An Australian Government Initiative

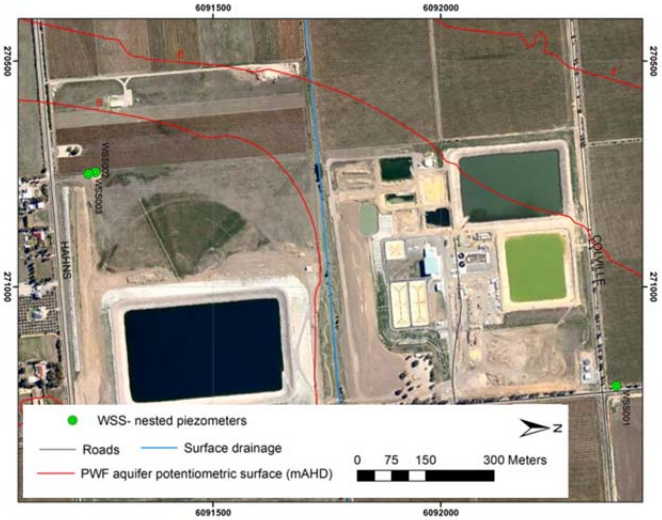
Groundwater Education Investment Fund Project

Borehole Infrastructure Report

Borehole Type	Multi-Level Piezometer	**GPS Easting**	(MGA-94 Zone 54)	271220
Unique Well ID	WSS-001	**GPS Northing**		6092385
Completion Date	10/12/2010	**Location**		Willunga Super Science Site
Drilled By	Geodrill	**Installed By**		Geodrill
Monument Type	PVC12	**Depth Drilled**		77.5 mBGS
Monument Diameter/Width	254 mm	**Drilled Diameter/Method**		200 mm (min), Rotary Mud
Development Details	Air lifted 1.5 hours			

Project Comments: WSS-001 is a multi-level piezometer monitoring bore, located at the Willunga Basin MAR site.

Bore ID	Casing Size (mm)/ Type	TOC (mAHD)	Casing Depth (mBGL)		Screen Size (mm)/ Aperture (mm)/ Type	Cement (mBGL)		Screen Depth (mBGL)		SWL after develop (mTOC)
WSS-001	254/PVC 12	24.784	-0.636	41	NA	0.0	41	NA	NA	NA
WSS-001-A	50/PVC	24.789	-0.641	40.9	50/1/PVC	0.0	40.4	40.9	41.9	20.16
WSS-001-B	50/PVC	24.801	-0.653	43.9	50/1/PVC	42.4	43.4	43.9	44.9	19.1
WSS-001-C	50/PVC	24.806	-0.658	50.3	50/1/PVC	45.4	49.8	50.3	51.3	20.2
WSS-001-D	50/PVC	24.795	-0.647	52.9	50/1/PVC	51.8	52.4	52.9	53.9	20.21
WSS-001-E	50/PVC	24.794	-0.646	57.4	50/1/PVC	54.4	56.9	57.4	58.4	20.25
WSS-001-F	50/PVC	24.798	-0.65	64.1	50/1/PVC	58.9	63.6	64.1	65.1	20.25



Map of Willunga Super Science Multi-level Piezometer Locations

WSS-001 Installation

Note* Appendix includes Lithology and Well Completion Log, Geophysical Logs, Hydraulic Test and Chemical Analysis.

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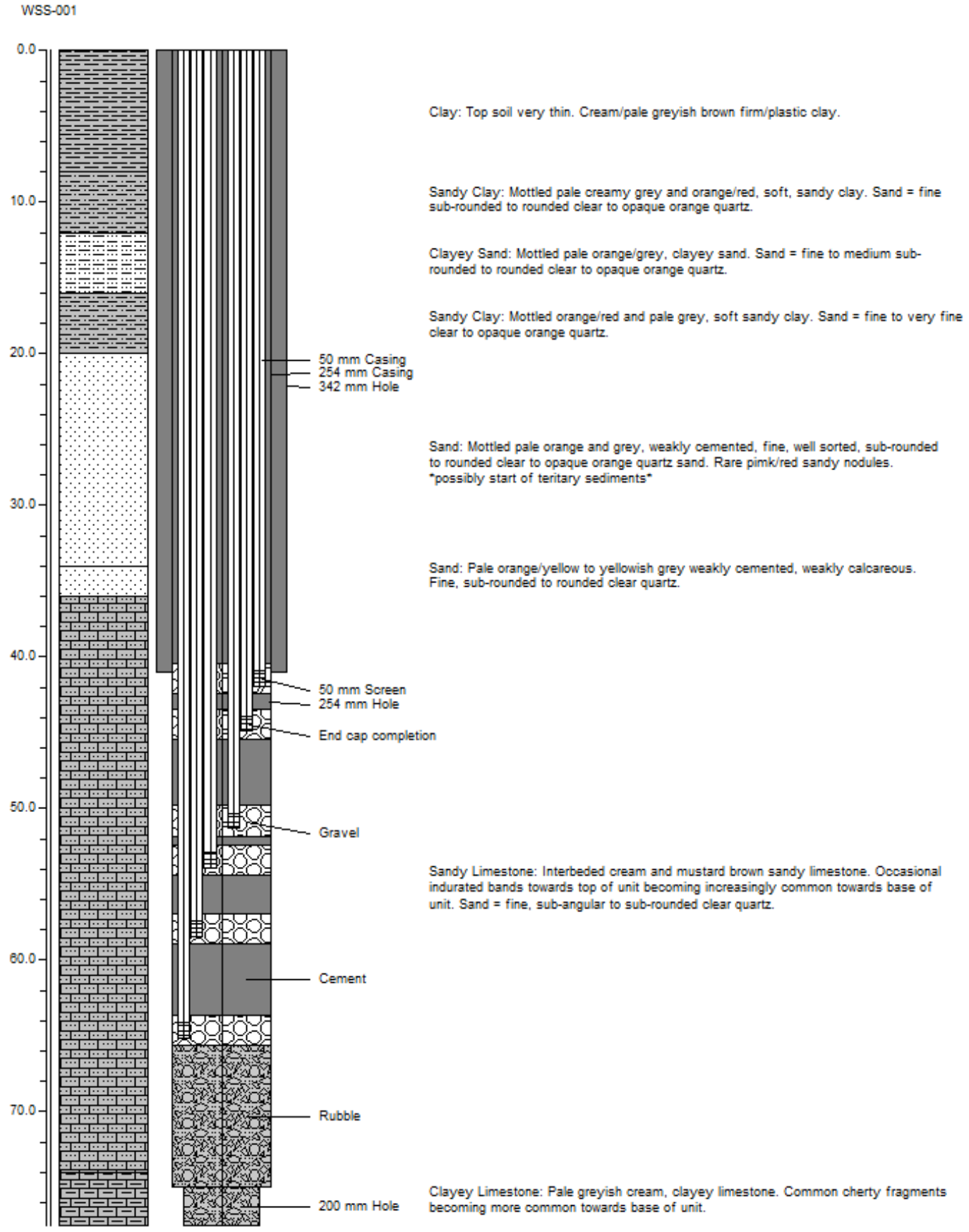
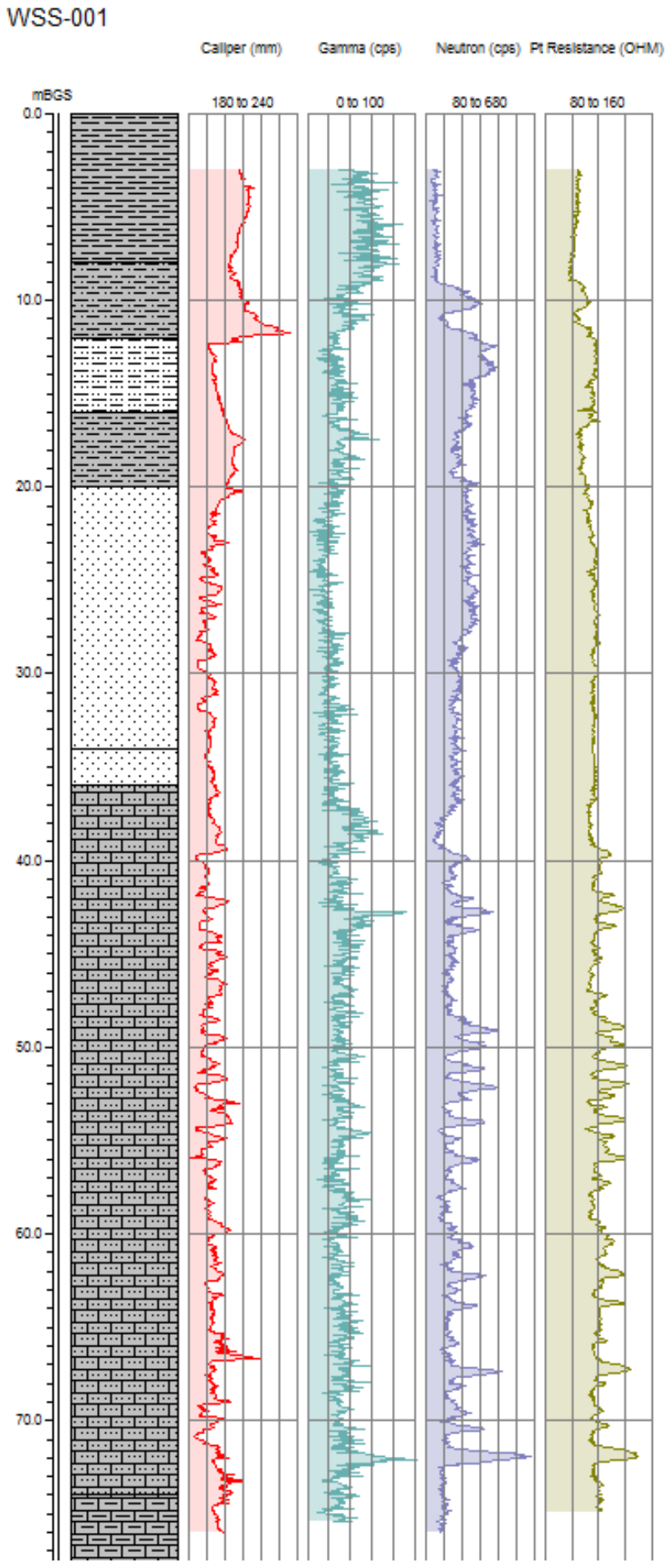
Lithology and Well Completion Log



*Gravel pack interval from 0.5 m above and to 0.5 m below each screen. The well collapsed back to 65 m during development.

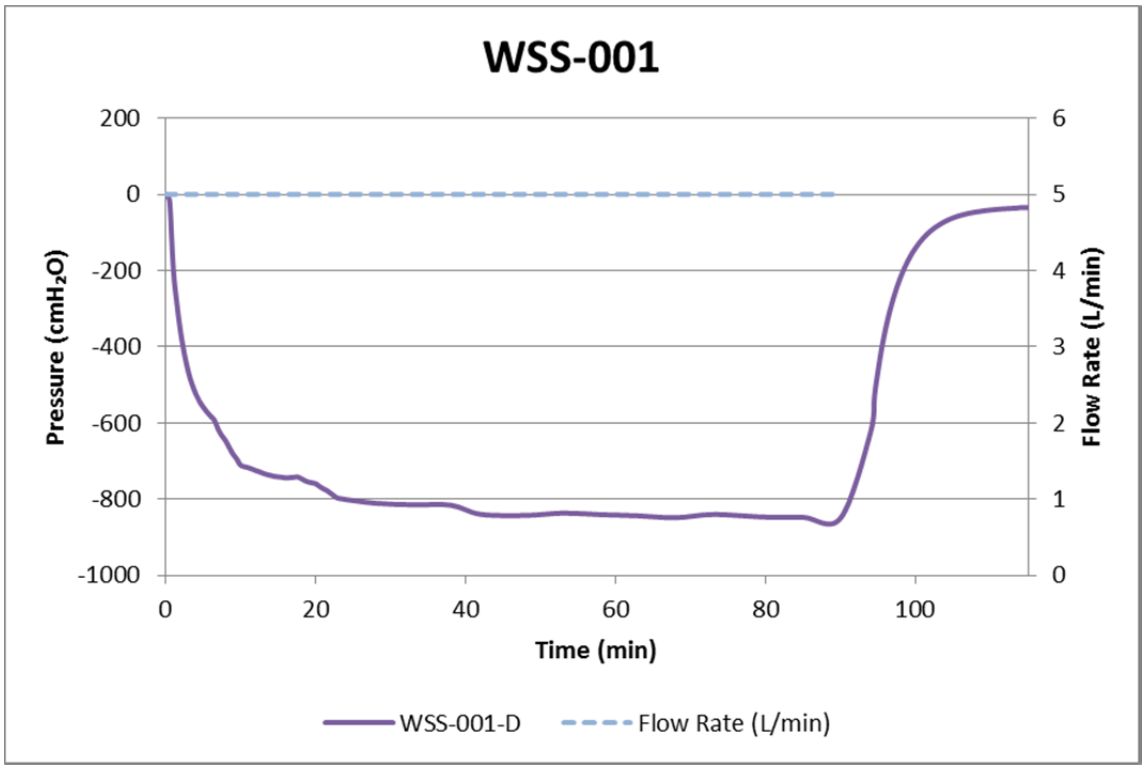
Geophysical Logs

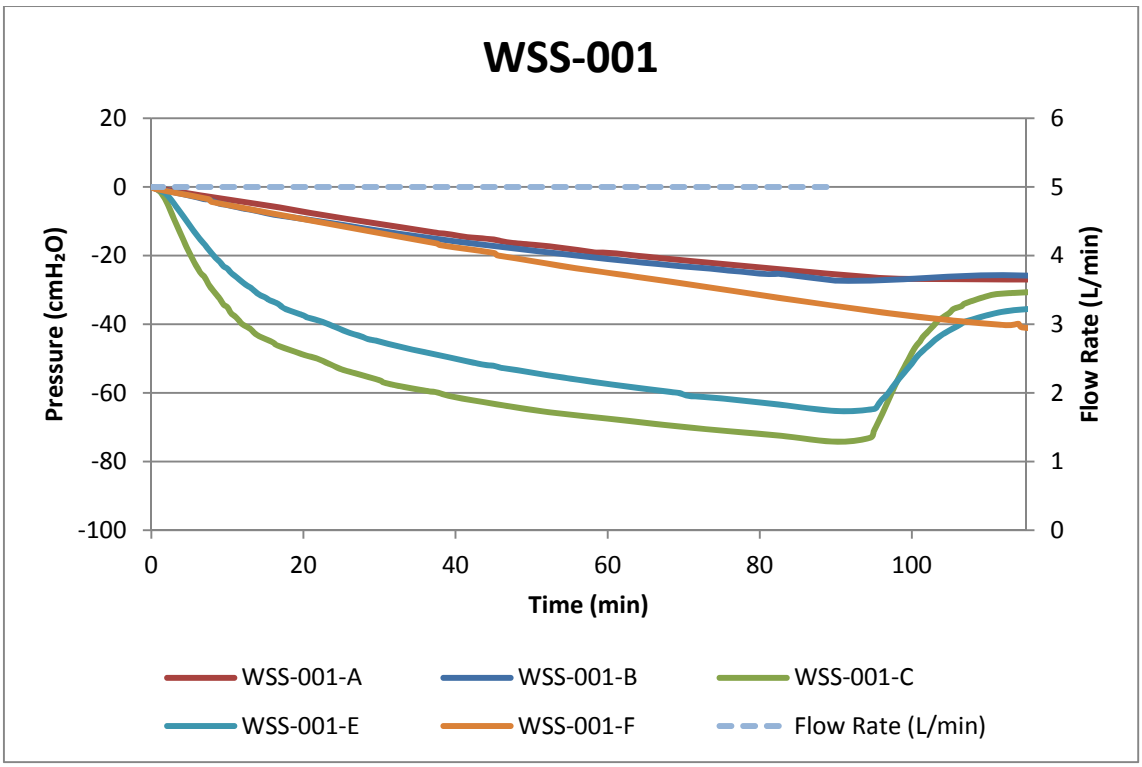
The Department for Water conducted geophysical logging in WSS-001 on 08/12/2012.



Pumping Test

A constant flow rate test was conducted in piezometer WSS-001-D, with all six intervals instrumented with water level loggers. The results of the test are presented below. The report author may be contacted for the full data set.





Chemical Analysis

Data from the chemical analysis of water from WSS-001 piezometers is shown below.

Well ID	Date Sampled	SWL	Field Parameters				Laboratory Analyses @ CSIRO ASU								
			pH	EC	Temp	Alkalinity	E.C.	Total Alkalinity	F^-	Cl^-	Br^-	NO_3^-	$SO_4^=$	Ca	K
		mTOC		µS/cm	°C	meq/L	µS/cm	meq/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WSS-001-A	6/01/2012	20.32	7.24	3558	22.5	6.2	3578	5.0	<0.2	1075	3.3	14	106	125	10.58
WSS-001-B	18/07/2011	19.1	7.2	3373	20.1	5.0		4.0	<0.2	1100	1.1	12	110	139	8.57
WSS-001-C	18/07/2011	20.2	7.34	3195	20.4	4.8		3.7	<0.2	980	1.0	13	120	113	8.6
WSS-001-D	19/07/2011	20.22	7.23	3322	20.4	4.9		4.0	<0.2	1100	1.1	11	110	134	9.05
WSS-001-E	18/07/2011	20.25	7.5	3353	20.6	5.3		4.0	<0.2	1100	1.1	11	91	136	11.7
WSS-001-F	13/01/2012	18.21	9.02	2066	21.6	2.4	2008	1.8	0.331	570.0	1.7	4.5	51	70	20.93

Well ID	Mg	Na	S	Al	As	B	Cd	Co	Cr
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WSS-001-A	65.14	538	32.3	<0.05	<0.05	0.485	<0.05	<0.05	<0.05
WSS-001-B	66.8	578	33.3	< 0.05	< 0.05	0.567	< 0.05	< 0.05	< 0.05
WSS-001-C	51.2	521	34.4	< 0.05	< 0.05	0.528	< 0.05	< 0.05	< 0.05
WSS-001-D	68.5	473	29.3	< 0.05	< 0.05	0.445	< 0.05	< 0.05	< 0.05
WSS-001-E	69.6	490	26	< 0.05	< 0.05	0.387	< 0.05	< 0.05	< 0.05
WSS-001-F	26.47	274	15.55	<0.05	<0.05	0.279	<0.05	<0.05	<0.05

Well ID	Cu	Fe	Mn	Mo	Ni	P	Pb	Sb	Se
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
WSS-001-A	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.1	<0.05
WSS-001-B	< 0.05	<0.1	< 0.05	< 0.05	< 0.05	<0.1	< 0.05	<0.1	< 0.05
WSS-001-C	< 0.05	<0.1	< 0.05	< 0.05	< 0.05	<0.1	< 0.05	<0.1	< 0.05
WSS-001-D	< 0.05	<0.1	< 0.05	< 0.05	< 0.05	<0.1	< 0.05	<0.1	< 0.05
WSS-001-E	< 0.05	<0.1	< 0.05	< 0.05	< 0.05	<0.1	< 0.05	<0.1	< 0.05
WSS-001-F	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.1	<0.05

Well ID	Si	Sr	Zn
	mg/L	mg/L	mg/L
WSS-001-A	11.0	1.25	<0.05
WSS-001-B	12.2	1.34	< 0.05
WSS-001-C	12.4	1.11	< 0.05
WSS-001-D	11.5	1.38	< 0.05
WSS-001-E	11.3	1.53	< 0.05
WSS-001-F	6.7	0.89	<0.05

*after extensive purging, pH in 001-F was still high