



Rotary Drilling Log: Lithology  
 INEOS BIO Replacement Monitor Well

Depth (feet bls)	Date	Logged By:	Lithologic Description Comments
0-10	12/2/2011	CJP	Fine-grained quartz SAND, yellowish gray (5Y8/1), sub-angular grains.
10-20	12/2/2011	CJP	Same as above
20-30	12/2/2011	CJP	SAND, as above, and white (N9) to medium gray (N5) angular SHELL FRAGMENTS, approximately 1-2 mm in diameter.
30-40	12/2/2011	CJP	Same as above, increasing percentage of SHELL FRAGMENTS, as above.
40-50	12/2/2011	CJP	SHELL FRAGMENTS, as above, with approximately 10% SAND, as above
50-60	12/2/2011	CJP	Same as above
60-70	12/2/2011	CJP	SHELL FRAGMENTS, as above, shell fragments larger (up to 1 cm) and better consolidated.
70-80	12/2/2011	CJP	Same as above
80-90	12/2/2011	CJP	Same as above
90-100	12/2/2011	CJP	Same as above
100-110	12/2/2011	CJP	LIMESTONE, light gray (N7) , poorly consolidated, with trace SHELL FRAGMENTS, (<=1 mm), as above
110-120	12/2/2011	CJP	Same as above
120-130	12/2/2011	CJP	LIMESTONE and SHELL FRAGMENTS as above, with medium dark gray (N4) CLAY.
130-140	12/2/2011	CJP	CLAY, as above
140-150	12/2/2011	CJP	Fine-grained quartz SAND, yellowish gray (5Y8/1), sub-angular grains, with trace amount of back (N9), angular PHOSPHORITE fragments.
150-160	12/2/2011	CJP	Same as above



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160-170	12/2/2011	CJP	Same as above
170-180	12/2/2011	CJP	SAND and PHOSPHORITE, as above, with very light gray (N8) LIMESTONE and white (N9) SHELL FRAGMENTS
180-190	12/2/2011	CJP	Same as above
190-200	12/2/2011	CJP	SAND, as above with CLAY, as above
200-210	12/2/2011	CJP	SAND and PHOSPHORITE, as above
210-220	12/2/2011	CJP	Same as above
220-230	12/2/2011	CJP	Same as above
230-240	12/2/2011	CJP	Same as above
240-250	12/2/2011	CJP	Same as above
250-260	12/2/2011	CJP	Same as above
260-270	12/2/2011	CJP	Same as above
270-280	12/2/2011	CJP	Same as above
280-290	12/2/2011	CJP	Very fine-grained quartz SAND, as above with approximately 50% sub-rounded, black (N1), PHOSPHORITE grains.
290-300	12/2/2011	CJP	Same as above
300-310	12/2/2011	CJP	Same as above
310-320	12/2/2011	CJP	Same as above



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320-330	12/2/2011	CJP	Same as above
330-340	12/2/2011	CJP	Same as above
340-350	12/2/2011	CJP	Same as above
350-360	12/2/2011	CJP	LIMESTONE, dark gray (N3) to very light gray (N8) , poorly consolidated, with trace white (N9) SHELL FRAGMENTS,
360-370	12/2/2011	CJP	Same as above
370-380	12/2/2011	CJP	Same as above
380-390	12/2/2011	CJP	Same as above
390-400	12/2/2011	CJP	Same as above
400-410	12/2/2011	CJP	Same as above
410-420	12/2/2011	CJP	CLAY (N5), with trace LIMESTONE and SHELL FRAGMENTS, as above
420-430	12/2/2011	CJP	Same as above
430-440	12/2/2011	CJP	Same as above
440-450	12/2/2011	CJP	Same as above
450-460	12/2/2011	CJP	LIMESTONE, yellowish gray (5Y8/1) with <i>Lepidocyclinea sp.</i>
460-470	12/2/2011	CJP	Same as above, with SHELL FRAGMENTS, as above
470-480	12/2/2011	CJP	Same as above



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480-490	12/2/2011	CJP	Same as above
490-500	12/2/2011	CJP	Same as above
500-510	01/13/2012	AJL	Same as above
510-520	01/13/2012	AJL	Same as above
520-530	01/13/2012	AJL	Same as above
530-540	01/13/2012	AJL	Same as above
540-550	01/13/2012	AJL	Same as above
550-560	01/13/2012	AJL	Same as above
560-570	01/13/2012	AJL	Same as above, no fossils
570-580	01/13/2012	AJL	Same as above, 5% mudstone
580-590	01/13/2012	AJL	Same as above, with fossils, shell fragments
590-600	01/13/2012	AJL	Same as above, no fossils, mudstone
600-610	01/13/2012	AJL	Same as above, becoming darker gray
610-620	01/13/2012	AJL	Same as above, fewer mudstone
620-630	01/13/2012	AJL	Same as above
630-640	01/13/2012	AJL	Same as above
650-660	01/13/2012	AJL	Same as above



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660-670	01/13/2012	AJL	Same as above, darker gray, few fossils, possible phosphate
670-680	01/13/2012	AJL	Same as above, lighter gray, no phosphate
680-690	01/13/2012	AJL	Same as above
690-700	01/13/2012	AJL	Same as above, few dark grains
700-710	01/13/2012	AJL	Same as above, gray
710-720	01/13/2012	AJL	Same as above
720-730	01/13/2012	AJL	Same as above
730-740	01/13/2012	AJL	Same as above
740-750	01/13/2012	AJL	Same as above, bluish gray, no fossils
750-760	01/13/2012	AJL	Same as above
760-770	01/13/2012	AJL	No sample
770-780	01/13/2012	AJL	Same as above
780-790	01/13/2012	AJL	Same as above, more bluish gray grains, no fossils
790-800	01/13/2012	AJL	LIMESTONE, tan, few fossils
800-810	01/13/2012	AJL	Same as above
810-820	01/13/2012	AJL	Same as above, light gray
820-830	01/13/2012	AJL	LIMESTONE/DOLOMITE mix, tan, with fossils



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830-840	01/13/2012	AJL	LIMESTONE, light tan/light gray
840-850	01/13/2012	AJL	LIMESTONE, gray, no fossils
850-860	01/13/2012	AJL	LIMESTONE/DOLOSTONE and dark massive mudstone, light gray to dark gray, with fossils
860-870	01/13/2012	AJL	LIMESTONE, tannish gray, few fossils
870-880	01/13/2012	AJL	Same as above
890-900	01/13/2012	AJL	DOLOMITE, tan
900-910	01/13/2012	AJL	Same as above, some limestone
910-920	01/13/2012	AJL	DOLOMITE, tan
920-930	01/13/2012	AJL	Same as above
930-940	01/13/2012	AJL	Same as above
940-950	01/13/2012	AJL	Same as above
950-960	01/13/2012	AJL	Same as above
960-970	01/13/2012	AJL	Same as above
970-980	01/13/2012	AJL	Same as above
980-990	01/13/2012	AJL	Same as above
990-1000	01/13/2012	AJL	Same as above
1000-1010	01/13/2012	AJL	Same as above



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1010-1020	01/13/2012	AJL	Same as above
1020-1030	01/13/2012	AJL	Same as above
1030-1040	01/13/2012	AJL	Same as above
1040-1050	01/13/2012	AJL	Same as above
1050-1060	01/13/2012	AJL	LIMESTONE, gray, no fossils
1060-1070	01/13/2012	AJL	Same as above, light gray
1070-1080	01/13/2012	AJL	Same as above
1080-1090	01/13/2012	AJL	LIMESTONE, light gray, mixed with chert
1090-1100	01/13/2012	AJL	DOLOMITE, tan
1100-1110	01/13/2012	AJL	Same as above
1110-1120	1/22/2012	AJL	Same as above – few limestone fossils (foraminifera)
1120-1130	1/22/2012	AJL	Same as above – no fossils
1130-1140	1/22/2012	AJL	Same as above – with mudstone
1140-1150	1/22/2012	AJL	Same as above – no mudstone
1150-1160	1/22/2012	AJL	Same as above
1160-1170	1/22/2012	AJL	Same as above
1170-1180	1/22/2012	AJL	Same as above – with fossils



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1180-1190	1/22/2012	AJL	Same as above
1190-1200	1/22/2012	AJL	Same as above – Without fossils, with few phosphate
1200-1210	1/22/2012	AJL	Dolomite, tan, with lignite layers
1210-1220	1/22/2012	AJL	Same as above
1220-1230	1/22/2012	AJL	Same as above showing dissolution features (cavities and crystal growth)
1230-1240	1/22/2012	AJL	Same as above
1240-1250	1/22/2012	AJL	Same as above
1250-1260	1/22/2012	AJL	Same as above
1260-1270	1/22/2012	AJL	Same as above with fewer dissolution features
1270-1280	1/22/2012	AJL	Same as above
1280-1290	1/22/2012	AJL	Dolomite with lignite, very porous (cavity from 1290-1298 drillers report)
1290-1300	1/22/2012	AJL	Same as above
1300-1310	1/22/2012	AJL	Same as above
1310-1320	1/22/2012	AJL	Same as above, mottled gray, rounded coarse grained gravel
1320-1330	1/22/2012	AJL	Dolomitic limestone, light tan
1330-1340	1/22/2012	AJL	Dolomite, light tan
1340-1350	1/22/2012	AJL	Same as above – with reworked lignite in very light rounded coarse grained gravel





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1350-1360	1/22/2012	AJL	Same as above
1360-1370	1/22/2012	AJL	Same as above – with lignite layers
1370-1380	1/22/2012	AJL	Same as above
1380-1390	1/22/2012	AJL	Same as above
1390-1400	1/22/2012	AJL	Same as above
1400-1410	1/22/2012	AJL	Same as above
1410-1420	1/22/2012	AJL	Limestone, light gray, few lignite, few vesicles
1420-1435	2/08/2012	AJL	Dolomite
1435-1445	2/08/2012	AJL	Dolomite with lignite
1445-1455	2/08/2012	AJL	Limestone, Gray, white, soft
1455-1465	2/08/2012	AJL	Same as above
1465-1475	2/08/2012	AJL	Same as above
1475-1485	2/08/2012	AJL	Same as above
1485-1495	2/08/2012	AJL	Same as above
1495-1505	2/08/2012	AJL	Same as above
1505-1515	2/08/2012	AJL	Same as above with minor Dolomite
1515-1525	2/08/2012	AJL	Limestone, white, soft
1525-1535	2/08/2012	AJL	Same as above
1535-1545	2/08/2012	AJL	Same as above with minor mudstone
1545-1555	2/08/2012	AJL	Dolomite, soft, tan, with minor mudstone



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1555-1565	2/08/2012	AJL	Same as above
1565-1575	2/08/2012	AJL	Limestone, white
1575-1585	2/08/2012	AJL	Same as above
1585-1595	2/08/2012	AJL	Dolomite, tan
1595-1605	2/08/2012	AJL	Same as above
1605-1615	2/08/2012	AJL	Limestone and Dolomite
1615-1625	2/08/2012	AJL	Same as above
1625-1635	2/08/2012	AJL	Same as above
1635-1645	2/08/2012	AJL	Same as above
1645-1655	2/08/2012	AJL	Same as above
1655-1665	2/08/2012	AJL	Same as above
1665-1675	2/08/2012	AJL	Same as above
1675-1685	2/08/2012	AJL	Limestone, white, soft
1685-1695	2/08/2012	AJL	Limestone/Dolomite
1695-1705	2/08/2012	AJL	Same as above
1705-1715	2/08/2012	AJL	Same as above
1715-1725	2/08/2012	AJL	Same as above
1725-1735	2/08/2012	AJL	Same as above
1735-1745	2/08/2012	AJL	Same as above
1745-1755	2/08/2012	AJL	Same as above
1755-1765	2/08/2012	AJL	Same as above
1765-1775	2/08/2012	AJL	Same as above
1775-1785	2/08/2012	AJL	Same as above



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1785-1795	2/08/2012	AJL	Same as above
1795-1805	2/08/2012	AJL	Same as above
1805-1815	2/08/2012	AJL	Same as above
1815-1825	2/08/2012	AJL	Dolomite, Tan
1825-1835	2/08/2012	AJL	Same as above
1835-1845	2/08/2012	AJL	Same as above
1845-1855	2/08/2012	AJL	Same as above
1855-1865	2/08/2012	AJL	Limestone/Dolomite
1865-1875	2/08/2012	AJL	Same as above
1875-1885	2/08/2012	AJL	Same as above
1885-1895	2/08/2012	AJL	Dolomite, Tan
1895-1905	2/08/2012	AJL	Same as above
1905-1915	2/08/2012	AJL	Same as above
1915-1925	2/08/2012	AJL	Same as above
1925-1935	2/08/2012	AJL	Same as above
1935-1945	2/08/2012	AJL	Same as above