

Merhar, Richard L.

From: Staron, Richard <rstaron@pa.gov>
Sent: Tuesday, June 10, 2014 1:28 PM
To: Merhar, Richard L.
Cc: Wade, Colin
Subject: RE: Hoff VC MW-9/MW-10 Well Screen Selections

Rich,

That is fine. I have no comments and neither does Colin. There seems to be enough interconnectivity in the fractures to justify such huge well screens. Go ahead with you plan.

Interesting how toluene is the only compound of note.

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From: Merhar, Richard L. [mailto:RICHARD.L.MERHAR@leidos.com]
Sent: Monday, June 09, 2014 2:41 PM
To: Wade, Colin; Staron, Richard
Cc: Machusick, Matthew D.
Subject: FW: Hoff VC MW-9/MW-10 Well Screen Selections

Colin and Rich, below are our well screen recommendations for the new Trim property wells. I have reviewed and discussed this with Matt Machusick. Let us know if you have any comments, changes, things you want to discuss, etc. Please review as soon as possible (by tomorrow morning sometime would be great) so I can inform the driller of the well specifications so he can order the materials he will need.

Thanks, Rich

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From: Machusick, Matthew D.
Sent: Monday, June 09, 2014 1:55 PM
To: Merhar, Richard L.
Subject: RE: Hoff VC MW-9/MW-10 Well Screen Selections

Rich,

I reviewed the available data from MW-9 and MW-10 and selected proposed well screen intervals. Data review included drilling logs, geophysics, packer testing, nearby well logs, local hydrogeology.

The ground surface elevation at MW-9 and MW-10 is approximately 350 ft above mean sea level (ft amsl). The majority of the existing site wells are at an elevation of 400-420 ft amsl. MW-7 and OW-6 are the closest to MW-9 & MW-10 in elevation. MW-7 has a surface elevation of 383 ft amsl and OW-6 has a surface elevation of 363 ft amsl. Existing well screen lengths range from 30 ft to 130 ft. The proposed well screens for MW-9 and MW-10 take into consideration the construction of the existing wells (elevations, lengths, hydrogeo info, etc).

The table below summarizes the packer testing data for MW-9 & MW-10. The attached graphs present the water level data for the tests.

Sample	Mid Point Elevation	Laboratory Analytical Detections	Field Parameters and Notes										
		Toluene	pH	Cond	Turb	DO	Temp	ORP	Hydraulic Connection	Drawdown	Yield	Specific Capacity (gpm/ft)	Notes
MW-9_0-83	289.5	90	8.29	0.99	>1,000	0.00	13.04	-132	Minor	25.50	0.9	0.04	Bottom zone shows drawdown spike, but then level. High drawdown in pumping zone
MW-9_85-105	255.0	8.2	7.91	1.28	63	1.03	13.07	-19	No	8.30	2.7	0.33	Top/Bottom Zones: minimal dd, middle ~8 ft dd.
MW-9_135-155	205.0	79	7.69	1.19	115	1.59	13.10	-6	Yes	1.75	3.0	1.71	Minor Influence noted in lower zone.
MW-9_155-175	185.0	45	7.69	1.09	349	3.58	13.05	5	Yes	2.55	2.7	1.06	Potential leakage, hydraulic connection with zones above and below.
MW-9_194-214	146.0	6.3	7.39	0.96	0	5.35	12.98	5	Yes	4.12	2.6	0.63	dd observed above/below pumping zone
MW-10_0-75	293.8	34	7.92	0.76	>1000	0.64	12.80	-76	Minor	12.26	0.9	0.07	Lower zones shows response to pumping.
MW-10_99-119	241.3	64	7.89	0.76	248	0.65	13.03	-49	Minor	30.30	2.1	0.07	Top/Bottom Zones show minimal fluctuation. Middle zone show large fluctuation
MW-10_119-139	221.3	14	7.96	0.90	518	0.00	12.73	-48	Yes	27.57	1.2	0.04	Top zone responds 0.7 ft to pumping.
MW-10_150-170	190.3	29	7.59	0.90	602	0.47	12.93	1	Strong	8.00	2.5	0.31	Top and middle identical (poor seal or rapid connection), bottom zone shows minor connection (0.25 ft)
MW-10_171-205	162.3	5.5	6.96	0.77	563	1.79	12.81	59	Yes	1.13	3.0	2.66	Top and bottom show minor hydraulic connection and response to pumping

Testing at MW-9 indicates that the upper 85 ft of the borehole is capable of sustaining well yield of approximately 0.9 gpm. Water quality monitoring indicates that the upper 155 ft of the borehole has similar geochemistry and that the lower portion (~155-220) of the borehole has a different geochemistry. Testing at 135-155 displayed hydraulic connection with the zone below (155-175), similarly testing at 155-175 should hydraulic connection to the zone above and below. The proposed well screens for MW-9D are:

MW-9D Upper 45-105 ft. This zone is designed to target the uppermost water bearing zones in the uncased borehole.

MW-9D Lower 140-190 ft. This zone will monitor the deeper bedrock aquifer at the site. The Lower screen at MW-9D targets the primary water bearing zones from ~143 to 166 ft. The screened interval specifically does not include the water bearing zones located below approximately 195 ft. The lower portion of the borehole, displays slightly different chemistry and may represent a different hydraulic zone.

Testing at MW-10 indicates that the upper 75 ft of the borehole is capable of sustaining well yield of approximately 0.9 gpm. Water quality monitoring indicates that the upper 139 ft of the borehole has similar geochemistry and that the lower portion (~171-205) of the borehole has a different geochemistry. Geochemistry of the zone 150-170 is transitional between the zones above and below. The upper three packer zones displayed minor to moderate hydraulic connection. Testing at 171-205 displayed a minor hydraulic connection with the zone above and was able to sustain pumping at 3 gpm with only 1.13 ft of drawdown. The proposed well screens for MW-10D are:

MW-10D Upper 45-115 ft. This zone will monitor the intermediate/shallow aquifer at the site.

MW-10D Lower 170-200 ft (with 5 ft sandpack at bottom). This zone will monitor the deeper bedrock aquifer at the site. The zone was stopped at 170 since the zone above (ie 150-170) appears to have differing geochemistry and since drilling logs indicate the primary water bearing zone is between 185-200 ft.

Here's a proposed well construction table:

	Item	MW-9	MW-10
	Ground Surface	0	0
	Bottom of Casing	38	38
	Top of Bent Seal	28	28
	Bentonite Seal Thickness	12	12
	Bottom of Bentonite Seal	40	40
Shallow Screen	Top Sand	40	40
	Upper Sandpack thickness	5	5
	top screen	45	45

	screen length	60	70
	bottom Screen	105	115
	Sand Pack Thickness	5	5
	Bottom Sand	110	120
	<i>Bentonite thickness</i>	25	45
Deep Screen	bottom bent/top sand	135	165
	sand thickness	5	5
	bottom sand	140	170
	top screen	140	170
	screen length	50	30
	bottom Screen	190	200
	lower sandpack thickness	5	5
lower sandpack bottom	195	205	
Lower Seal	bentonite seal thickness	25	0
	bentonite seal bottom	220	205
	sandpack thickness	0	0
	sandpack bottom	220	205
	total depth	220	205

Please let me know if you have any questions, changes, suggestions, etc.

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