

Response to Nevada Division of Environmental Protection (NDEP) Comments dated December 22, 2008, regarding BRC's December 9, 2008 Response to NDEP Comments dated November 4, 2008, regarding NDEP Request for Vertical Delineation of Contaminant Plumes and Hydraulic Gradients, NDEP Facility ID# H-000688

1. Response-to-comment (RTC) 3.a, the NDEP has the following comments:
 - a. Please note that the 50 foot limitation was based on the fact that the majority of reported vertical gradients are quite small. Thus, when a well used in these calculations is on the order of 1,000 feet away the horizontal component of the gradient likely affects the calculation. This has been further supported by pumping tests completed by Tronox and the Pioneer-Olin-Stauffer-Syngenta-Montrose (POSSM) group. These pumping tests generally showed negligible response even at the 50 foot distance.

Response: BRC appreciates the clarification of this criterion. BRC notes, however, that the response to pumping can be limited by other factors such as: a short test duration, relatively low pumping rate, and other factors unrelated to vertical gradient calculations.

- b. BRC should be aware that layer two of the model only extends 50 feet below the base of model layer one. The vertical gradient evaluation extends beyond the scope of the groundwater flow model. The existing groundwater flow model is not an appropriate tool to address this question.

Response: NDEP is correct that model layer two represents approximately the top 50 feet of the UMCf. However, the effects of leakage between the upper portion of the UMCf and the deep UMCf is approximated through application of a general head boundary at the bottom of the model. The prescribed boundary heads for the general head boundary term are based on the available deep UMCf water level observations. Therefore, BRC believes that the groundwater flow model is a useful tool to assist with conceptualization of the potential distribution and relative magnitude of leakage between the shallow and deep UMCf.

- c. NDEP disagrees with BRC that additional wells are not necessary. NDEP believes that it is appropriate and timely to initiate installation of wells in deeper water-bearing zones (the "middle" and the "deep"). Regardless of the outputs of the groundwater flow model, these wells can be used as sentinel wells. NDEP requests that BRC provide a scope of work with the response to these comments. This scope of work should, at a minimum, propose wells along the northeast transect and along the northern side of the Lower Ponds.

Response: BRC will discuss data gaps with NDEP at the February 4th meeting, including suggested additional wells, so that these data gaps are comprehensively addressed as part of the conceptual site model (CSM) update.

- d. Please provide a revised figure based upon the revisions discussed in BRC's response.

Response: Figure 19 from the November 4, 2008 model calibration report is attached for review.

2. RTC 3.b, please note also NDEP's response to Comment 3.a above. One of the objectives for the vertical gradient assessment was to evaluate contaminants at depth and possible driving mechanisms. This is beyond the scope of BRC's existing groundwater flow model.

Response: Please see response to comment 1b above. BRC disagrees with NDEP's characterization of the scope of the modeling effort.

3. RTC 4.a, the NDEP has the following comments:
 - a. Please refer to NDEP's response to RTC 3.a above.

Response: As mentioned above in the response to comment 1c, BRC will discuss data gaps with NDEP at the February 4th meeting, including suggested additional wells, so that these data gaps are comprehensively addressed as part of the conceptual site model (CSM) update.

- b. This statement carries with it the problem of defining impacts to groundwater at the CAMU due to upgradient conditions. The NDEP disagrees that it is appropriate at this time to conclude that impacts to groundwater from the BMI Landfills are unknowable.

Response: BRC is currently conducting a baseline quarterly monitoring program for groundwater at the CAMU. Data from this effort, along with data collected by others in the CAMU area will be used to determine the impacts of BRC's CAMU area sources on groundwater, if any. As NDEP is aware, BRC has implemented source removal as a fundamental strategy to the maximum extent possible and practical, at the CAMU area. BRC maintains that, given the concentrations of pollutants upgradient, the impacts of the BMI Landfills to groundwater, are, in many cases, not knowable.

4. RTC 5, this answer is non-responsive. If BRC is correct about the elevated groundwater temperature in this area (per BRC's RTC 2); then, the 13.5 degree number that BRC apparently used for the calculations cannot be supported. Please advise.

Response: BRC utilized 15 degrees C as the input for temperature in the calculations. This value was obtained from the guidance (Ground Water, Vol 5 Page 669, Table 1). However, the attached table shows revised calculations using actual BRC well temperature data where available. None of the vertical gradients changed (from up to down or the reverse) as a result of the revised calculations using actual temperature data.

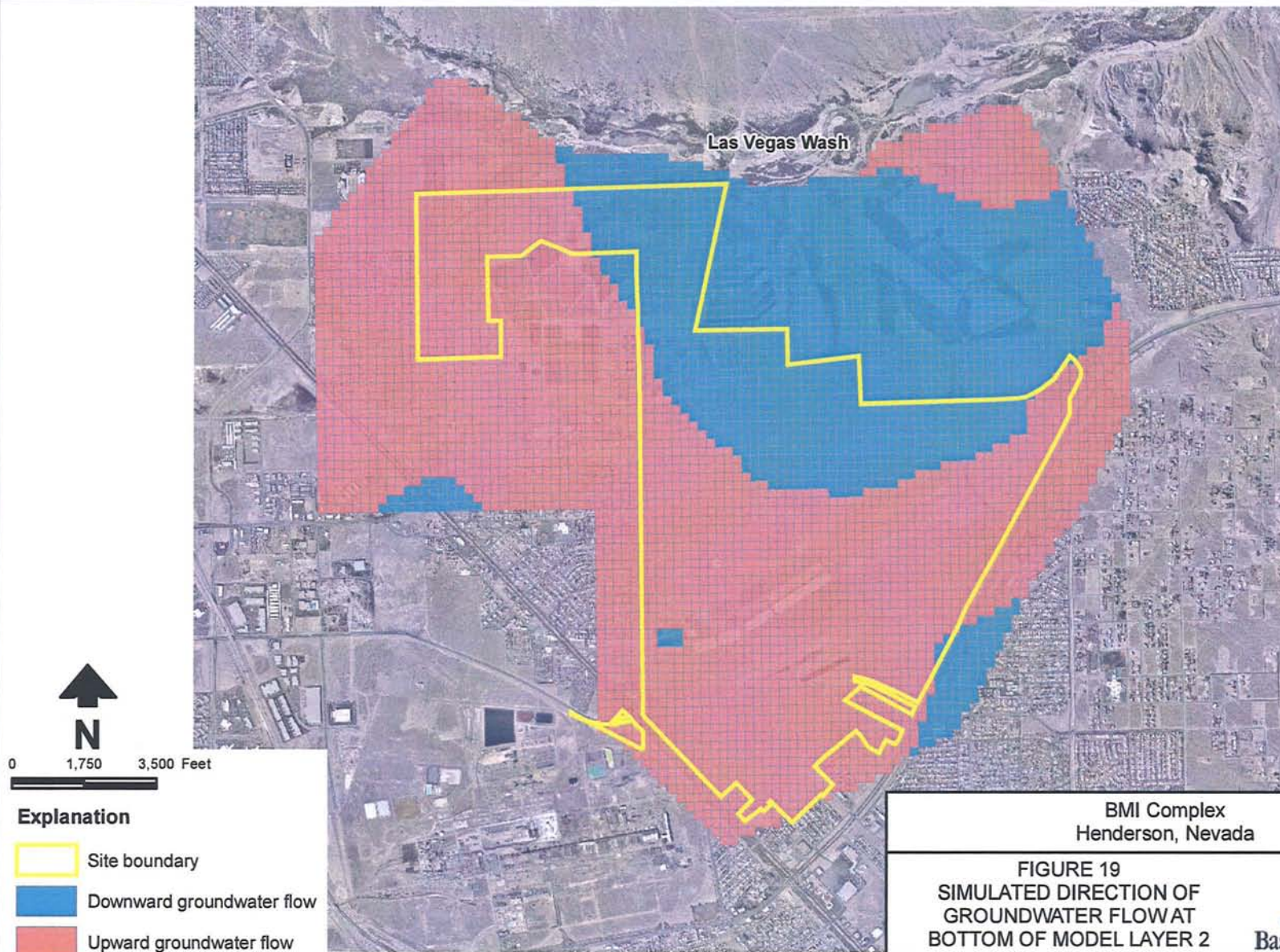
5. RTC 6.b, BRC's RTC 6, Part 1, is not applicable. The point here is that the anion sum indicated that for these samples the Standard Methods calculation is potentially not appropriate.

Response: Understood and agreed. BRC appreciates the clarification of this NDEP comment.

Mr. Mark Paris

1/27/2009

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Source: Aerial photograph, April 2004

BMI Complex
Henderson, Nevada

FIGURE 19
SIMULATED DIRECTION OF
GROUNDWATER FLOW AT
BOTTOM OF MODEL LAYER 2
FOR CURRENT PERIOD SIMULATION



Prepared by:
DBS&A GJ

Date
11/4/08

S:/PROJECTS/BRC/ES07.0252_BRC_GROUNDWATER_MODELING/GIS/MXDS/REPORT FIGURES 10-08/FIG19_SIM_DIR_GW_FLOW_MOD_BOT LAYER 2.MXD 800201

Figure 19



Daniel B. Stephens & Associates, Inc.
JN ES07.0252

Table 1. Summary of Vertical Gradient Data
BRC Common Areas - Eastside
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Shallow Well Pairs																						Uncorrected for Groundwater Density				Corrected for Groundwater Density			
Deep Well	Depth to Top of Screen (feet)	Depth to Bottom of Screen	Screen Midpoint (AMSL) (z)	Groundwater Elevation (AMSL) (h)	GW Elevation Date Measured	Groundwater TDS (mg/L)	TDS Date Measured	Groundwater Temperature (C)	GW Density (g/cm ³) (ρ)	Fresh Water Head (AMSL) (h _f)	Shallow Well	Depth to Top of Screen (feet)	Depth to Bottom of Screen (feet)	Screen Midpoint (AMSL) (z)	Groundwater Elevation (AMSL) (h)	GW Elevation Date Measured	Groundwater TDS (mg/L)	TDS Date Measured	Groundwater Temperature (C)	GW Density (g/cm ³) (ρ)	Fresh Water Head (AMSL) (h _f)	Point Water Head Delta (ft)	Point Water Head Deep/Shallow Vertical Gradient (ft/ft)	Point Water Head Vertical Flow Direction	Fresh Water Head Delta (AMSL)	Fresh Water Head Deep/Shallow w Vertical Gradient	Vertical Flow Direction		
MCF-01A	335	355	1409.44	1720.21	7/25/04	---	---	---	---	---	AA-01	29	49	1715.93	1712.03	4/8/04	---	---	---	---	---	---	-8.18	0.03	UP	---	---	---	
MCF-01A	335	355	1409.44	1723.51	4/18/06	3570	05/30/06	27.72	0.999	1723.20	AA-01	29	49	1715.93	1712.35	4/18/06	3430	04/26/06	25.01	1.000	1712.35	-11.16	0.04	UP	-10.85	0.04	UP		
MCF-01A	335	355	1409.44	1726.61	7/27/06	4020	08/07/06	26.39	0.997	1725.66	AA-01	29	49	1715.93	1711.69	7/27/06	3930	08/01/06	24.84	1.000	1711.69	-14.92	0.05	UP	-13.97	0.05	UP		
MCF-01A	335	355	1409.44	1727.87	10/16/06	4060	10/24/06	26.01	1.000	1727.87	AA-01	29	49	1715.93	1711.50	10/16/06	3310	10/18/06	23.88	1.000	1711.50	-16.37	0.05	UP	-16.37	0.05	UP		
MCF-01A	335	355	1409.44	1726.47	1/22/07	3930	02/02/07	23.4	1.000	1726.47	AA-01	29	49	1715.93	1711.45	1/22/07	3730	01/25/07	24	1.000	1711.45	-15.02	0.05	UP	-15.02	0.05	UP		
MCF-08A	350	370	1219.02	ARTESIAN	4/7/04	---	---	---	---	---	AA-08	5	35	1558.46	1566.82	6/7/04	---	---	---	---	---	---	(a)	(a)	UP	(a)	(a)	UP	
MCF-08A	350	370	1219.02	ARTESIAN	4/21/06	110000	06/07/06	24.59	1.082	(a)	AA-08	5	35	1558.46	1567.69	4/21/06	5070	05/25/06	23.48	1.001	1567.70	(a)	(a)	UP	(a)	(a)	UP		
MCF-08A	350	370	1219.02	ARTESIAN	7/26/06	113000	08/23/06	23.8	1.084	(a)	AA-08	5	35	1558.46	1565.47	7/26/06	4390	08/14/06	23.3	1.001	1565.48	(a)	(a)	UP	(a)	(a)	UP		
MCF-08A	350	370	1219.02	ARTESIAN	10/17/06	113000	11/10/06	25.73	1.084	(a)	AA-08	5	35	1558.46	1568.82	10/17/06	4640	11/01/06	23.65	1.001	1568.83	(a)	(a)	UP	(a)	(a)	UP		
MCF-08A	350	370	1219.02	ARTESIAN	1/23/07	116000	02/08/07	22.5	1.087	(a)	AA-08	5	35	1558.46	1568.72	1/23/07	4700	02/08/07	23.4	1.001	1568.73	(a)	(a)	UP	(a)	(a)	UP		
MCF-10A	365	385	1238.32	1613.06	4/14/04	---	---	---	---	---	AA-10	10	40	1587.54	1595.91	7/9/04	---	---	---	---	---	---	-17.15	0.05	UP	---	---	---	
MCF-10A	365	385	1238.32	ARTESIAN	4/21/06	8080	05/31/06	24.96	1.003	(a)	AA-10	10	40	1587.54	1596.04	4/21/06	4880	05/12/06	23.36	1.001	1596.05	(a)	(a)	UP	(a)	(a)	UP		
MCF-10A	365	385	1238.32	1601.56	7/27/06	6800	08/21/06	24.3	1.002	1602.29	AA-10	10	40	1587.54	1596.97	7/27/06	4720	08/11/06	23.2	1.001	1596.98	-4.59	0.01	UP	-5.31	0.02	UP		
MCF-10A	365	385	1238.32	1607.46	10/17/06	7700	11/14/06	25.01	1.003	1608.57	AA-10	10	40	1587.54	1596.75	10/17/06	4770	10/27/06	22.63	1.001	1596.76	-10.71	0.03	UP	-11.81	0.03	UP		
MCF-10A	365	385	1238.32	1612.18	1/23/07	7270	02/16/08	22.51	1.003	1613.30	AA-10	10	40	1587.54	1596.89	1/23/07	4560	02/05/07	22.9	1.001	1596.90	-15.29	0.04	UP	-16.40	0.05	UP		
MCF-12A	349.5	369.5	1354.18	1658.06	7/22/04	---	---	---	---	---	MCF-12B	64	84	1638.74	1648.18	6/5/04	---	---	---	---	---	---	-9.88	0.03	UP	---	---	---	
MCF-12A	349.5	369.5	1354.18	1661.03	4/27/06	5950	05/18/06	28.13	1.003	1661.95	MCF-12B	64	84	1638.74	1649.08	4/27/06	2630	05/23/06	25.14	0.999	1649.07	-11.95	0.04	UP	-12.88	0.05	UP		
MCF-12A	349.5	369.5	1354.18	1661.21	7/27/06	5900	08/10/06	25.6	1.001	1661.52	MCF-12B	64	84	1638.74	1648.33	7/27/06	2520	08/09/06	26.7	0.999	1648.32	-12.88	0.05	UP	-13.20	0.05	UP		
MCF-12A	349.5	369.5	1354.18	1661.36	10/16/06	7580	01/25/00	24.64	1.003	1662.28	MCF-12B	64	84	1638.74	1648.20	10/16/06	2620	11/08/06	24.54	0.999	1648.19	-13.16	0.05	UP	-14.09	0.05	UP		
MCF-12A	349.5	369.5	1354.18	1661.54	1/24/07	6320	01/24/00	24.6	1.002	1662.15	MCF-12B	64	84	1638.74	1647.75	1/24/07	2760	02/15/07	21.19	1.000	1647.75	-13.79	0.05	UP	-14.40	0.05	UP		
MCF-16A	364.5	384.5	1315.17	1661.98	4/6/04	---	---	---	---	---	MCF-16C	53	73	1626.88	1629.98	6/11/04	---	---	---	---	---	---	-32.00	0.10	UP	---	---	---	
MCF-16A	364.5	384.5	1315.17	1643.84	4/20/06	81800	05/18/06	25.74	1.059	1663.23	MCF-16C	53	73	1626.88	1626.23	4/20/06	8150	05/22/06	23.3	1.004	1626.23	-17.61	0.06	UP	-37.00	0.12	UP		
MCF-16A	364.5	384.5	1315.17	1643.62	7/26/06	83800	08/21/06	24.0	1.061	1663.66	MCF-16C	53	73	1626.88	1625.68	7/26/06	8190	08/16/06	25.8	1.003	1625.88	-17.74	0.06	UP	-37.78	0.12	UP		
MCF-16A	364.5	384.5	1315.17	1643.84	10/17/06	86400	11/06/06	24.14	1.063	1664.55	MCF-16C	53	73	1626.88	1625.66	10/17/06	7010	11/06/06	23.53	1.003	1625.66	-18.18	0.06	UP	-38.89	0.12	UP		
MCF-16A	364.5	384.5	1315.17	1644.13	1/22/07	88300	02/16/07	23.2	1.065	1665.51	MCF-16C	53	73	1626.88	1625.51	1/22/07	6480	02/20/07	22.3	1.003	1625.51	-18.62	0.06	UP	-40.01	0.13	UP		
MCF-27	361.5	381.5	1415.53	1763.48	7/14/04	---	---	---	---	---	AA-27	61.5	81.5	1715.35	1729.98	7/13/04	---	---	---	---	---	---	-33.50	0.11	UP	---	---	---	
MCF-27	361.5	381.5	1415.53	1773.50	4/20/06	1460	05/19/06	26.42	0.998	1772.78	AA-27	61.5	81.5	1715.35	1723.58	4/19/06	4080	04/27/06	24.97	1.000	1723.58	-49.92	0.17	UP	-49.20	0.16	UP		
MCF-27	361.5	381.5	1415.53	1774.28	7/26/06	1260	08/02/06	25.58	0.998	1773.56	AA-27	61.5	81.5	1715.35	1722.66	7/26/06	4240	08/02/06	24.65	1.000	1722.66	-51.62	0.17	UP	-50.90	0.17	UP		
MCF-27	361.5	381.5	1415.53	1774.88	10/16/06	1170	10/20/06	25.41	0.998	1774.16	AA-27	61.5	81.5	1715.35	1722.61	10/16/06	4220	10/19/06	24.67	1.000	1722.61	-52.27	0.17	UP	-51.55	0.17	UP		
MCF-27	361.5	381.5	1415.53	1775.27	1/22/07	968	02/20/07	24.3	0.998	1774.55	AA-27	61.5	81.5	1715.35	1722.46	1/22/07	4340	02/02/07	24.9	1.000	1722.46	-52.81	0.18	UP	-52.09	0.17	UP		
MCF-06A	373.5	393.5	1205.3	1563.27	4/16/04	---	---	---	---	---	MCF-06C	44	59	1578.92	1584.17	7/15/04	---	---	---	---	---	---	20.90	-0.06	DOWN	---	---	---	
MCF-06A	373.5	393.5	1205.3	1519.38	4/20/06	186000	05/30/06	26.27	1.144	1564.61	MCF-06C	44	59	1578.92	1580.63	4/20/06	47600	05/22/06	24.09	1.033	1580.69	61.25	-0.16	DOWN	16.08	-0.04	DOWN		
MCF-06A	373.5	393.5	1205.3	1509.54	7/27/06	185000	08/21/06	25.1	1.143	1553.05	MCF-06C	44	59	1578.92	1579.38	7/26/06	6280	08/08/06	23.97	1.002	1579.38	69.84	-0.19	DOWN	26.33	-0.07	DOWN		
MCF-06A	373.5	393.5	1205.3	1512.00	10/16/06	205000	11/13/06	23.44	1.162	1561.68	MCF-06C	44	59	1578.92	1578.93	10/17/06	6720	10/30/06	23.57	1.002	1578.93	66.93	-0.18	DOWN	17.25	-0.05	DOWN		
MCF-06A	373.5	393.5	1205.3	1515.31	1/23/07	191000	02/23/07	20.4	1.151	1562.12	MCF-06C	44	59	1578.92	1578.09	1/23/07	6980	02/01/07	22.3	1.003	1578.09	62.78	-0.17	DOWN	15.97	-0.04	DOWN		
MCF-07	350	370	1250.07	1524.30	7/24/04	---	---	---	---	---	AA-07	30	50	1570.12	1570.81	7/23/04	---	---	---	---	---	---	46.51	-0.15	DOWN	---	---	---	
MCF-07	350	370	1250.07	(b)	5/24/06	---	---	---	---	---	AA-07	30	50	1570.12	1572.10	5/24/06	2030	06/06/06	23.99	0.999	1572.10	(b)	(b)	DOWN	---	---	---		
MCF-07	350	370	1250.07	1523.04	8/30/06	174000	08/30/06	25.0	1.134	1559.62	AA-07	30	50	1570.12	1572.05	7/27/06	1990	08/16/06	23.58	0.999	1572.05	49.01	-0.15	DOWN	12.43	-0.04	DOWN		
MCF-07	350	370	1250.07	1532.33	10/16/06	182000	11/10/06	24.29	1																				

Table 1. Summary of Vertical Gradient Data

BRC Common Areas - Eastside

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Intermediate/Shallow Well Pairs

Intermediate/Shallow Well Pairs																						Uncorrected for Groundwater Density				Corrected for Groundwater Density			
Intermediate Well	Depth to Top of Screen (feet)	Depth to Bottom of Screen	Screen Midpoint (AMSL) (zi)	Groundwater Elevation (AMSL) (hi)	Date Measured	Groundwater TDS (mg/L)	TDS Date Measured	Groundwater Temperature (C)	GW Density (g/cm ³) (pi)	Fresh Water Head, Hf (AMSL) (hi)	Shallow Well	Depth to Top of Screen (feet)	Depth to Bottom of Screen (feet)	Screen Midpoint (AMSL) (zi)	Groundwater Elevation (AMSL) (hi)	Date Measured	Groundwater TDS (mg/L)	TDS Date Measured	Groundwater Temperature (C)	GW Density (g/cm ³) (pi)	Fresh Water Head, Hf (AMSL)	Point Water Head Delta (AMSL)	Point Water Head Deep/Shallow Vertical Gradient (ft/ft)	Point Water Head Vertical Flow Direction	Fresh Water Head Delta (AMSL)	Fresh Water Head Deep/Shallow Vertical Gradient	Fresh Water Head Vertical Flow Direction		
BEC-9	44	59	---	1570.98	7/27/06	6020	08/02/06	22.8	1.002	---	AA-19	22	42.0	1607.88	1,601.02	7/26/06	---	---	---	---	---	30.04	---	DOWN	---	---	---		
BEC-9	44	59	---	1570.20	10/16/06	5120	10/19/06	23.51	1.001	---	AA-19	22	42.0	1607.88	1,599.85	10/17/06	---	---	---	---	---	29.65	---	DOWN	---	---	---		
BEC-9	44	59	---	1569.15	1/22/07	5900	01/29/07	22.6	1.002	---	AA-19	22	42.0	1607.88	1,598.54	1/22/07	---	---	---	---	---	29.39	---	DOWN	---	---	---		
MCF-10B	84	104	1518.38	1597.87	7/9/04	---	---	---	---	---	AA-10	10	40	1587.38	1595.91	7/9/04	---	---	---	---	---	---	-1.96	0.03	UP	---	---	---	
MCF-10B	84	104	1518.38	1597.92	4/21/06	2050	05/18/06	24.35	0.999	1597.84	AA-10	10	40	1587.38	1596.04	4/21/06	4880	05/01/06	23.36	1.001	1596.05	-1.88	0.03	UP	-1.79	0.03	UP		
MCF-10B	84	104	1518.38	1598.08	7/27/06	2030	08/15/06	23.75	0.999	1598.00	AA-10	10	40	1587.38	1596.97	7/27/06	4610	08/11/06	23.2	1.001	1596.98	-1.11	0.02	UP	-1.02	0.01	UP		
MCF-10B	84	104	1518.38	1598.81	10/17/06	2050	11/10/06	23.67	0.999	1598.73	AA-10	10	40	1587.38	1596.75	10/17/06	4770	10/23/06	22.63	1.001	1596.76	-2.06	0.03	UP	-1.97	0.03	UP		
MCF-10B	84	104	1518.38	1598.85	1/23/07	2150	02/27/07	23.0	0.999	1598.77	AA-10	10	40	1587.38	1596.89	1/23/07	4560	01/26/07	22.9	1.001	1596.90	-1.96	0.03	UP	-1.87	0.03	UP		
MCF-11	93.5	103.5	1559.25	1632.13	7/13/04	---	---	---	---	---	AA-11	9	29	1639	1632.84	4/15/04	---	---	---	---	---	---	0.71	-0.01	DOWN	---	---	---	
MCF-11	93.5	103.5	1559.25	1630.82	4/20/06	3470	05/16/08	25.11	1.000	1630.82	AA-11	9	29	1639	1630.62	4/20/06	---	---	---	---	---	-0.20	0.00	UP	---	---	---		
MCF-11	93.5	103.5	1559.25	1630.12	7/26/06	3250	08/16/08	24.4	1.000	1630.12	AA-11	9	29	1639	1629.96	7/26/06	---	---	---	---	---	-0.16	0.00	UP	---	---	---		
MCF-11	93.5	103.5	1559.25	1629.89	10/17/06	3350	10/27/08	24.01	0.999	1629.82	AA-11	9	29	1639	1629.74	10/17/06	---	---	---	---	---	-0.15	0.00	UP	---	---	---		
MCF-11	93.5	103.5	1559.25	1630.11	1/23/07	3520	02/23/07	23.7	1.000	1630.11	AA-11	9	29	1639	1629.87	1/23/07	---	---	---	---	---	-0.24	0.00	UP	---	---	---		
MCF-12C	155	175	1548.03	1647.56	7/21/04	---	---	---	---	---	MCF-12B	64	84	1638.74	1648.18	6/5/04	---	---	---	---	---	---	0.62	-0.01	DOWN	---	---	---	
MCF-12C	155	175	1548.03	1648.68	4/27/06	1690	05/22/06	24.97	0.998	1648.48	MCF-12B	64	84	1638.74	1649.08	4/27/06	2630	05/23/06	25.14	0.999	1649.07	0.40	0.00	DOWN	0.59	-0.01	DOWN		
MCF-12C	155	175	1548.03	1647.97	7/27/06	1820	08/10/06	25.3	0.998	1647.77	MCF-12B	64	84	1638.74	1648.33	7/27/06	2520	08/09/06	26.7	0.999	1648.32	0.36	0.00	DOWN	0.55	-0.01	DOWN		
MCF-12C	155	175	1548.03	1647.76	10/16/06	2010	11/03/06	24.35	0.999	1647.66	MCF-12B	64	84	1638.74	1648.20	10/16/06	2620	11/08/06	24.54	0.999	1648.19	0.44	0.00	DOWN	0.53	-0.01	DOWN		
MCF-12C	155	175	1548.03	1647.28	1/24/07	2100	02/22/07	21.7	0.999	1647.18	MCF-12B	64	84	1638.74	1647.75	1/24/07	2760	02/15/07	21.19	1.000	1647.75	0.47	-0.01	DOWN	0.57	-0.01	DOWN		
MCF-16B	283.7	313.7	1390.97	1628.46	7/23/04	---	---	---	---	---	MCF-16C	53	73	1626.88	1629.98	6/11/04	---	---	---	---	---	---	1.52	-0.01	DOWN	---	---	---	
MCF-16B	283.7	313.7	1390.97	1626.55	4/20/06	64800	05/01/06	25.83	1.046	1637.39	MCF-16C	53	73	1626.88	1626.23	4/20/06	8150	05/22/06	23.3	1.004	1626.23	-0.32	0.00	UP	-11.16	0.05	UP		
MCF-16B	283.7	313.7	1390.97	1627.11	7/26/06	70000	08/23/06	24.31	1.050	1638.92	MCF-16C	53	73	1626.88	1625.88	7/26/06	8190	08/16/06	25.8	1.003	1625.88	-1.23	0.01	UP	-13.04	0.06	UP		
MCF-16B	283.7	313.7	1390.97	1626.95	10/17/06	72200	11/06/06	23.34	1.052	1639.22	MCF-16C	53	73	1626.88	1625.66	10/17/06	7010	11/06/06	23.53	1.003	1625.66	-1.29	0.01	UP	-13.56	0.06	UP		
MCF-16B	283.7	313.7	1390.97	1626.83	1/22/07	74400	02/20/07	19.50	1.055	1639.80	MCF-16C	53	73	1626.88	1625.51	1/22/07	6480	02/20/07	22.3	1.003	1625.51	-1.32	0.01	UP	-14.30	0.06	UP		
MCF-1B	55	85	1683.95	1713.88	6/7/04	---	---	---	---	---	AA-01	29	49	1715.96	1712.03	4/8/04	---	---	---	---	---	---	-1.85	0.06	UP	---	---	---	
MCF-1B	55	85	1683.95	1712.16	4/18/06	2000	05/11/06	24.89	0.999	1712.13	AA-01	29	49	1715.96	1712.35	4/18/06	3430	04/26/06	25.01	1.000	1712.35	0.19	-0.01	DOWN	0.22	-0.01	DOWN		
MCF-1B	55	85	1683.95	1711.50	7/27/06	2070	07/31/06	25.89	0.998	1711.44	AA-01	29	49	1715.96	1711.69	7/27/06	3930	08/01/06	24.84	1.000	1711.69	0.19	-0.01	DOWN	0.25	-0.01	DOWN		
MCF-1B	55	85	1683.95	1711.34	10/16/06	1980	11/06/06	23.67	0.999	1711.31	AA-01	29	49	1715.96	1711.50	10/16/06	3310	10/18/06	23.88	1.000	1711.50	0.16	0.00	DOWN	0.19	-0.01	DOWN		
MCF-1B	55	85	1683.95	1711.28	1/22/07	1830	02/14/06	23.93	0.999	1711.25	AA-01	29	49	1715.96	1711.45	1/22/07	3730	01/25/07	24	1.000	1711.45	0.17	-0.01	DOWN	0.20	-0.01	DOWN		
MCF-6B	67	82	1555.9	1590.58	7/16/04	---	---	---	---	---	MCF-06C	44	59	1578.92	1584.17	7/15/04	---	---	---	---	---	---	-6.41	0.28	UP	---	---	---	
MCF-6B	67	82	1555.9	1581.18	4/20/06	31400	05/18/06	24.38	1.021	1581.71	MCF-06C	44	59	1578.92	1580.63	4/20/06	47600	05/22/06	24.09	1.033	1580.69	-0.55	0.02	UP	-1.02	0.04	UP		
MCF-6B	67	82	1555.9	1580.25	7/26/06	39700	08/09/06	24.02	1.027	1580.91	MCF-06C	44	59	1578.92	1579.38	7/26/06	6280	08/08/06	23.97	1.002	1579.38	-0.87	0.04	UP	-1.53	0.07	UP		
MCF-6B	67	82	1555.9	1579.92	10/17/06	38200	10/31/06	25.63	1.026	1580.54	MCF-06C	44	59	1578.92	1578.93	10/17/06	6720	10/30/06	23.57	1.002	1578.93	-0.99	0.04	UP	-1.61	0.07	UP		
MCF-6B	67	82	1555.9	1578.79	1/23/07	39700	02/01/06	19.3	1.029	1579.45	MCF-06C	44	59	1578.92	1578.09	1/23/07	6980	02/01/07	22.3	1.003	1578.09	-0.70	0.03	UP	-1.37	0.06	UP		
MCF-8B	107.5	137.5	1455.93	1570.59	6/9/04	---	---	---	---	---	AA-08	5	35	1558.46	1566.82	6/7/04	---	---	---	---	---	---	-3.77	0.04	UP	---	---	---	
MCF-8B	107.5	137.5	1455.93	1578.43	4/21/06	27100	05/23/06	23.45	1.018	1580.63	AA-08	5	35	1558.46	1567.69	4/21/06	5070	05/25/06	23.48	1.001	1567.70	-10.74	0.10	UP	-12.94	0.13	UP		
MCF-8B	107.5	137.5	1455.93	1576.89	7/26/06	26200	08/23/06	23.87	1.017	1578.95	AA-08	5	35	1558.46	1565.47	7/26/06	4390	08/14/06	23.3	1.001	1565.48	-11.42	0.11	UP	-13.47	0.13	UP		
MCF-8B	107.5	137.5	1455.93	1577.54	10/17/06	26800	11/10/06	23.80	1.018	1579.73	AA-08	5	35	1558.46	1568.82	10/17/06	4640	11/01/06	23.65	1.001	1568.83	-8.72	0.09	UP	-10.90	0.11	UP		
MCF-8B	107.5	137.5	1455.93	1578.59	1/23/07	28300	02/08/07	22.6	1.019	1580.92	AA-08	5	35	1558.46	1568.72	1/23/07	4700	02/08/07	23.4	1.001	1568.73	-9.87	0.10	UP	-12.19	0.12	UP		
MCF-9B	105	125	1578	1663.43	7/7/04	---	---	---	---	---	AA-09	30	65	1646.61	1663.46	7/7/04	---	---	---	---	---	---	0.03	0.00	DOWN	---	---	---	
MCF-9B	105	125	1578	1660.14	4/20/06	3390	05/03/06	25.30	1.000	1660.14	AA-09	30	65	1646.61	1659.16	4/20/06	5670	05/01/06	25.3	1.001	1659.17	-0.98	0.01	UP	-0.97	0.01	UP		
MCF-9B	105	125	1578	1659.39	7/26/06	3510	08/04/06	25.99	0.999	1659.31	AA-09	30	65	1646.61	1658.64	7/26/06	5740	08/11/06	24.38	1.002	1658.66	-0.75	0.01	UP	-0.64	0.01	UP		
MCF-9B	105	125	1578																										

Table 1. Summary of Vertical Gradient Data

BRC Common Areas - Eastside

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Deep/Intermediate Well Pairs																					Uncorrected for Groundwater Density						Corrected for Groundwater Density					
Deep Well	Depth to Top of Screen (feet)	Depth to Bottom of Screen	Screen Midpoint (AMSL) (zi)	Groundwater Elevation (AMSL) (hi)	GW Elevation Date Measured	Groundwater TDS (mg/L)	TDS Date Measured	Groundwater Temperature (C)	GW Density (g/cm ³) (pi)	Fresh Water Head, Hf (AMSL) (h(f))	Intermediate e Well	Depth to Top of Screen (feet)	Depth to Bottom of Screen (feet)	Screen Midpoint (AMSL) (zi)	Groundwater Elevation (AMSL) (hi)	GW Elevation Date Measured	Groundwater TDS (mg/L)	TDS Date Measured	Groundwater Temperature (C)	GW Density (g/cm ³) (pi)	Fresh Water Head, Hf (AMSL)	Point Water Head Delta (AMSL)	Deep/Head Vertical Gradient (ft/ft)	Point Water Head Vertical Flow Direction	Fresh Water Head Delta (AMSL)	Fresh Water Head Deep/Shallow Vertical Gradient	Fresh Water Head Vertical Flow Direction					
MCF-10A	365	385	1238.32	1613.06	4/14/04	---	---	---	---	---	MCF-10B	84	104	1518.38	1597.87	7/9/04	---	---	---	---	---	---	-15.19	0.05	UP	---	---	---				
MCF-10A	365	385	1238.32	ARTESIAN	4/21/06	8080	05/31/06	24.96	1.003	---	MCF-10B	84	104	1518.38	1597.92	4/21/06	2050	05/18/06	24.35	0.999	1597.84	(a)	(a)	UP	(a)	(a)	UP					
MCF-10A	365	385	1238.32	1601.56	7/27/06	6800	08/15/06	24.3	1.002	1602.29	MCF-10B	84	104	1518.38	1598.08	7/27/06	2030	08/15/06	23.75	0.999	1598.00	-3.48	0.01	UP	-4.29	0.02	UP					
MCF-10A	365	385	1238.32	1607.46	10/17/06	7700	11/10/06	25.01	1.003	1608.57	MCF-10B	84	104	1518.38	1598.81	10/17/06	2050	11/10/06	23.67	0.999	1598.73	-8.65	0.03	UP	-9.84	0.04	UP					
MCF-10A	365	385	1238.32	1612.18	1/23/07	7270	02/27/06	22.51	1.003	1613.30	MCF-10B	84	104	1518.38	1598.85	1/23/07	2150	02/27/07	23.0	0.999	1598.77	-13.33	0.05	UP	-14.53	0.05	UP					
MCF-12A	349.5	369.5	1354.18	1658.06	7/22/2004	---	---	---	---	---	MCF-12C	155	175	1548.03	1647.56	7/21/04	---	---	---	---	---	---	---	-10.50	0.05	UP	---	---	---			
MCF-12A	349.5	369.5	1354.18	1661.03	4/27/06	5950	05/18/06	28.13	1.003	1661.95	MCF-12C	155	175	1548.03	1648.68	4/27/06	1690	05/22/06	24.97	0.998	1648.48	-12.35	0.06	UP	-13.47	0.07	UP					
MCF-12A	349.5	369.5	1354.18	1661.21	7/27/06	5900	08/10/06	25.6	1.001	1661.52	MCF-12C	155	175	1548.03	1647.97	7/27/06	1820	08/10/06	25.3	0.998	1647.77	-13.24	0.07	UP	-13.75	0.07	UP					
MCF-12A	349.5	369.5	1354.18	1661.36	10/16/06	7580	11/10/06	24.64	1.003	1662.28	MCF-12C	155	175	1548.03	1647.76	10/16/06	2010	11/03/06	24.35	0.999	1647.66	-13.60	0.07	UP	-14.62	0.08	UP					
MCF-12A	349.5	369.5	1354.18	1661.54	1/24/07	6320	02/23/07	24.8	1.002	1662.15	MCF-12C	155	175	1548.03	1647.28	1/24/07	2100	02/22/07	21.7	0.999	1647.18	-14.26	0.07	UP	-14.97	0.08	UP					
MCF-16A	364.5	384.5	1315.17	1661.98	4/6/04	---	---	---	---	---	MCF-16B	283.7	313.7	1391.05	1628.46	7/23/04	---	---	---	---	---	---	-33.52	0.44	UP	---	---	---				
MCF-16A	364.5	384.5	1315.17	1643.84	4/20/06	81800	05/18/06	25.74	1.059	1663.23	MCF-16B	283.7	313.7	1391.05	1626.55	4/20/06	64800	05/01/06	25.83	1.046	1637.38	-17.29	0.23	UP	-25.85	0.34	UP					
MCF-16A	364.5	384.5	1315.17	1643.62	7/26/06	83800	08/21/06	24.0	1.061	1663.66	MCF-16B	283.7	313.7	1391.05	1627.11	7/26/06	70000	08/23/06	24.31	1.050	1638.91	-16.51	0.22	UP	-24.74	0.33	UP					
MCF-16A	364.5	384.5	1315.17	1643.84	10/17/06	86400	11/06/06	24.14	1.063	1664.55	MCF-16B	283.7	313.7	1391.05	1626.95	10/17/06	72200	11/06/06	23.34	1.052	1639.22	-16.89	0.22	UP	-25.33	0.33	UP					
MCF-16A	364.5	384.5	1315.17	1644.13	1/22/07	88300	02/16/07	23.2	1.065	1665.51	MCF-16B	283.7	313.7	1391.05	1626.83	1/22/07	74400	02/20/07	19.50	1.055	1639.80	-17.30	0.23	UP	-25.71	0.34	UP					
MCF-1A	335	355	1409.44	1720.21	7/25/04	---	---	---	---	---	MCF-1B	55	85	1683.95	1713.88	6/7/04	---	---	---	---	---	---	-6.33	0.02	UP	---	---	---				
MCF-1A	335	355	1409.44	1723.51	4/18/06	3570	05/30/06	27.72	0.999	1723.20	MCF-1B	55	85	1683.95	1712.16	4/18/06	2000	05/11/06	24.89	0.999	1712.13	-11.35	0.04	UP	-11.06	0.04	UP					
MCF-1A	335	355	1409.44	1726.61	7/27/06	4020	08/07/06	26.39	0.997	1725.66	MCF-1B	55	85	1683.95	1711.50	7/27/06	2070	07/31/06	25.89	0.998	1711.44	-15.11	0.06	UP	-14.21	0.05	UP					
MCF-1A	335	355	1409.44	1727.87	10/16/06	4060	10/24/06	26.01	1.000	1727.87	MCF-1B	55	85	1683.95	1711.34	10/16/06	1980	11/06/06	23.67	0.999	1711.31	-16.53	0.06	UP	-16.56	0.06	UP					
MCF-1A	335	355	1409.44	1726.47	1/22/07	3930	02/02/07	23.4	1.000	1726.47	MCF-1B	55	85	1683.95	1711.28	1/22/07	1830	02/14/06	23.93	0.999	1711.25	-15.19	0.06	UP	-15.22	0.06	UP					
MCF-2A	360	380	1446.44	1770.22	3/24/04	---	---	---	---	---	MCF-2B	215	235	1591.36	1751.83	7/8/04	---	---	---	---	---	---	---	-18.39	0.13	UP	---	---	---			
MCF-2A	360	380	1446.44	1775.11	4/18/06	494	05/10/06	26.55	0.997	1774.12	MCF-2B	215	235	1591.36	1757.25	4/20/06	622	05/05/06	26.92	0.997	1756.75	-17.86	0.12	UP	-17.37	0.12	UP					
MCF-2A	360	380	1446.44	1775.80	7/27/06	560	08/04/06	26.66	0.997	1774.81	MCF-2B	215	235	1591.36	1757.40	7/27/06	620	08/21/06	26.2	0.997	1756.90	-18.40	0.13	UP	-17.91	0.12	UP					
MCF-2A	360	380	1446.44	1776.48	10/16/06	492	11/07/06	25.68	0.997	1775.49	MCF-2B	215	235	1591.36	1757.62	10/16/06	650	11/03/06	26.76	0.997	1757.12	-18.86	0.13	UP	-18.37	0.13	UP					
MCF-2A	360	380	1446.44	1776.98	1/22/07	623	02/15/07	25.54	0.997	1775.99	MCF-2B	215	235	1591.36	1757.59	1/22/07	638	02/20/07	25.3	0.997	1757.09	-19.39	0.13	UP	-18.90	0.13	UP					
MCF-3A	364	384	1409.23	1732.71	2/25/04	---	---	---	---	---	MCF-3B	57	77	1716.46	1741.72	7/9/04	---	---	---	---	---	---	---	9.01	-0.03	DOWN	---	---	---			
MCF-3A	364	384	1409.23	1736.73	4/20/06	694	06/07/06	26.0	0.997	1735.75	MCF-3B	57	77	1716.46	1742.02	4/20/06	2590	05/12/06	24.75	0.999	1741.99	5.29	-0.02	DOWN	6.25	-0.02	DOWN					
MCF-3A	364	384	1409.23	1737.12	7/27/06	631	08/14/06	25.09	0.998	1736.46	MCF-3B	57	77	1716.46	1741.80	7/27/06	2450	08/16/06	24.68	0.999	1741.77	4.68	-0.02	DOWN	5.31	-0.02	DOWN					
MCF-3A	364	384	1409.23	1737.57	10/16/06	627	11/02/06	24.21	0.998	1736.91	MCF-3B	57	77	1716.46	1741.56	10/16/06	2490	11/03/06	24.86	0.999	1741.53	3.99	-0.01	DOWN	4.62	-0.02	DOWN					
MCF-3A	364	384	1409.23	1737.81	1/22/07	640	02/27/07	21.8	0.998	1737.15	MCF-3B	57	77	1716.46	1741.61	1/22/07	2610	02/20/07	24.2	0.999	1741.58	3.80	-0.01	DOWN	4.43	-0.01	DOWN					
MCF-6A	373.5	393.5	1205.3	1563.27	4/16/04	---	---	---	---	---	MCF-6B	67	82	1555.9	1590.58	7/16/04	---	---	---	---	---	---	---	27.31	-0.08	DOWN	---	---	---			
MCF-6A	373.5	393.5	1205.3	1519.38	4/20/06	186000	05/30/06	26.27	1.144	1564.61	MCF-6B	67	82	1555.9	1581.18	4/20/06	31400	05/18/06	24.38	1.021	1581.71	61.80	-0.18	DOWN	17.10	-0.05	DOWN					
MCF-6A	373.5	393.5	1205.3	1509.54	7/27/06	185000	08/21/06	25.1	1.143	1553.05	MCF-6B	67	82	1555.9	1580.25	7/26/06	39700	08/09/06	24.02	1.027	1580.91	70.71	-0.20	DOWN	27.86	-0.08	DOWN					
MCF-6A	373.5	393.5	1205.3	1512.00	10/16/06	205000	11/13/06	23.44	1.162	1561.68	MCF-6B	67	82	1555.9	1579.92	10/17/06	38200	10/31/06	25.63	1.026	1580.54	67.92	-0.19	DOWN	18.86	-0.05	DOWN					
MCF-6A	373.5	393.5	1205.3	1515.31	1/23/07	191000	02/23/07	20.4	1.151	1562.12	MCF-6B	67	82	1555.9	1578.79	1/23/07	39700	02/01/06	19.3	1.029	1579.45	63.48	-0.18	DOWN	17.33	-0.05	DOWN					
MCF-8A	350	370	1219.02	ARTESIAN	4/7/04	---	---	---	---	---	MCF-8B	107.5	137.5	1455.93	1570.59	6/9/04	---	---	---	---	---	---	(a)	(a)	(a)	(a)	(a)	UP				
MCF-8A	350	370	1219.02	ARTESIAN	4/21/06	110000	06/07/06	24.59	1.082	---	MCF-8B	107.5	137.5	1455.93	1578.43	4/21/06	27100	05/23/06	23.45	1.018	1580.64	(a)	(a)	(a)	(a)	(a)	UP					
MCF-8A	350	370	1219.02	ARTESIAN	7/26/06	113000	08/23/06	23.8	1.084	---	MCF-8B	107.5	137.5	1455.93	1576.89	7/26/06	26200	08/23/06	23.87	1.017	1578.95	(a)	(a)	(a)	(a)	(a)	UP					
MCF-8A	350	370	1219.02	ARTESIAN	10/17/06	113000	11/10/06	25.73	1.																							