Appendix 1. Well data for HS study.

WELL NAME	NORTH. COORD.	EAST. COORD.	WELL DEPTH (FT-MP)	CASING DIAM (IN)	DATE	DEPTH (FT-MP)	ELEV. (FT-MSL)	MP ABOVE LSD (FT)	MP-ELEV. (FT-MSL)	DEPTH TO BASE OF ALLUVIUM (FT-LSD)	ELEV. TO BASE OF ALLUVIUM (FT-MSL)	SCREEN INTERVAL (FT-LSD)	SATURATED THICKNESS (FT)	comment
					ALLUVIUM									
	WASTE PILE													
T11	489887	1544585	193	5	8/24/09	116.52	6540.29	2.7	6656.81	160		113-193	46.2	
	NEAR UPGRADIENT													
DD	1546989	488943	78.5	4	11/22/2013	49.04	6543.55	1.9	6592.59	83	6507.7	40-80	35.9	
DD2	1547439	489251	94.3	5	11/22/2013	47.8	6545.48	2	6593.28	---	---	50-90	---	NO DATA IN TABLE
ND	1545927	494872	70	4	12/3/2013	43.49	6549.4	1.1	6592.89	65	6526.8	50-70	22.6	
P3	1546159	490785	95	5	7/22/2013	44.03	6545.92	2.2	6589.95	85	6502.8	55-95	43.2	
	FAR UPGRADIENT													
916	1552350	499600	160	4	5/7/2009	36.63	6588.37	0	6625	---	---	45-70	---	ONLY WELLS OF GRP WITH DEPTH INFO
950	1560400	498300	81	5	7/12/2000	25.7	6631.3	0.5	6657	---	---	-	---	Skip
Q	1548693	492153	98.3	4	5/13/2013	44.96	6548.86	2.3	6593.82	100	6491.5	72-102	57.3	Btter option
	REGIONAL UPGRADIENT													
n-16	-107.790233	35.3977446	71	2	7/22/15	57	6581	?	6638	70		60-70	13 A	SKIP
n-17	-107.854028	35.276223	70	2	7/23/15	60	6573	?	6633	70		60-70	10 A	
	DOWNGRADIENT													
MO	1543620	485518	88	4.5	11/1/2013	48.24	6524.65	2	6572.89	80	6490.9	45-85	33.8	SKIP
MV	1542618	484418	105	4.5	12/12/2013	58.31	6511.47	1.3	6569.78	95	6473.5	75-105	38	
					UPPER CHINLE									all impacted below?
	Mixing impacted													
CW50	1546687	491159	170	5	12/11/2013	45.43	6543.13	3	6588.56	128	6458	130-170	Upper	
AW	1540235	488015	156	6	12/11/2013	31.99	6531.44	0.1	6563.43	63	6500	-		SKIP
										100	6463	66-155	Upper	
	Non mixing impacted													
CW18	1535924	491378	230.7	5	12/11/2013	36.05	6536.6	1.5	6572.65	90	6481	-	---	
										190	6381	177-232	Upper	
										340	6231	-		
	Non mixing, not impacted													
	IMPACTED													
CE7	1542652	490079	120	6	12/11/2013	36.7	6539.29	1.9	6575.99	95	6479	100-140	Upper	EXTRACTION
					MIDDLE CHINLE									
	Mixing impacted													
484	1536448	490356	320	5	12/26/1996	39.43	6524.55	0	6563.98	38	6526	-	---	
										129	6435	-	---	
										280	6284	220-300	Middle	
CW45	1535036	489494	193	5	12/11/2013		6508.05	0.6	6561.3	166	6395	163-193		90
	IRRIGATION SUPPLY WELL													
										100	6463	66-155	Upper	
	Mixing non impacted													

9787592

CW15			1536259	485961	134.6	5	12/11/2013	85.56	6465.76	2.6	6551.32	50	6499	-		
												91	6458	73-133	Middle	
												311	6238	-		
		820	1539254	486513	230	---	5/9/2002	99.2	6458.8	0	6558	---	---	125-230	Middle	
	Non mixing impacted															
CW28			1535112	491008	370	5	12/11/2013	74.98	6496.7	1.9	6571.68	90	6480	-		
												110	6460	-		
												294	6276	280-360	Middle	
		482	1536981	489579	260	5	5/26/2010	36.94	6525.72	0	6562.66	80	6483	220-260	Alluvium	
												210	6353	220-260	Middle	
CW1			1545235	490295	325	5	6/24/2013	93.82	6491.4	0.7	6585.22	105	6480	-	---	
												272	6313	212-323	Middle	
	Non mixing, not impacted															
WCW			1541045	488520	307	6	12/11/2013	76.6	6490.77	0.8	6567.37	83	6484	-		
												254	6313	257-307	Middle	
CW2			1545212	491302	355	5	11/4/2013	106.6	6478.88	1.7	6585.48	85	6499	-		
												136	6448	-		
												305	6279	306-353	Middle	
ACW			1540235	488070	325	6	12/11/2013	73.36	6490.44	1.2	6563.8	40	6523	-	---	
		57	6506	-	---							57	6506	-	---	
		264	6299	265-325	Middle							264	6299	265-325	Middle	
Misc.																
	Injected water															
	San Andreas well															
LOWER CHINLE																
	MIXING IMPACTED															
CW26			1534116	489593	300	5	12/11/2013	91.1	6470.33	0.5	6561.43	50	6511	-	---	
												50	6511	-	---	
												231	6330	245-285	Lower	
CW37			1537240	484853	150.1	5	12/11/2013	63.55	6487.62	1.3	6551.17	55	6495	-	---	
												100	6450	100-150	Lower	

TYPE CODES

FOR LOG AND PASSIVE WELLS

WP	WASTE PILE
UN	UPGRADIENT NEAR
UF	UPGRADIENT FAR

CHINLE QW WELLS

MI	MIXING IMPACTED
NI	NON MIXING IMPACTED
MN	MIXING NON IMPACT
NU	NON MIXING UNIMPACTED

E	EXTRACTION

WELL SELECTION CRITERIA

Alluvial wells

1. Well data available
2. Waste impacted wells
3. Regional impacted wells
4. background wells
5. near upgradient wells-potentially local impact
6. downgradient wells?

Upper Chinle wells
1. Well data available
2. Wells designated as mixing
   a. clearly local impacted -time trends evident
   b. questionable local impacted-no time trend evident
3. Wells designated as non-mixing
   a. clearly local impacted -time trends evident
   b. questionable local impacted-no time trend evident
4. Wells within and outside of fault areas
5. Wells distal and proximal to subcrop areas

Middle Chinle wells (same as upper)
1. Well data available
2. Wells designated as mixing
   a. clearly local impacted -time trends evident
   b. questionable local impacted-no time trend evident
3. Wells designated as non-mixing
   a. clearly local impacted -time trends evident
   b. questionable local impacted-no time trend evident
4. Wells within and outside of fault areas
5. Wells distal and proximal to subcrop areas

Is it important to replicate what we learned in upper chinle to middle?
Is it enough to focus on upper alone?

Lower Chinle wells
1. None selected

San Andreas
1. Well data available
2. Wells near fault zone that may contribute upward flow to Chinle

Injected water
1. After treatment water from plant.

NAME	EAST	NORTH	DEPTH	AQUIFER	CASING	DATE	WLDEPTH	ELEV.	STICKUP	MPELEV	BASE	(FT-MSL)	SCREEN	SATB	TYPE
MV	484418	1542618	105	A	4.5	12/12/13	58.31	6511.47	1.3	6569.78	95	6473.5	75-105	38	WP
DD	488943	1546989	78.5	A	4	11/22/13	49.04	6543.55	1.9	6592.59	83	6507.7	40-80	35.9	UN
DD2	489251	1547439	94.3	A	5	11/22/13	47.8	6545.48	2	6593.28	0	0	50-90	0	UN
ND	494872	1545927	70	A	4	12/3/13	43.49	6549.4	1.1	6592.89	65	6526.8	50-70	22.6	UN
P3	490785	1546159	95	A	5	7/22/13	44.03	6545.92	2.2	6589.95	85	6502.8	55-95	43.2	UN
916	499600	1552350	160	A	4	5/7/09	36.63	6588.37	0	6625	0	0	45-70	0	UF
T11	489887	1544585	193	A	5	8/24/09	116.52	6540.29	2.7	6656.81	160		113-193	46.2	WP
CW50	491159	1546687	170	UC	5	12/11/13	45.43	6543.13	3	6588.56	128	6458	130-170	0	MI
CW2	491302	1545212	355	MC	5	11/4/13	106.6	6478.88	1.7	6585.48	305	6279	306-353	0	NI
CW15	485961	1536259	134.6	MC	5	12/11/13	85.56	6465.76	2.6	6551.32	91	6458	73-133	0	MN
820	486513	1539254	230	MC	0	5/9/02	99.2	6458.8	0	6558	0	0	125-230	0	MN
CW28	491008	1535112	370	MC	5	12/11/13	74.98	6496.7	1.9	6571.68	294	6276	280-360	0	NI
CW1	490295	1545235	325	MC	5	6/24/13	93.82	6491.4	0.7	6585.22	272	6313	212-323	0	NI
CW18	491378	1535924	230.7	UC	5	12/11/13	36.05	6536.6	1.5	6572.65	190	6381	177-232	0	NI
n-17	493823	1555803	70	A	2	7/23/15	60	6573 ?		6633	70	0	60-70	10	UF
Q	492153	1548693	98.3	A	4	05/13/13	44.96	6548.86	2.3	6593.82	100	6491.5	72-102	57.3	UF
484	490356	1536448	320	MC	5	12/26/1996	39.43	6524.55	0	6563.98	280	6284	220-300	0	MI
ACW	488070	1540235	325	MC	6	12/11/2013	73.36	6490.44	1.2	6563.8	264	6299	265-325	0	NU
CW45	489494	1535036	193	MC	5	12/11/2013	2/22/00	6508.05	0.6	6561.3	166	6395	163-193	90	MI
CE7	490079	1542652	120	UC	6	12/11/2013	36.7	6539.29	1.9	6575.99	95	6479	100-140	95	E
CW26	489593	1534116	300	LC	5	12/11/2013	91.1	6470.33	0.5	6561.43	231	6330	245-285	0	NU
CW37	484853	1537240	150.1	LC	5	12/11/13	63.55	6487.62	1.3	6551.17	100	6450	100-150	0	MI

INJECTATE

NAME	EAST	NORTH	DEPTH	AQUIFER	CASING	DATE	WLDEPTH	ELEV.	STICKUP	MPELEV	BASE	(FT-MSL)	SCREEN	SATB	TYPE
MO	485518	1543620	88	A	4.5	11/1/13	48.24	6524.65	2	6572.89	80	6490.9	45-85	33.8	WP
MV	484418	1542618	105	A	4.5	12/12/13	58.31	6511.47	1.3	6569.78	95	6473.5	75-105	38	WP
DD	488943	1546989	78.5	A	4	11/22/13	49.04	6543.55	1.9	6592.59	83	6507.7	40-80	35.9	UN
DD2	489251	1547439	94.3	A	5	11/22/13	47.8	6545.48	2	6593.28	0	0	0	0	UN
ND	494872	1545927	70	A	4	12/3/13	43.49	6549.4	1.1	6592.89	65	6526.8	50-70	22.6	UN
P3	490785	1546159	95	A	5	7/22/13	44.03	6545.92	2.2	6589.95	85	6502.8	55-95	43.2	UN
916	499600	1552350	160	A	4	5/7/09	36.63	6588.37	0	6625	0	0	45-70	0	UF
CW50	491159	1546687	170	UC	5	12/11/13	45.43	6543.13	3	6588.56	128	6458	130-170	0	MI
AW	488015	1540235	156	UC	6	12/11/13	31.99	6531.44	0.1	6563.43	100	6463	66-155	0	MI
CW2	491302	1545212	355	MC	5	11/4/13	106.6	6478.88	1.7	6585.48	305	6279	306-353	0	NI
CW15	485961	1536259	134.6	MC	5	12/11/13	85.56	6465.76	2.6	6551.32	91	6458	73-133	0	MN
820	486513	1539254	230	MC	0	5/9/02	99.2	6458.8	0	6558	0	0	125-230	0	MN
CW28	491008	1535112	370	MC	5	12/11/13	74.98	6496.7	1.9	6571.68	294	6276	280-360	0	NI
CW1	490295	1545235	325	MC	5	6/24/13	93.82	6491.4	0.7	6585.22	272	6313	212-323	0	NI
WCW	488520	1541045	307	MC	6	12/11/13	76.6	6490.77	0.8	6567.37	254	6313	257-307	0	NU
CW18	491378	1535924	230.7	UC	5	12/11/13	36.05	6536.6	1.5	6572.65	190	6381	177-232	0	NI
n-17	-107.854028	35.276223	70	A	2	7/23/15	60	6573	?	6633	70	0	60-70	10	UF
Q	492153	1548693	98.3	A	4	05/13/13	44.96	6548.86	2.3	6593.82	100	6491.5	72-102	57.3	UF
484	490356	1536448	320	MC	5	12/26/1996	39.43	6524.55	0	6563.98	280	6284	220-300	0	MI
482	489579	1536981	260	MC	5	5/26/2010	36.94	6525.72	0	6562.66	210	6353	220-260	0	NI
ACW	488070	1540235	325	MC	6	12/11/2013	73.36	6490.44	1.2	6563.8	264	6299	265-325	0	NU
CW2	491302	1545212	355	MC	5	11/4/2013	106.6	6478.88	1.7	6585.48	305	6279	306-353	0	NU
INJECTATE															

NAME	EAST	NORTH	DEPTH	AQUIFER	CASING	DATE	WLDEPTH	ELEV.	STICKUP	MPELEV	BASE	(FT-MSL)	SCREEN	SATB	TYPE
MV	484418	1542618	105	A	4.5	12/12/13	58.31	6511.47	1.3	6569.78	95	6473.5	75-105	38	WP
DD	488943	1546989	78.5	A	4	11/22/13	49.04	6543.55	1.9	6592.59	83	6507.7	40-80	35.9	UN
DD2	489251	1547439	94.3	A	5	11/22/13	47.8	6545.48	2	6593.28	0	0	0	0	UN
ND	494872	1545927	70	A	4	12/3/13	43.49	6549.4	1.1	6592.89	65	6526.8	50-70	22.6	UN
P3	490785	1546159	95	A	5	7/22/13	44.03	6545.92	2.2	6589.95	85	6502.8	55-95	43.2	UN
Q	492153	1548693	98.3	A	4	05/13/13	44.96	6548.86	2.3	6593.82	100	6491.5	72-102	57.3	UF
n-17	493823	1555803	70	A	2	7/23/15	60	6573	?	6633	70		60-70	10	UF
T11	489887	1544585	193	A	5	8/24/09	116.52	6540.29	2.7	6656.81	160		113-193	46.2	WP

BOLD HIGH PRIORITY

NAME	EAST	NORTH	DEPTH	AQUIFER	CASING	DATE	WLDEPTH	ELEV.	STICKUP	MPELEV	BASE	(FT-MSL)	SCREEN	SATB	TYPE	SAMPLE#	S1-TOP D BLS
MV	484418	1542618	105	A	4.5	12/12/13	58.31	6511.47	1.3	6569.78	95	6473.5	75-105	38	WP	8	
DD	488943	1546989	78.5	A	4	11/22/13	49.04	6543.55	1.9	6592.59	83	6507.7	40-80	35.9	UN	9	
DD2	489251	1547439	94.3	A	5	11/22/13	47.8	6545.48	2	6593.28	0	0	50-90	0	UN	?	
P3	490785	1546159	95	A	5	7/22/13	44.03	6545.92	2.2	6589.95	85	6502.8	55-95	43.2	UN	9	
Q	492153	1548693	98.3	A	4	05/13/13	44.96	6548.86	2.3	6593.82	100	6491.5	72-102	57.3	UF	8	
T11	489887	1544585	193	A	5	8/24/09	116.52	6540.29	2.7	6656.81	160		113-193	46.2	WP	9	

Table 3. Analytical and well selection list.

SEE -WELLSELEC-R43

NAME	AQUIFER	Field values	Dissolved ferrous iron	Dissolved oxygen	Alkalinity	Total organic carbon	Major anions	Major cations	Trace elements	Nitrogen	Gross alpha/beta	**Radium isotopes**	**Radon-222**	**Uranium isotopes**	Stable isotopes of water	Sulfur isotopes of sulfate	Nitrogen isotopes	Carbon 13	Carbon-14	Dissolved gases	**Tritium /Helium-3**	**CFCs**	Helium-4
MO	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
MV	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
DD	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
DD2	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
ND	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
P3	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
916	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
n-17	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Q	A	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
CW50	UC	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CW18	UC	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CE7	UC	X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CW2	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x	2 of this grp	2 of this grp	x	x	x	x	x	x
CW15	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x
820	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x
CW28	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x
CW1	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x
484	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x
ACW	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x
CW45	MC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	x	x	x
CW26	LC	X	X	X	X	X	x	x	x	x	x	x	x	x	x	none	none	x	x	x	one of this grp	one of ths grp	x
CW37	LC	X	X	X	X	X	x	x	x	x	x	x	x	x	x			x	x	x	?	?	x
INJECTATE		X	X	X	X	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x