

Memorandum

TO: MS. ASHLEY RITTER, ASSOCIATE ENGINEER
IDAHO DEPARTMENT OF WATER RESOURCES

FROM: NECIA MAIANI, P.E.

PRJ. #: 41314

SUBJECT: WATER RIGHT EXAMINATION FOR 95-16580

DATE: MARCH 8, 2019

CC: TERRY PICKEL, CITY OF COEUR D' ALENE WATER SUPERINTENDENT



Background

The City prepared and submitted a Statement of Completion for Permit 95-16580 which was received by IDWR on November 26, 2018 included the following general information:

1. Physical description of the Ralph Capaul well and pumping equipment.
2. Well Production and Power Consumption for the Ralph Capaul well between 2015 and 2018. This included discussion of the peak month pumping observed for the well as well as the peak instantaneous diversion rate for the well.
3. Description of the type of beneficial use for the City.

IDWR reviewed this submittal with respect to the conditions of Permit No. 95-16580 and provided the following comment (Letter from Ashley Ritter dated January 10, [2019]):

"During review of your proof report and the permit listed above, it is stated that the maximum instantaneous withdrawal rate for all wells operating within the City of Coeur d'Alene's municipal water system for FY 2018 is 31,425 gpm. The department is requesting that you include reference of the certified professional engineer or geologist who measured or reasonably estimated the maximum instantaneous rate of diversion and provide supporting documentation how this rate was established."

Welch Comer was contracted to assist the City in responding to this comment.

Qualifications

I am a certified water right examiner for the State of Idaho and a licensed professional engineer in the State of Idaho. Additionally, I was part of the design team for the Ralph Capaul well, which included analysis and development of the design operating point for this well. Analysis and development of the design operating point relied heavily upon system operating information provided by the City's operators as well as the use of the City's water system hydraulic model. Through the Ralph Capaul project and other projects with the City of Coeur d'Alene Water Department, I have a good understanding of the system's configuration and operation.

City SCADA Monitoring and Meter Equipment

Like many large water purveyors, the City utilizes a sophisticated SCADA control system to monitor operation of their water system. Every well within the City's water system is tied into and monitored through SCADA. The master meter at each well site reports (through SCADA) the total flow pumped over the course of 24 hours as well as the corresponding flow rate for each well based on the actual hours of pumping. This is the basis of the meter data supplied to IDWR by the City. As indicated previously, this is also the same source of data that we utilized in designing the operating point for the new Ralph Capaul well. Considering my experience with the data that the City records and that the Ralph Capaul well is meeting its design operating point, I am very comfortable with the accuracy of the City's data.

As reflected by the inventory of source meters in Table 1, all of the City's wells are metered. The City utilizes a combination of magmeters, insertion meters, and propeller meters. All magmeters are new within the last 4 years. The City completed a certification of meter flow for each well on September 12, 2016.

Analysis

As previously reported by the City, the maximum day of demand was recorded by SCADA on August 5, 2018. Total production was 40,613,184 gallons which translates to average production over 24 hours of 28,203 gpm. The City operated all wells to support peak hour demands in conjunction with equalization storage available in their storage tanks. After reviewing the gallons each well pumped and the number of hours each well ran on 8/5/2018, it appears that the system pumped a maximum of 31,873 gpm or 71.0 cfs with all wells operating.

Because the 8/5/2018 conditions cannot be recreated in the winter of 2019, to evaluate the accuracy of the data submitted, I conducted a field examination with Dion Holton from the City of Coeur d'Alene on February 22, 2019. During the exam, we visited each of the City's ten wells, operated each until the flow rate stabilized and recorded the flow rate of each along with the discharge pressure. Table 1 provides a summary of the field examination results.

Table 2 compares the 2/22/2019 field examination with the 8/5/2018 SCADA results. As shown in the table the flows witnessed on 2/22/2019 were slightly lower (approximately 6.2%) than those recorded on 8/5/2018. The reasons for this are as follows:

1. Summer demands on the water system are substantially higher than winter demands.
2. Tank levels are drawn down lower by the summer peak hour than in the winter

The combination of these two items effectively create a lower hydraulic head condition in the water system during summer demands, allowing the pumps to operate at a higher flow rate based on the pump curve. (The average difference in head for the wells controlled by the Industrial Park standpipe and Prairie standpipe was approximately 40 feet (as reflected in the discharge pressure readings) versus an estimated 15 feet for the wells controlled by the Tubb's Hill tank.)

Conclusion:

Thus, it is my opinion that the maximum instantaneous diversion rate measured and recorded by the City on 8/5/2018 of 31,873 gpm (71.0 cfs) is accurate and reasonable based on my evaluation of the data, the system operating conditions, field observations and knowledge of this water system.

City of Coeur d'Alene
Water Right Examination 95-16580

Table 1: 2/22/19 Exam Results

Date	Time Start (a.m.)	Well	Flowmeter					Pressure		Flow (gpm)	System Conditions	
			Type	Make	Model/Serial	Size (inch)	Last Meter Certification	Start (psi) (Before Pump Start)	End (psi)		Tank Levels ¹ (feet)	Other Wells Operating
2/22/2019	9:56	Linden Well	Siemens	SITRANS FM MAG 5100 W	593103U356	16	12-Sep-16	54	63	3239	17.5	Honeysuckle/ 4th
2/22/2019	9:40	Locust Well	Data Industrial Transmitter	510-10	510/000580	16	12-Sep-16	58	65	3030	17.5	Honeysuckle/ 4th
2/22/2019	9:15	4th Street Well	Siemens	SITRANS FM MAG 5100 W	577503U514	16	12-Sep-16	On	78	2590	17.5	Honeysuckle/ 4th
2/22/2019	9:05	Honeysuckle Well	Data Industrial Transmitter	510-10	510/000570	12	12-Sep-16	On	80	1550	143.7	Honeysuckle/ 4th
2/22/2019	8:49	Hanley Well	Sparling		127125	16	12-Sep-16	63	65	3404	143.7	Honeysuckle/ 4th
2/22/2019	8:35	Prairie Well	Sparling		131843	16	12-Sep-16	62	63	3219	143.4	Honeysuckle/ 4th
2/22/2019	7:47	Atlas Well	Siemens	SITRANS FM MAG 5000	593003U356	16	12-Sep-16	41314Not Recorded		3730	3737	Honeysuckle/ 4th
2/22/2019	8:01	Ralph Capaul Well	Siemens	SITRANS FM MAG 5100 W	7ME658 188301U224	18	12-Sep-16	62	70	3915	142	Honeysuckle/ 4th
2/22/2019	9:28	Annie Well	Data Industrial Transmitter	510-10	510/000571	16	12-Sep-16	52	61	2023	17.5	Honeysuckle/ 4th
2/22/2019	8:18	Landing Well	Data Industrial Transmitter	510-10	510/000602	16	12-Sep-16	55	68	3300	142	Honeysuckle/ 4th

Total
(gpm) 30007
Total (cfs) 66.9

Examiner: Necia Maiani, PE
CDA Representative: Dion Holton

1. Tank Levels for Linden, Locust, 4th Street, and Annie reflect Tubbs Hill. Tank Levels for Honeysuckle, Hanley and Prairie reflect Prairie Standpipe. Tank Levels for Atlas, Ralph Capaul and Landings reflect Industrial Standpipe.

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Table 2: 2/22/2019 Exam Results Versus 8/5 SCADA

Well	Well Pump HP	8/5/2018 Flow (from SCADA)			2/22/2019 Exam	
		Flow Rate (gpm)	Total (gallons)	Discharge Pressure (psi)	Measured Flow Rate (gpm)	Discharge Pressure (psi)
Linden Well	350	3,330	6,993,000	60	3,239	63
Locust Well	350	2,958	2,058,768	57	3,030	65
4th Street Well	400	2,862	1,803,060	62	2,590	78
Honeysuckle Well	250	1,709	2,645,532	56	1,550	80
Hanley Well	500	3,707	3,825,624	46	3,404	65
Prairie Well	500	3,246	5,589,612	50	3,219	63
Atlas Well	600	3,705	2,845,440	66	3,737	Not Recorded
Ralph Capaul Well	600	4,275	5,694,300	51	3,915	70
Annie Well	350	2,083	2,449,608	57	2,023	61
Landing Well	500	3,998	6,708,240	49	3,300	68

Total (gpm)	31,873
Total (cfs)	71.0

Total (gpm)	30,007	
Total (cfs)	66.9	