



Unified SCADA Reporting

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K2 Data Systems, Inc.

May 2014

www.k2datasystems.com



"Organizing Your Information"



Water Fact Quiz

We all rely on water



"Organizing Your Information"



Water Fact Quiz

We all rely on water

1. About how much of our body is water?

A. 20%

B. 40%

C. 70%

D. 90%



“Organizing Your Information”



Water Fact Quiz

We all rely on water

2. The largest user of water in the house?

A. dishwasher

B. showers

C. toilets

D. lawns



“Organizing Your Information”



Water Fact Quiz

We all rely on water

3. People supplied by public water facilities?

A. 85%

B. 65%

C. 45%

D. 25%



“Organizing Your Information”



Water Fact Quiz

We all rely on water

4. The chemical name for H₂O?



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Calvin and Hobbes

by NATHERSON

GLIK
GLIK
GLIK



OH NO! WHAT HAVE I DONE?!



THE HUMAN BODY IS 80% WATER. LITTLE DID CALVIN REALIZE HOW CRITICAL IT IS TO MAINTAIN THAT!



NOW IT'S TOO LATE! BY DRINKING THAT EXTRA GLASS OF WATER, CALVIN HAS UPSET THAT PRECIOUS BALANCE! HE IS NOW 90% WATER!



EVERYTHING SOLID IN CALVIN'S BODY BEGINS TO DISSOLVE!



HE IS BECOMING A LIQUID!?



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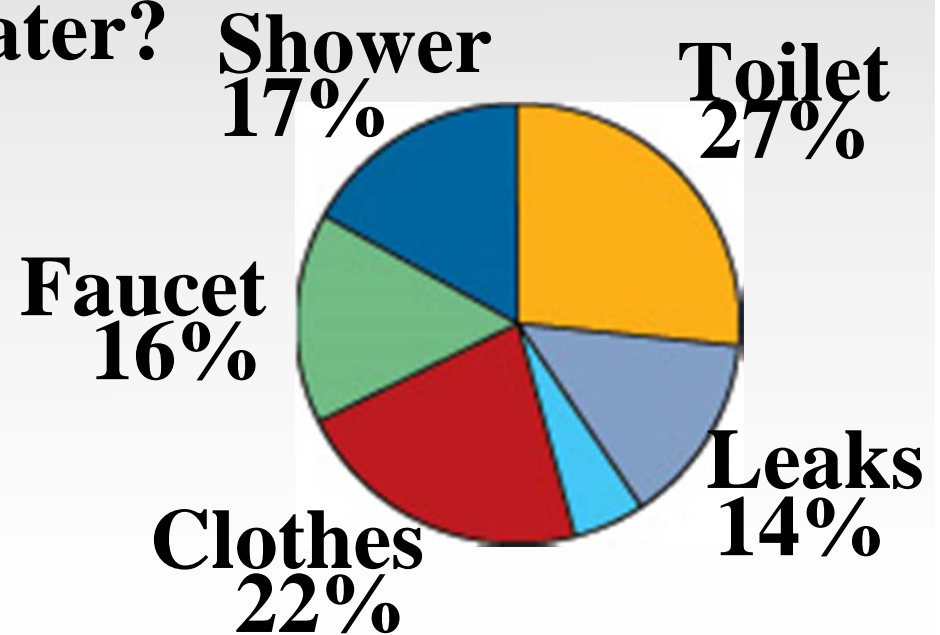
2. The largest user of water? Shower

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Water Fact Quiz

We all rely on water

4. The chemical name for H₂O?

Dihydrogen Monoxide



“Organizing Your Information”

About K2

- **Wonderware Certified – over 20 years**
 - **Inductive Automation (Ignition) Certified**
 - **SQL Server Certified**
 - **Strong Focus on Municipalities**
- **Information and Reporting Systems ****



"Organizing Your Information"

Unified?

Multiple Data Sources >> Single Reporting System

- **One Location**
- **One Interface**
- **One Set of Management Tools**



"Organizing Your Information"

Reporting Systems Can Involve Many Data Sources

- **Historian**
- **Alarms**
- **SPC**
- **LIMS (Lab)**
- **Excel Files**
- **CMMS**
- **ERP**
- **Other**



"Organizing Your Information"

Historians

- **Collect and store LOTS of process data**
- **Fast and Secure**
- **Long Term**
- **Redundant**
- **Data Available to Other Systems**
(or at least it should be)



"Organizing Your Information"

Wonderware Historian

- **World-Class Historian**
- **Tried and tested**
- **Stores data in proprietary compressed flat files, allowing for very fast queries with tons of data**
- **Configuration data in database**
- **Excellent client tools**
- **Supports SQL queries**



"Organizing Your Information"

Inductive Automation Historian

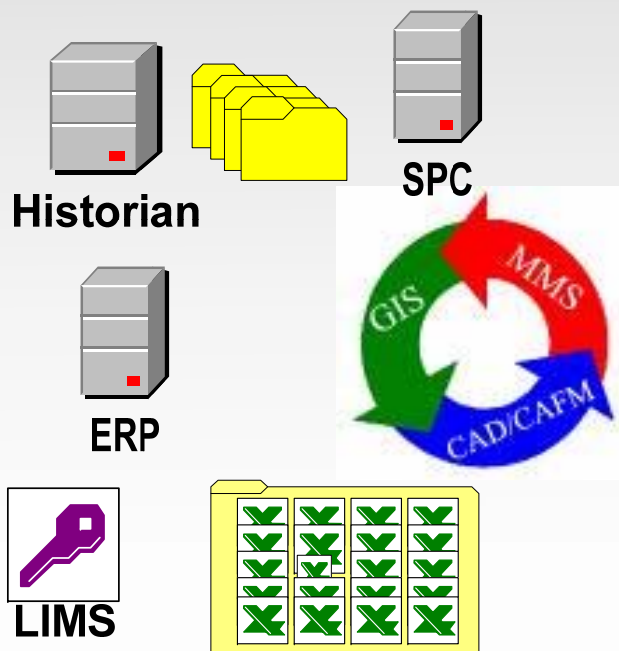
- Stores data in multiple database tables
- Excellent client tools
- Supports SQL queries
- Relatively new
- Significantly cheaper



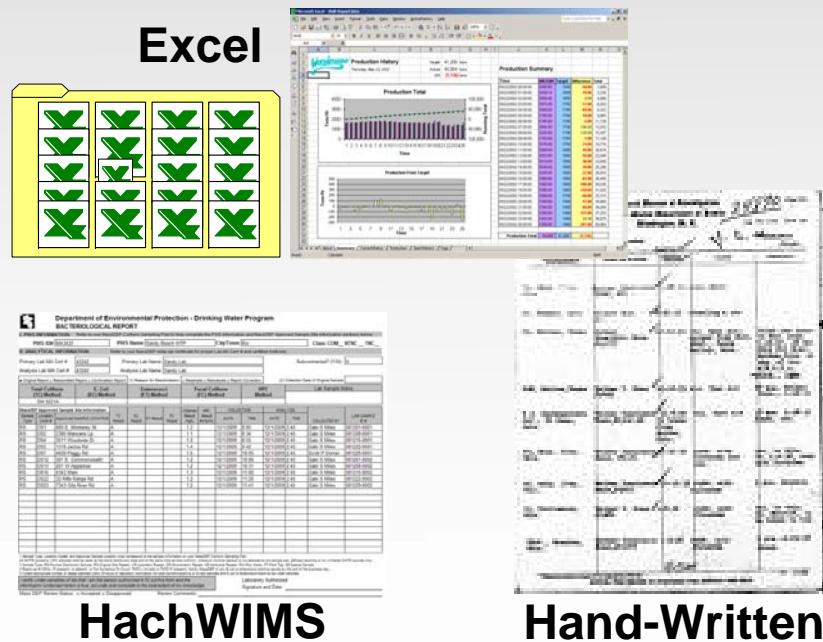
"Organizing Your Information"

Reporting – the Problem

Lots of Data

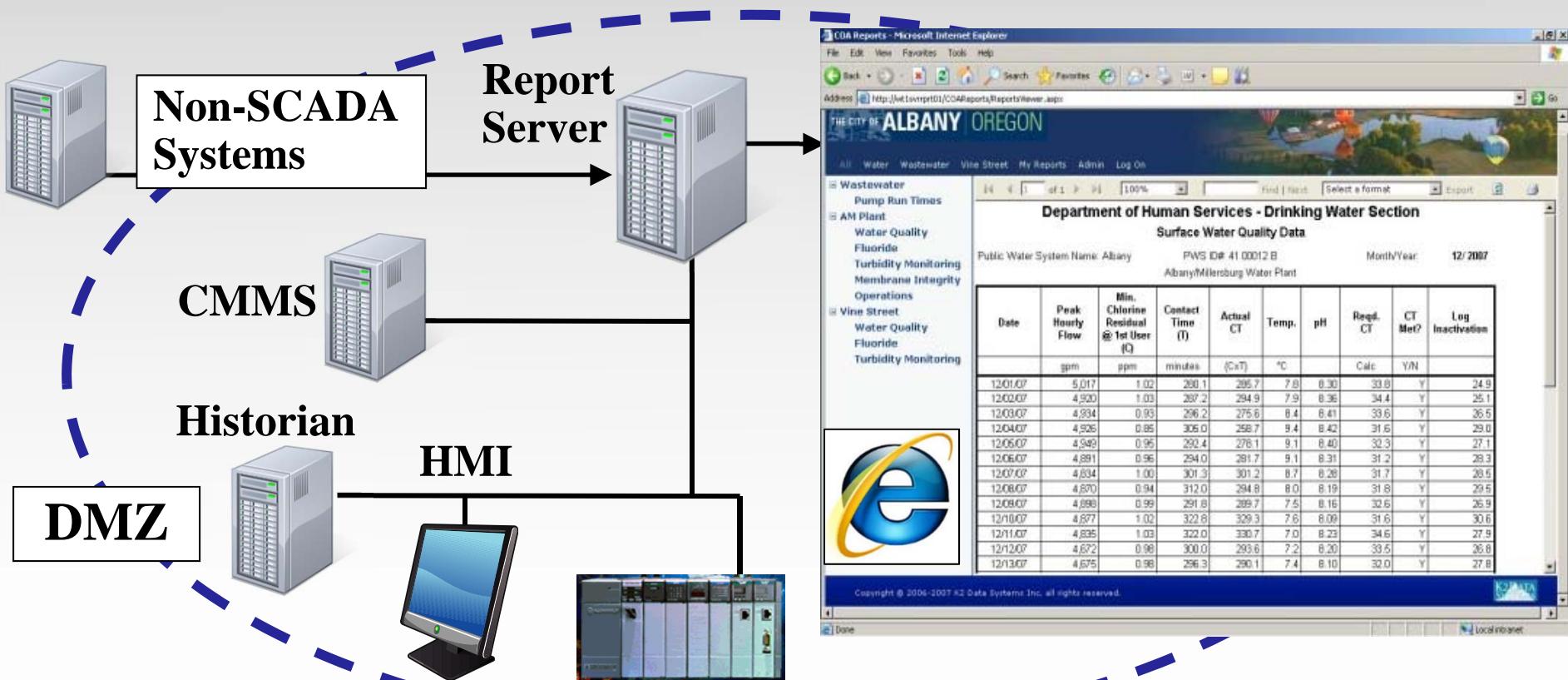


Disconnected Reporting



“Organizing Your Information”

Web-Based Reports



"Organizing Your Information"

COA Reports - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: http://vt.lanvpr101/COAReports/ReportsViewer.aspx

THE CITY OF ALBANY OREGON

Water Wastewater Vine Street My Reports Admin Log On

Wastewater
 Pump Run Times
 AM Plant
 Water Quality
 Fluoride
 Turbidity Monitoring
 Membrane Integrity
 Operations
 Vine Street
 Water Quality
 Fluoride
 Turbidity Monitoring

1 of 1 100% Find Next Select a format Export

Department of Human Services - Drinking Water Section
Surface Water Quality Data

Public Water System Name: Albany PWS ID# 41 00012 B Month/Year: 12/ 2007
 Albany/Milksburg Water Plant

Date	Peak Hourly Flow	Min. Chlorine Residual @ 1st User (C)	Contact Time (T)	Actual CT	Temp.	pH	Reqd. CT	CT Met?	Log Inactivation
	gpm	ppm	minutes	(C x T)	°C		Calc	Y/N	
12/01/07	5,017	1.02	290.1	295.7	7.8	8.30	33.8	Y	24.9
12/02/07	4,920	1.03	297.2	294.9	7.9	8.36	34.4	Y	25.1
12/03/07	4,934	0.93	296.2	275.6	8.4	8.41	33.6	Y	26.5
12/04/07	4,926	0.85	306.0	258.7	9.4	8.42	31.6	Y	29.0
12/05/07	4,949	0.95	292.4	276.1	9.1	8.40	32.3	Y	27.1
12/06/07	4,891	0.95	294.0	281.7	9.1	8.31	31.2	Y	28.3
12/07/07	4,834	1.00	301.3	301.2	8.7	8.28	31.7	Y	28.5
12/08/07	4,870	0.94	312.0	294.8	8.0	8.19	31.8	Y	29.5
12/09/07	4,898	0.99	291.8	289.7	7.5	8.16	32.6	Y	26.9
12/10/07	4,877	1.02	322.8	329.3	7.6	8.09	31.6	Y	30.6
12/11/07	4,835	1.03	322.0	330.7	7.0	8.23	34.6	Y	27.9
12/12/07	4,872	0.98	300.0	293.6	7.2	8.20	33.5	Y	26.8
12/13/07	4,675	0.98	296.3	290.1	7.4	8.10	32.0	Y	27.8

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Done Local internet

Reporting System Provides

- Reports that can include any data source
- Won't affect your process systems
- Web-based using your browser
- Built on SQL Server
- Using Software you may already own



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Getting Data to the Reporting System

- **Easy if on the Same Network**
 - **SQL Queries**
 - **Integration Services – ETL**
 - **File Copies**
- **Not Connected**
 - **Copy Files Through DMZ**
 - **Cloud, Web Services**

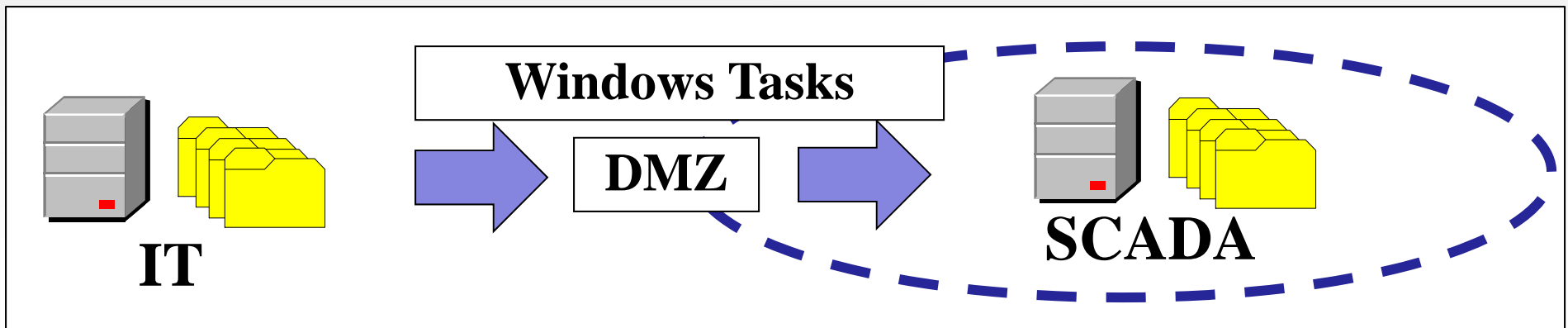


"Organizing Your Information"

Getting Data to the Reporting System

Business Network Data to SCADA

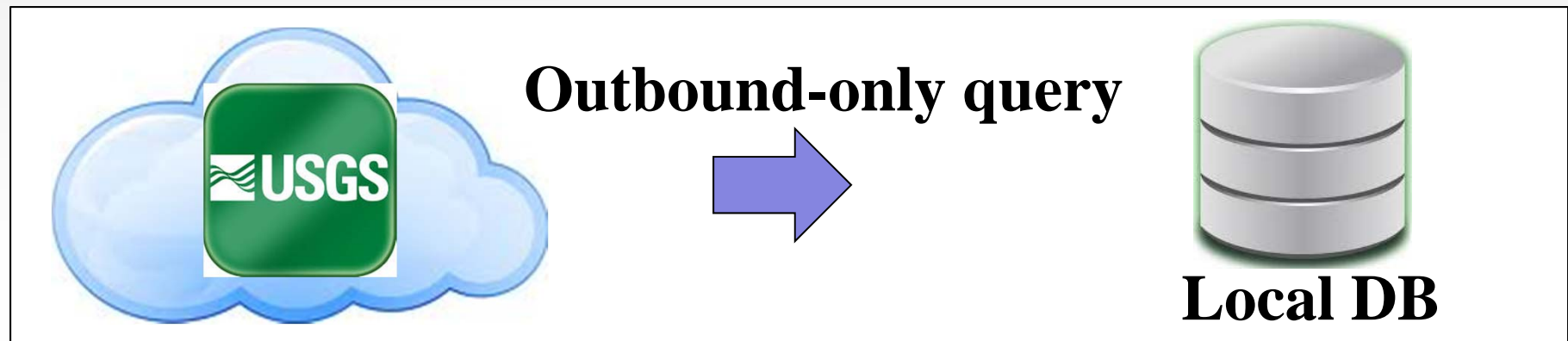
- Flat files copied to DMZ
- Moved from DMZ into SCADA



Getting Data to the Reporting System

Web Service Example - USGS data needed for stream flows

- Outbound-only query to USGS web service >> data stored in local database



Your Data Can Tell You

- **How many times did that pump start**
- **Times of peak flow rates, associated costs**
- **Permit values exceeded**
- **Operational efficiencies**
- **Downtime / Runtime**
- **Alarm Summaries**
- **WHAT DO YOU WANT TO KNOW ??**



"Organizing Your Information"

Example Reports

Portal provides

- Grouping
- Security
- Management
- Custom Looks

THE CITY OF ALBANY OREGON

City of Albany Report Portal

Admin

Water

Waste Water

4-Hour Peak Flow

Production (Monthly)

Production

Vine St. WTP

AMM WTP

Canal System

Distribution

Turbidity Monitoring

Water Quality

Fluoride

Lead Copper

Vine Street Operations

LT2 Turbidity Monitoring

LT2 Turbidity Compliance

LT2 Turbidity Samples

Filter Backwash



"Organizing Your Information"

Fluoride Usage

Department of Human Services - Drinking Water Section

Fluoride Report Form

Public Water System Name: Albany

PWS ID#: 41 00012 043

Month/Year:

12/ 2007

Albany/Millersburg Water Plant

Date	Water Treated	Sodium Silicafluoride Used	Average Concentrate	Calculated Concentrate
	mgd	Lbs	mg/L	mg/L
12/01/07	6.86	0.00	0.07	0.00
12/02/07	6.80	0.00	0.07	0.00
12/03/07	6.92	0.00	0.07	0.00
12/04/07	6.40	0.00	0.07	0.00
12/05/07	6.88	0.00	0.07	0.00
12/06/07	6.40	0.00	0.07	0.00
12/07/07	6.54	0.00	0.07	0.00
12/08/07	6.18	0.00	0.07	0.00
12/09/07	6.35	0.00	0.07	0.00
12/10/07	6.81	0.00	0.07	0.00
12/11/07	5.94	0.00	0.07	0.00
12/12/07	6.22	0.00	0.07	0.00
12/13/07	5.75	0.00	0.07	0.00
12/14/07	6.51	0.00	0.07	0.00
12/15/07	5.97	0.00	0.06	0.00
12/16/07	6.18	0.00	0.05	0.00
12/17/07	6.22	0.00	0.05	0.00

Pump Runtime

COA Reports - Microsoft Internet Explorer

File Edit View Favorites Tools Help


Address <http://wt1svrrprt01/COAReports/ReportsViewer.aspx> Go

THE CITY OF **ALBANY** OREGON

All Water Wastewater Vine Street My Reports Admin Log On

- Wastewater
 - Pump Run Times
- AM Plant
 - Water Quality
 - Fluoride
 - Turbidity Monitoring
 - Membrane Integrity
 - Operations
- Vine Street
 - Water Quality
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1 of 1 100% Find | Next Select a format Export

 **Wastewater Lift Station Pump Run Time Report**
1/8/2008 4:47:40 PM - 1/9/2008 4:47:40 PM

Station	Location	Well Level Minimum	Well Level Maximum	Pump	Starts	Run Time (minutes)
RTU03	Maple Street	180.2 ft	180.2 ft	Pump 1	0	0
				Pump 2	0	961
				Pump 3	0	757
				Pump 4	0	0
RTU04	Queen Street	21.5 %	51.5 %	Pump 1	15	174
				Pump 2	15	142
RTU05	Umatilla	36.4 %	48.0 %	Pump 1	44	363
				Pump 2	44	391
RTU06	Oak Creek	10.2 %	10.2 %	Pump 1	68	333
				Pump 2	68	387

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Local intranet

Water Quality

COA Reports - Microsoft Internet Explorer

File Edit View Favorites Tools Help

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	gpm	ppm	minutes	(CxT)	°C		Calc	Y/N	
12/01/07	5,017	1.02	280.1	285.7	7.8	8.30	33.8	Y	24.9
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12/12/07	4,672	0.98	300.0	293.6	7.2	8.20	33.5	Y	26.8
12/13/07	4,675	0.98	296.3	290.1	7.4	8.10	32.0	Y	27.8

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tion

Done Local intranet

Communications Status



RTU Communications

4/17/2014 2:06:00 PM - 4/18/2014 2:06:00 PM

RTU #	RTU Name ¹	Longest Comm Loss (min)	# of Comm Alarms	# of Power Alarms	# of Comm Failure Events ²	Comm Perf. % ³
4	Queen St	0.6	0	0	0	100.0%
5	Umatilla	0.6	0	0	0	100.0%
6	Oak Creek	1.6	0	0	0	100.0%
7	College Green	0.5	0	0	0	100.0%
8	34th Ave	0.6	0	0	0	100.0%
144	Albany Gates	0.8	0	0	0	100.0%
145	Diversion Dam Radio	8.2	0	0	145	86.4%
145	Diversion Dam VLink	4.3	0	0	1	99.9%
147	Lebanon Gates	0.5	0	0	0	100.0%
149	Waterloo	4.3	0	0	5	99.6%
161	Millersburg Vault	1376.3	1	0	1	33.1%

Turbidity

OHA - Drinking Water Program - Turbidity Monitoring Report Form County: Linn Conventional or Direct Filtration

System Name: ALBANY, CITY OF ID #: OR4100012 WTP:-WTP-A

Month/Year: 1/2014

DAY	12 AM	4 AM	8 AM	NOON	4 PM	8 PM	Highest Reading of the Day (1)
	[NTU]	[NTU]	[NTU]	[NTU]	[NTU]	[NTU]	[NTU]
1	Plant Off	Plant Off	Plant Off	0.046	0.068	Plant Off	0.068
2	Plant Off	Plant Off	Plant Off	0.045	0.065	Plant Off	0.065
3	Plant Off	Plant Off	Plant Off	0.065	0.074	Plant Off	0.074
4	Plant Off	Plant Off	Plant Off	0.063	0.060	Plant Off	0.063

28	Plant Off	Plant Off	Plant Off	0.046	0.056	Plant Off	0.056
29	Plant Off	Plant Off	Plant Off	0.046	0.047	Plant Off	0.047
30	Plant Off	Plant Off	Plant Off	0.048	0.049	Plant Off	0.049
31	Plant Off	Plant Off	Plant Off	0.048	0.046	Plant Off	0.048

Conventional or Direct Filtration		Monthly Summary (Answer Yes or No)	
95% of turbidity readings \leq 0.3 NTU?	Yes / No	CT's met everyday? Yes / No	All CL2 residuals at entry point \geq 0.2 mg/l? Yes / No
All turbidity readings < 1 NTU	Yes / No		
All turbidity readings < IFE triggers? (2)	Yes / No		
Notes:	PRINTED NAME:		
	SIGNATURE:		DATE:
	PHONE #:		CERT #:

(1) Including continuous turbidity data, if applicable, for optimization recording purposes. Compliance values in columns "12 AM" through "8 PM" may not correspond to continuous readings' maximum. (2) IFE = Individ. Filter Eff. (OAR 333-061-0040(1)(e)(B&C))

- **Save As**

1 of 1 100% Find | Next

OHA - Drinking Water Program - Surface Water Qu

System Name: ALBANY, CITY OF ID #: OR4100012 WTP-;WTP-B Month/Year

Date / Time	Minimum CL2 Residual @ 1st User (C) (3) [ppm or mg/L]	Contact Time (T) [minutes]	Actual CT C x T	Temp. [°C]	pH	Reqd CT	Use tables	Yes / No	[GPM]
1	0.97	196.9	191.3	16.8	8.34	19.8	Y	72,548	

XML file with report data
 CSV (comma delimited)
PDF
 MHTML (web archive)
 Excel
 TIFF file
 Word

- **Reporting Services Subscriptions**



“Organizing Your Information”

Other Reports

What Questions do you need answered?

- **Satisfy your customers**
- **Satisfy regulators**
- **Make your job easier**
- **WHAT DO YOU WANT TO KNOW ??**



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Thank You

Any Questions?

May 2014

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