | Sep 23 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other Expense | | | | | | | | | | | | | | |
| 5700 · Capital Outlay Offset | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -349,139 | 0 | 0 | 0 | -349,139 |
| 6540 · Depreciation Expense | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 240,118 | 0 | 0 | 0 | 240,118 |
| 6550 · Water Fund - Transfers Out | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 121,000 | 0 | 0 | 0 | 121,000 |
| 7030 · Capital Reserve - Transfers Out | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128,740 | 0 | 0 | 0 | 0 | 128,740 |
| 8500 · Fire Protection-Expense | 148,216 | 0 | 0 | 300,000 | 619,416 | 0 | 309,708 | 0 | 0 | 309,708 | 0 | 0 | 0 | 1,687,047 |
| Total Other Expense | 148,216 | 0 | 0 | 300,000 | 619,416 | 0 | 309,708 | 0 | 128,740 | 321,686 | 0 | 0 | 0 | 1,827,766 |
| Net Other Income | -140,397 | 8,591 | 1,075,227 | 493,493 | -592,263 | 19,644 | -267,141 | 13,303 | -117,512 | -160,601 | 6,041 | 9,338 | 8,008 | 355,731 |
| Net Income | 49,874 | -7,523 | 910,771 | 462,495 | -668,726 | 8,654 | -275,945 | 13,488 | 5,819 | -169,428 | 112,383 | 139,719 | 61,892 | 643,473 |

DIVIDER PAGE

# RESOLUTIONS

**RESOLUTION 2023-19**
**RAINBOW WATER DISTRICT**
**RESOLUTION REGARDING A PARTIAL**
**SETTLEMENT OF THE PFAS LITIGATION**

**WHEREAS,** Rainbow Water District is a domestic water supply district under Oregon Revised Statues Chapter 264 which provides that "the power and authority given to districts is vested in and shall be exercised by a board of five commissioners, each of whom shall be an elector of the district", and the Rainbow Water District Board of Commissioners also serves as the Local Contract Review Board, and

**WHEREAS,** the District's Board of Commissioners met on October 11, 2023 to discuss the two partial settlements of the pending PFAS litigation as relates to DuPont (and entities related to DuPont) and 3M, and

**NOW, THEREFORE, BE IT RESOLVED** that the Rainbow Water District Board of Commissioners approves proceeding with the settlement agreements with DuPont (and entities related to DuPont) and 3M and hereby authorizes and instructs retained legal counsel NOT to opt out of either settlement and to take all necessary steps for Rainbow Water and Fire District doing business as Rainbow Water District to execute any and all documents in furtherance of the same.

ADOPTED by a vote of ___________ Yes votes and _____________ No votes this 11th day of October 2023.

___________________________________________
President
Board of Commissioners

Attest:

___________________________________________
Secretary-Treasurer

# DIVIDER PAGE

# PROGRAM
# OR POLICY
# REVIEW

# Understanding Water Well Rehabilitation

MARKETING SEPTEMBER 6, 2020 WELL SERVICES

As water wells age, the rate at which water may be pumped (commonly referred to as the well yield, flow, or performance) tends to decrease, especially in wells that were not properly developed when first drilled. This article briefly describes common well problems and discusses rehabilitation measures.

## Water Well Maintenance

Water wells require regular maintenance to ensure adequate water flow and continued water quality. Every 1 years water quality testing is recommended for bacteria, total dissolved solids, and land uses occurring or expected to occur within sight of the well. Additionally, if there are unusual stains, tastes, or odors in water, s testing that will help identify the source of these symptoms.

Water wells should also be inspected annually for obvious signs of damage or contamination. Additionally, be sure the area within 100 feet around the well is clear of debris or items that might pollute the water supply.

It’s also recommended that you get your wells professionally inspected by a water well contractor at least eve ten years. Furthermore, copies of all records related to the history of each well should be maintained:

- Water well completion report or log (if you have it) which should include information such as water well depth, date drilled, construction (including casing specifications, grouting, and screen), and water well yie flow rate in gallons per minute (gpm)
- Water quality test reports
- Past inspection reports, including video inspections
- Invoices for work done by water well contractors (including pump replacement and maintenance)
- Well equipment makes/models, warranties, invoices, and manuals

Most of these items should be available by contacting the drilling contractor, well development company, consulting engineer, or the geologist.

## Well Performance Over Time

As water wells age, the rate at which water may be pumped tends to decrease, especially in wells that were r properly developed when first drilled. A drop or complete loss of water production from a well can sometime occur even in relatively new wells due to a lowered water level from persistent drought or over-pumping of tl well which can dewater the water-bearing zones. More often, reduced well yield over time can be related to changes in the water well itself including:

- Incrustation from mineral deposits
- Bio-fouling by the growth of microorganisms
- Physical plugging of the “aquifer” (the saturated layer of sand, gravel, or rock through which water is transmitted) by sediment
- Sand pumping
- Well screen or casing corrosion
- Pump wear or damage

# Water Well Rehabilitation

Measures taken to correct these problems are referred to as well rehabilitation or restoration. A successful w rehabilitation will maximize the flow of water from the well and minimize pumping costs. The chances for successful rehabilitation are dependent on the cause(s) of poor well performance and the degree to which th problem has progressed.

Upon noticing the loss of performance in your well have a professional water well contractor inspect your we preferably with a specialized downhole camera or video equipment.

A common measure of well performance (or capacity) is referred to as the “specific capacity” which is defined the pumping rate (gallons per minute) divided by the drawdown or increased depth to water during pumping feet).

Generally, a decrease of 25% or more in well yield indicates that rehabilitation is in order. Delaying rehabilita procedures can significantly increase costs and in some cases make rehabilitation impossible.

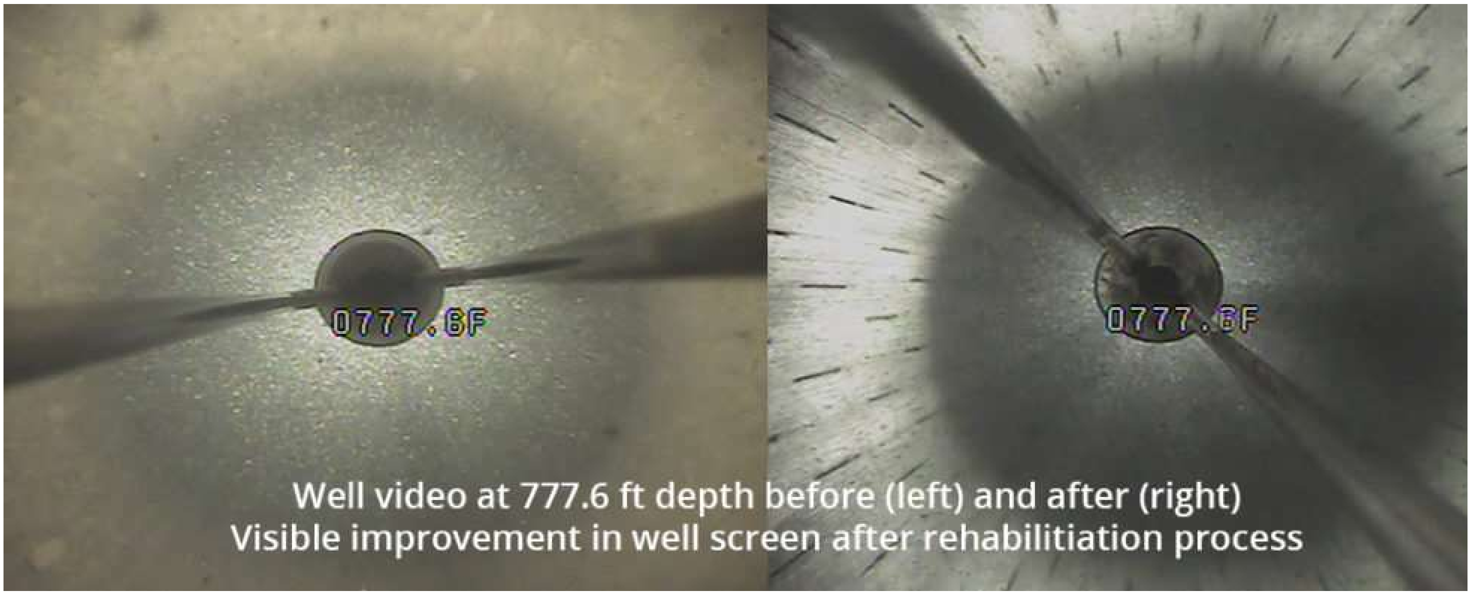
To detect deterioration of well performance, you must have a point of reference. Often this reference is the original well construction and pump test data which are normally supplied to you by the well driller (well completion report) or well log when the well was installed and developed. However, even if you do not have t information, significant changes in your well’s performance are also a warning sign. Major changes in any of following well characteristics are an indication that your well or pump needs attention:

- Decreased pumping rate
- Decreased water level
- Decreased specific capacity
- Increased sand or sediment content in the water (cloudiness)
- Decreased total well depth

# Well Rehabilitation Methods

The most common rehabilitation methods for water wells include one or more of the following treatments:

- Chemicals/acids to dissolve obstructing materials in the well
- AirShock® the well with high-pressure gas (pulsing shock waves and oscillating gas bubbles)
- Physical/mechanical methods (i.e. brushes, pressure jetting, surging, etc.)
- A combination of several methods




[IMAGE: Well video images showing fouled (before) and cleared (after) well screen]

Sometimes contractors will use a combination of these methods depending upon the reason(s) for the decrea in well performance.

## Reduced Yield from Incrustation or Bio-Fouling

Chemical and biological incrustation are common causes of reduced well performance. Incrustations are phy obstructions that develop on well screens and rock fractures or openings delivering water to the well screen borehole.

In severe cases, the obstructions to flowing water can render the well useless. Major forms of incrustations ca occur from build-up of calcium and magnesium salts, iron and manganese compounds, or plugging caused b slime producing iron bacteria or other similar organisms (bio-fouling).

## Treatment of Well Incrustation

The principal means used for rehabilitation of chemical incrustation problems involves the use of strong acic solutions to dissolve incrusting materials. These acids are typically placed in the well for 24-48 hours for opti performance.

Once loosened or dissolved, the incrusting materials are pumped from the well with the acid solution for disposal. The type of acid to be used, its form (liquid, granular, pelletized), the procedures used to introduce agitate the acid solution, and the severity of incrustation all play a part in determining the success of acid treatment. It is common for acid-treated older wells to completely recover or even exceed the original well yie assuming any material dislodged by the acid is properly removed from the well.

While acid treatment methods for incrustation removal are very effective, physical agitation methods like AirShock® and mechanical brushing are often used in conjunction with acid treatment to improve results.

## Treatment of Bio-Fouling

The primary cause of bio-fouling, or biological clogging, of well screens and rock fractures is attributed to iror bacteria. These and other similar bacteria create a slimy, voluminous "biomat" that plugs or clogs the well scr

Rapid growth of these bacteria can quickly clog well screen pores and render a well virtually useless in a mat of months. Once iron bacteria become established in a well, they can be extremely difficult to eradicate.

Treating iron bacteria colonies in water wells is often a perpetual process that seeks to maintain well performance at an acceptable level. In general, chemical means of control are most effective. However, best results are achieved when chemical bactericides are used in conjunction with physical agitation of the boreh water to remove the biological residue.

Chemical treatment of iron bacteria problems may not be effective without subsequent agitation of the well water. Turbulent flow causes greater surface area exposure of slime growths to the chemical solution and as in dislodging obstructions.

Since precipitation of iron in the bacteria biomatting contributes to clogging of flow spaces, rehabilitation res are usually improved when acid treatments are alternated with bactericide treatments.

## Failure Caused by Physical Plugging and Sand Pumping

A portion of the loss in well performance over time can often be attributed to the slow migration of fine parti from the aquifer toward the borehole and into the well screen. In some cases, the screen itself can become clogged. To prevent pump damage, the replacement of a deteriorating screen is frequently a good decision. There are several reasons for sediment plugging including:

- Improper well design (poor screen placement, slot design, etc.)
- Insufficient or no well development during the initial well construction
- Removal of aquifer formation cementing materials holding sands together
- Screen and/or casing corrosion
- Over pumping of the well beyond its designed capacity

## Treatment of Physical Plugging

The most important preventative measure to avoid physical plugging is proper well development during the initial construction. Adequate well development will stabilize the aquifer material so that subsequent pumpi from the well will not result in excessive sediment removal. Removal of fine silt and clay particles introduced some drilling fluids, or which naturally occur in certain kinds of aquifers, can only be accomplished with the u of chemical treatments.

As with other chemical rehabilitation treatments, agitation of the chemical into and out of the aquifer format is crucial to the success of the operation. This agitation may be provided by a surge plunger, compressed air, pump, or a high-velocity jet. The use of a high-velocity jet is generally recognized as the most effective means agitation. When water from the well is re-circulated for jetting, sediment should be removed prior to reuse. Continuous removal of dislodged sediment, as done in a recirculating jet operation, gives the best results as cleaning solution is able to penetrate more deeply into the aquifer medium.

## Failure Caused by Corrosion

Corrosion of metal well casing and other components can seriously reduce the useful life of a well in several ways.

Corroded and enlarged well screen holes may lead to sand pumping, which in turn results in abrasive deterioration of pump parts and enlarged screen openings leading to excessive sediment velocities.

In this case, abrasive materials carried in high-velocity flows can lead to erosion of the screen openings. A scr or well casing that has undergone significant corrosive deterioration may collapse altogether. A final negative impact of well corrosion is that water from a seriously affected well may be such low quality that uses are lim

## Treatment of Well Corrosion

The best way to avoid or fix corrosion problems is to select appropriate corrosion-resistant casing and screen materials. Carbon steel screens are less expensive than stainless steel but are more susceptible to corrosion Keep in mind that excessive acid-rehabilitation well treatments can also significantly accelerate general corrosion.

## Failure Caused by Pump Damage

Water well pump damage is usually the result of one or more of the following factors:

- Pumping of abrasive sand or sediment
- Corrosion of pump parts
- Excessively high operating temperatures
- Pump cavitation

Abrasive deterioration resulting from sand pumping is the leading cause of pump failure.

Excessive sediment concentrations in well water can be brought about by inadequate initial well developmer absence of a well screen in a loose rock formation, oversized screen openings, excessive well screen entrance water velocities resulting from undersized openings, or well screen corrosion.

## Treatment of Pump Damage

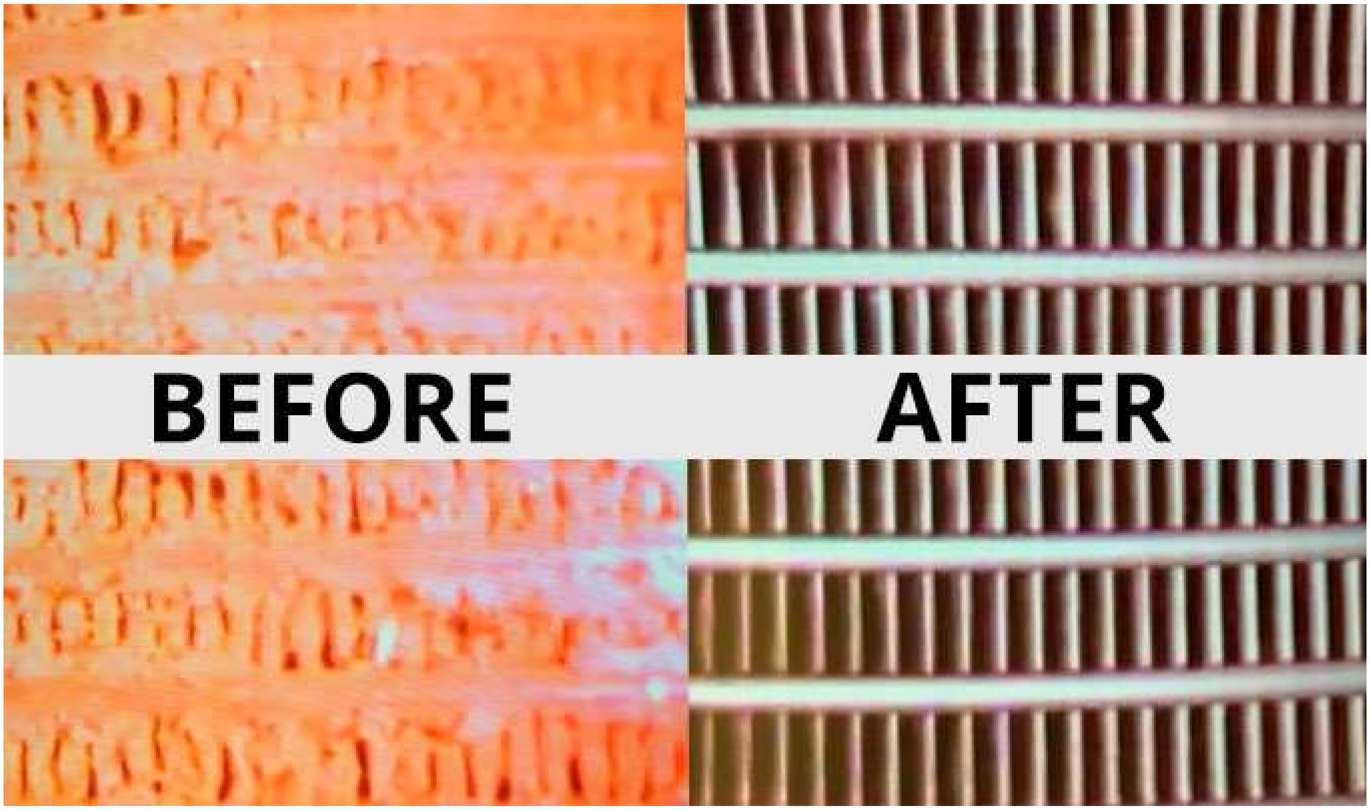
Usually, a pump will show some evidence that maintenance is in order. Most major causes of pump failure ar related to mechanical problems such as bearings, stuffing boxes, impellers, and pump bowl assemblies. Maintenance, repair and replacement of the pump and motor parts should be in accordance with the manufacturer’s recommendations by an experienced well or pump contractor.

Correction of recurring sand pumping problems is in some cases cost-prohibitive. Total well replacement ma the long run be more economical than rehabilitation of a severely deteriorated well. This is especially true of shallow wells.

However, when drilling a new well is not feasible, it is sometimes possible to extract and replace a severely damaged well screen in the existing well. Installation of a smaller diameter screen (also known as a liner) ins the original well screen has also been used as a remedy. Various devices can also be installed to even out or reduce the flow of water entering the well and thus reduce the potential for sand pumping.

## Summary

If your well begins to demonstrate the symptoms of poor performance, don’t delay in contacting a profession water well contractor. The sooner that they can inspect the well to find the problem and treat it, the more like you are to have a successful water well rehabilitation.




[IMAGE: Well screen before and after comparison following AirShock® treatment]

# Development of Water Wells

Procedures designed to maximize well yield are included in the term “well development”. Development has two broad objectives : (1) repair damage done to the formation by the drilling operation so that natural hydraulic properties are restored, and (2) alter the basic physical characteristics of the aquifer near the borehole so that water will flow more freely to the well. These objectives are accomplished by applying some form of energy to the screen and formation. Well development is confined mainly to a zone immediately adjacent to the well, where the formation materials have been disturbed by the well construction procedures or adversely affected by drilling fluids. In addition, the undisturbed part of the aquifer just outside the damaged zone may be reworked physically during development to improve its natural hydraulic properties.

All new wells should be developed before being put into production to achieve sand-free water at the highest possible efficiency. In addition, older wells often require periodic redevelopment to maintain or even improve the original well yield and drawdown conditions. Maintaining a high specific capacity (i.e. efficiency) assures that the well will be energy efficient.

In natural development, a highly permeable zone is created around the screen from materials existing in the formation. Creation of this zone is best understood by visualizing what happens throughout a series of concentric cylindrical zones in a sand aquifer surrounding the screen. In the zone next to the screen, development removes most particles smaller than the screen openings, leaving only the coarsest material in place. A little farther out, some medium-sized grains remain mixed with the coarse sediment. Beyond that zone, the material gradually grades back to the original character of the water-bearing formation (Figure 15.3). Finer particles brought into the screen are removed by bailing, pumping, or air-lift from the drilling rig compressor. Development work is continued until the movement of fines from the formation becomes negligible.

By creating this succession of graded zones around the screen, development stabilizes the formation and prevents further movement of sediment. After development, water moving toward the screen encounters sediment with increasing hydraulic conductivity and porosity. Improving the hydraulic conditions around the well will increase the specific capacity and efficiency. Thus, more water can be produced by the well, and for any yield the cost of lifting the water will be minimized.

**Causes of Unstable, Sand-Pumping Wells**

If the aquifer formation consists of interbedded fine and coarse materials, screen slot openings may mistakenly be chosen for the coarser layers only, allowing the finer layer materials to pass through the screen and result in an unstable sandpumping well. This is a common occurrence in air rotary drilling where thin layers of fine sand may be mixed with the coarse material in the drill cuttings brought to the surface and the finer layer will remain undetected by the driller, leading to selection of a screen with over-large slot openings. In such cases, an excessive amount of development time may be required to rearrange the material, withdrawing the finer layer next to the screen and agitating the coarser layer sufficiently to move it into the voids thus created.

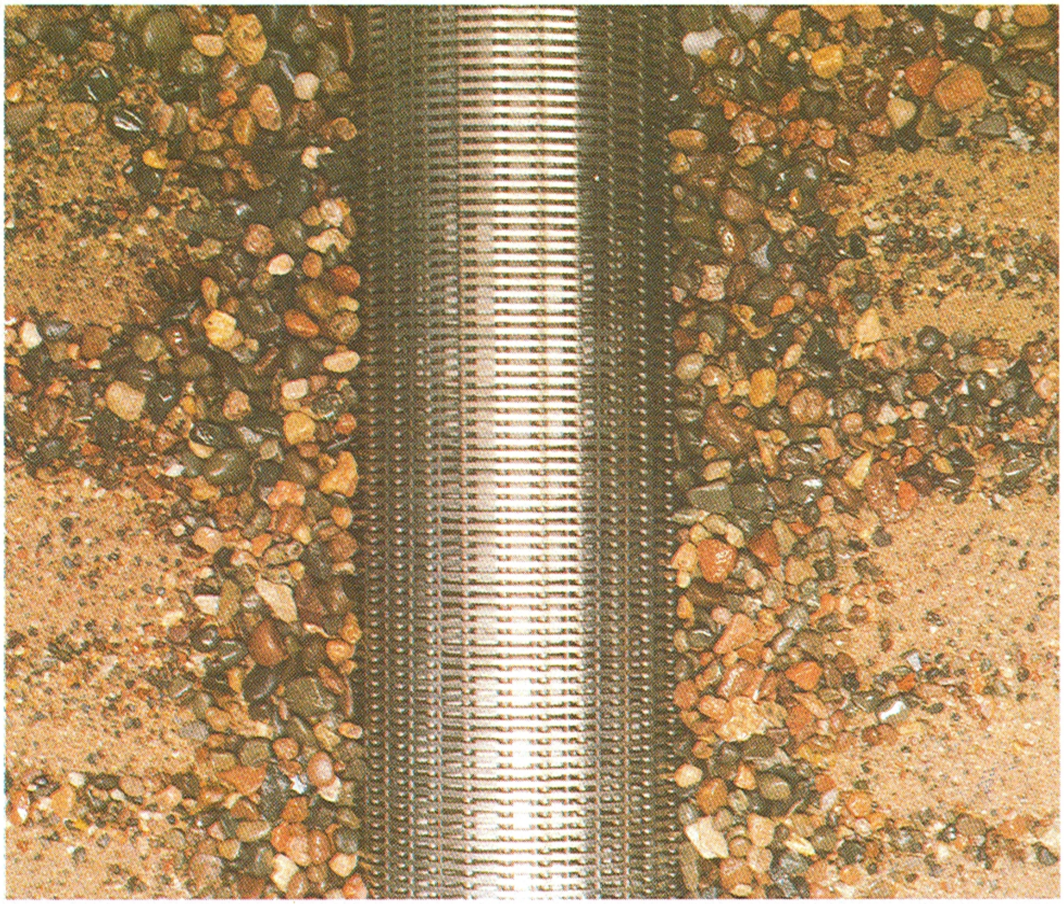


**Figure 15.3. Natural development removes most particles near the well screen that are smaller than the slot openings, thereby increasing porosity and hydraulic conductivity in a zone surrounding the screen.**

Another cause of instability is when a well in service is overpumped with water flowing in only one direction (toward the screen), some larger sand grains may be left in a bridged condition, resulting in a formation that is unstable (Figure 15.4). If this condition exists and the formation is agitated during normal pump on-off cycles, finer sediment may pass between the bridged material, or the bridged material may become unstable and collapse, causing the well to pump sand.

Sand bridging may also occur when a new well is developed for a short period only using air-lift from the drilling rig compressor to blow out the well. This method is usually insufficient to form a natural graded filter around the screen.

Effective development procedures should cause reversals of flow through the screen openings that will agitate the sediment, remove the finer fraction, and then rearrange the remaining formation particles (Figure 15.5). Reversing the direction of flow breaks down the bridging between large particles and across screen openings that results when water flows in only one direction. The backflow portion of a backwashing cycle breaks down bridging, and the inflow then moves the fine material toward the screen and into the well.

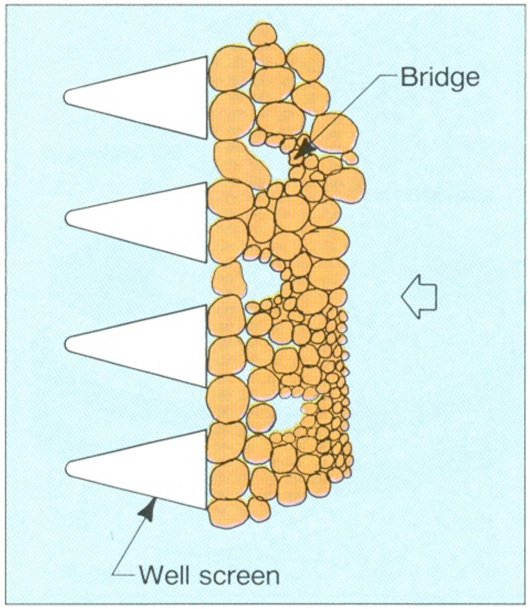



**Figure 15.4. During development by overpumping, sand grains can bridge openings because flow occurs in only one direction. Once the well is placed into service, agitation by normal pump cycling can break down the bridges, causing sand pumping.**

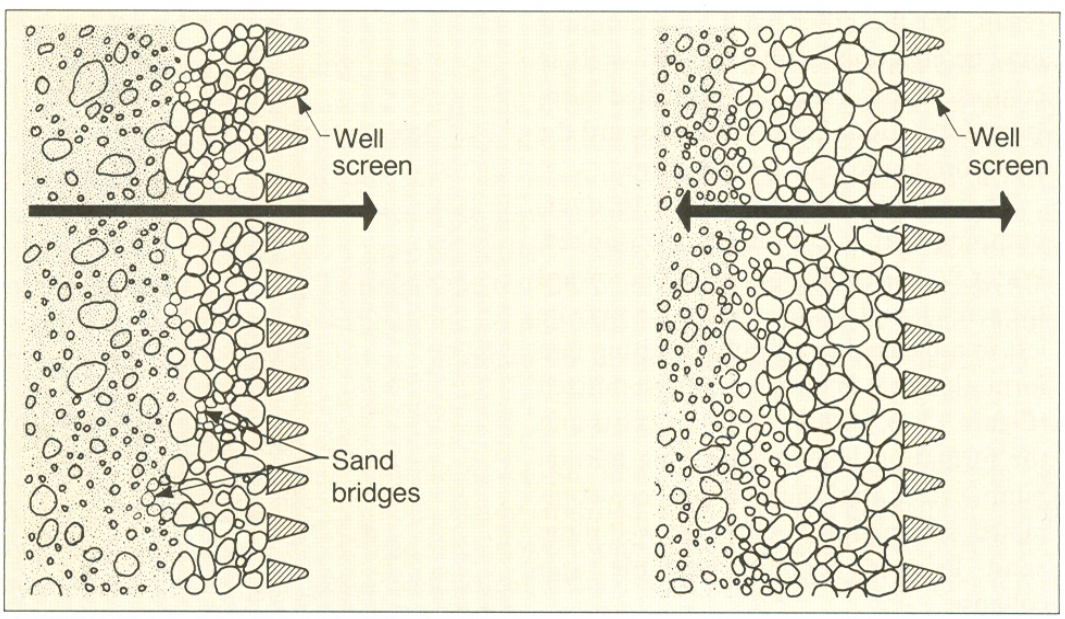



**Figure 15.5. Effective development action requires movement of water in both directions through screen openings. Reversing flow helps break down bridging of particles. Movement in only one direction, as when pumping from the well, does not produce the proper development effect.**

Different types of formations are developed more effectively by using certain development methods. For example, highly stratified, coarse-grained deposits are most effectively developed by methods that concentrate energy on small parts of the formation. In uniform deposits, development methods that apply powerful surging forces over the entire well bore produce highly satisfactory results. Other development methods that withdraw or inject large volumes of water or air quickly can actually reduce the natural hydraulic conductivity of formations containing a significant amount of silt and clay.

Different well development procedures have evolved in different regions because of the physical characteristics of aquifers and the type of drilling rig used to drill the well. Any development procedure applied should be able to clean the well so that it produces sand-free water.

**Mechanical Surging**

The traditional method of development is to force water to flow into and out of a screen by operating a plunger up and down in the casing, similar to a piston in a cylinder. The tool normally used is called a surge block. Periodically during the surging process fine material drawn in through the screen is removed from the borehole using a suction bailer.

Before starting to surge, the well is bailed to clean the bottom of accumulated sand and scale. The surge block is lowered into the well until it is beneath the static water level, but above the screen or packer and the initial surging motion should be relatively gentle, allowing any material blocking the screen to break up, go into suspension, and then move into the well. The surge block must be operated with particular care if the formation above the screen consists mainly of fine sand or silt which may slump into the screen. As water begins to move easily both into and out of the screen and the well appears to be stabilizing, the surging tool is lowered into the screen and worked progressively downward. Particular attention is given to zones that produce a large amount of sand, or other zones that appear to be blocked requiring harder surging action to loosen the formation material and increase the flow of water.

Surging and bailing are continued until little or no sand can be pulled into the well. Total development time may range from about two hours for small wells to many days for large wells with long screens.

---

Reference :

Driscoll, F.G.; ***Groundwater and Wells***; Published by U.S. Filter/Johnson Screens, St. Paul, Minnesota; 2nd Ed. 1986.

DIVIDER PAGE

INFORMATION ONLY

# Artificial intelligence tech behind ChatGPT guzzles Iowa water, researchers say

Published: Sep. 11, 2023, 11:39 a.m.


A Microsoft data center is seen near Interstate 35, Tuesday, Sept. 5, 2023, in West Des Moines, Iowa. Microsoft has been amassing a cluster of data centers to power its cloud computing services for more than a decade. Its fourth and fifth data centers in the city are due to open later this year. AP Photo/Charlie Neibergall

**By Matt O’Brien and Hannah Fingerhut | The Associated Press**

The cost of building an artificial intelligence product like ChatGPT can be hard to measure.

But one thing Microsoft-backed OpenAI needed for its technology was plenty of water, pulled from the watershed of the Raccoon and Des Moines rivers in central Iowa to cool a powerful supercomputer as it helped teach its AI systems how to mimic human writing.

As they race to capitalize on a craze for generative AI, leading tech developers including Microsoft, OpenAI and Google have acknowledged that growing demand for their AI tools carries hefty costs, from expensive semiconductors to an increase in water consumption.

But they’re often secretive about the specifics. Few people in Iowa knew about its status as a birthplace of OpenAI’s most advanced large language model, GPT-4, before a top Microsoft executive said in a speech it “was literally made next to cornfields west of Des Moines.”

Building a large language model requires analyzing patterns across a huge trove of human-written text. All of that computing takes a lot of electricity and generates a lot of heat. To keep it cool on hot days, data centers need to pump in water — often to a cooling tower outside its warehouse-sized buildings.

In its latest environmental report, Microsoft disclosed that its global water consumption spiked 34% from 2021 to 2022 (to nearly 1.7 billion gallons, or more than 2,500 Olympic-sized swimming pools), a sharp increase compared to previous years that outside researchers tie to its AI research.

“It’s fair to say the majority of the growth is due to AI,” including “its heavy investment in generative AI and partnership with OpenAI,” said Shaolei Ren, a researcher at the University of California, Riverside who has been trying to calculate the environmental impact of generative AI products such as ChatGPT.

In a paper due to be published later this year, Ren’s team estimates ChatGPT gulps up 500 milliliters of water (close to what’s in a 16-ounce water bottle) every time you ask it a series of between 5 to 50 prompts or questions. The range varies depending on where its servers are located and the season. The estimate includes indirect water usage that the companies don’t measure — such as to cool power plants that supply the data centers with electricity.

“Most people are not aware of the resource usage underlying ChatGPT,” Ren said. “If you’re not aware of the resource usage, then there’s no way that we can help conserve the resources.”

Google reported a 20% growth in water use in the same period, which Ren also largely attributes to its AI work. Google's spike wasn't uniform -- it was steady in Oregon where its water use has attracted public attention, while doubling outside Las Vegas. It was also thirsty in Iowa, drawing more potable water to its Council Bluffs data centers than anywhere else.

In response to questions from The Associated Press, Microsoft said in a statement this week that it is investing in research to measure AI's energy and carbon footprint "while working on ways to make large systems more efficient, in both training and application."

"We will continue to monitor our emissions, accelerate progress while increasing our use of clean energy to power data centers, purchasing renewable energy, and other efforts to meet our sustainability goals of being carbon negative, water positive and zero waste by 2030," the company's statement said.

OpenAI echoed those comments in its own statement Friday, saying it's giving "considerable thought" to the best use of computing power.

“We recognize training large models can be energy and water-intensive” and work to improve efficiencies, it said.

Microsoft made its first $1 billion investment in San Francisco-based OpenAI in 2019, more than two years before the startup introduced ChatGPT and sparked worldwide fascination with AI advancements. As part of the deal, the software giant would supply computing power needed to train the AI models.

To do at least some of that work, the two companies looked to West Des Moines, Iowa, a city of 68,000 people where Microsoft has been amassing data centers to power its cloud computing services for more than a decade. Its fourth and fifth data centers are due to open there later this year.

“They’re building them as fast as they can,” said Steve Gaer, who was the city’s mayor when Microsoft came to town. Gaer said the company was attracted to the city’s commitment to building public infrastructure and contributed a “staggering” sum of money through tax payments that support that investment.

“But, you know, they were pretty secretive on what they’re doing out there,” he added.

Microsoft first said it was developing one of the world’s most powerful supercomputers for OpenAI in 2020, declining to reveal its location to AP at the time but describing it as a “single system” with more than 285,000 cores of conventional semiconductors, and 10,000 graphics processors — a kind of chip that’s become crucial to AI workloads.

Experts have said it can make sense to “pretrain” an AI model at a single location because of the large amounts of data that need to be transferred between computing cores.

It wasn’t until late May that Microsoft’s president, Brad Smith, disclosed that it had built its “advanced AI supercomputing data center” in Iowa, exclusively to enable OpenAI to train what has become its fourth-generation model, GPT-4. The model now powers premium versions of ChatGPT and some of Microsoft's own products and has accelerated a debate about containing AI's societal risks.

"It was made by these extraordinary engineers in California, but it was really made in Iowa," Smith said.

In some ways, West Des Moines is a relatively efficient place to train a powerful AI system, especially compared to Microsoft's data centers in Arizona that consume far more water for the same computing demand.

"So if you are developing AI models within Microsoft, then you should schedule your training in Iowa instead of in Arizona," Ren said. "In terms of training, there's no difference. In terms of water consumption or energy consumption, there’s a big difference.”

For much of the year, Iowa’s weather is cool enough for Microsoft to use outside air to keep the supercomputer running properly and vent heat out of the building. Only when the temperature exceeds 29.3 degrees Celsius (about 85 degrees Fahrenheit) does it withdraw water, the company has said in a public disclosure.

That can still be a lot of water, especially in the summer. In July 2022, the month before OpenAI says it completed its training of GPT-4, Microsoft pumped in about 11.5 million gallons of water to its cluster of Iowa data centers, according to the West Des Moines Water Works. That amounted to about 6% of all the water used in the district, which also supplies drinking water to the city’s residents.

In 2022, a document from the West Des Moines Water Works said it and the city government “will only consider future data center projects” from Microsoft if those projects can “demonstrate and implement technology to significantly reduce peak water usage from the current levels” to preserve the water supply for residential and other commercial needs.

Microsoft said Thursday it is working directly with the water works to address its feedback. In a written statement, the water works said the company has been a good partner and has been working with local officials to reduce its water footprint while still meeting its needs.

-- Matt O’Brien and Hannah Fingerhut, The Associated Press