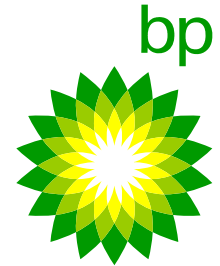


Exploration & Production **Technology**

delivering breakthrough solutions



Overview and Objectives of IntelliServ Enabled Applications Field Trail at Wamsutter

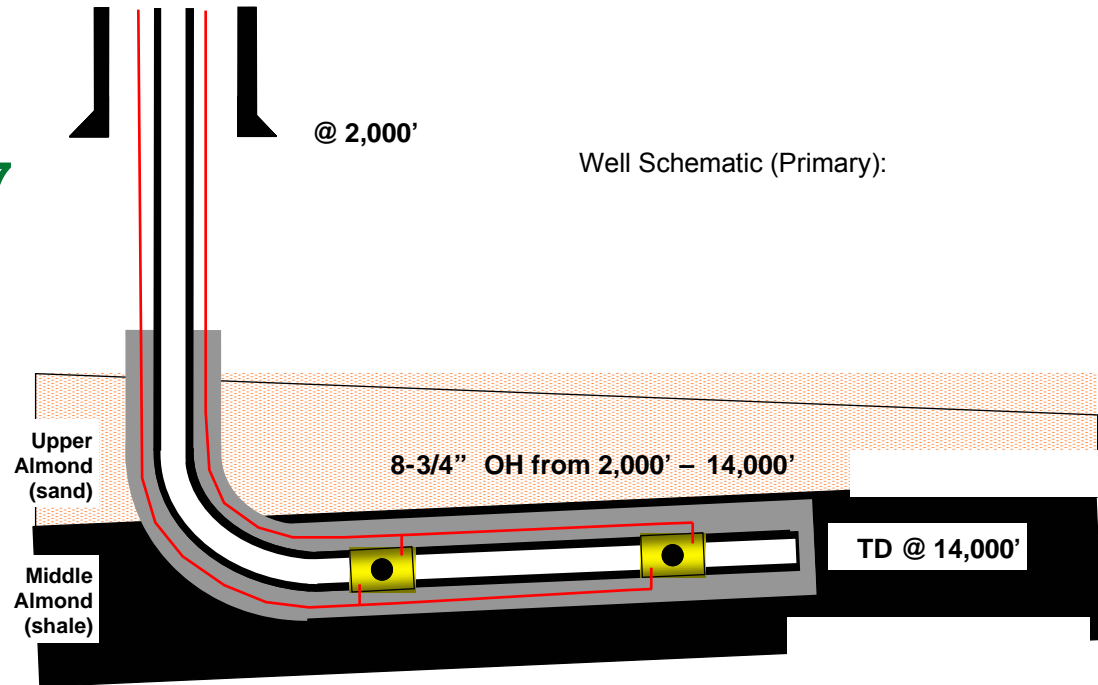
Summary Date: Nov, 2007

Wamsutter Major Projects Well Schematic



Practice Run – April 2007

Full Trial – Nov 2007



- IntelliPipe and wired BHA components
- AutoTrak, StarTrak, LithoTrak, Azimuthal and GR, Resistivity, PWD and Co-pilot will be run from surface casing to TD.

Results from Field Trail #1



First horizontal well drilled in North America using AutoTrak / LithoTrak and CoPilot with IntelliServ™ Network.

Drilled 3000ft of horizontal hole with successful broad band data transfer over IntelliServ Network.

Network uptime 85% (downtime mainly because of surface cabling problems).

- Real-time transfer of “memory quality” image and caliper data
- 10 second update rates on:
 - PWD
 - Co-pilot (12 downhole dynamics measurements)
 - AutoTrak data (near bit inclination etc.)
- Successful down linking to Autotrak
- Real-time transfer of broad-band data stream via WITSML back to BP network.

Results from Field Trail #2



Well is currently being drilled.

- Drilled 5000ft of vertical section in 2 days (150 – 200 ft/hr) with 100% uptime
- Some intermittent signal loss toward end of the run
- Acquired first StarTrak (high resolution LWD resistivity image) via IntelliPipe.
- Network uptime xx%

- 2 second update rates on:
 - PWD
 - Co-pilot (12 downhole dynamics measurements)
 - AutoTrak data (near bit inclination etc.)

- Satellite Link of real-time data back to BP office and being used in several applications.

1st Field Trial Results - Issues



- Rig and top drive alignment caused mis-stabing early on. This caused damage to some connections which needed to be replaced.
- Early data swivel had top be replaced/re-designed due to contact with the top drive.
- Surface cabling was damaged a couple of times. Needs to be firmly secured or go to wireless option.
- Some minor network “grey-outs”
- Overall 85% uptime.
- Seamless switch to Mud Pulse when wired pipe network down.

Objectives of the Trial



- IntelliPipe had already been “proved” on 7 Oklahoma wells in 05/06
- Objective is to test the IntelliPipe/BHI system with a “sophisticated” BHA
- Objective is to test “IntelliPipe enabled Applications” – i.e. what can IntelliPipe do for you?

IntelliPipe Enabled Applications



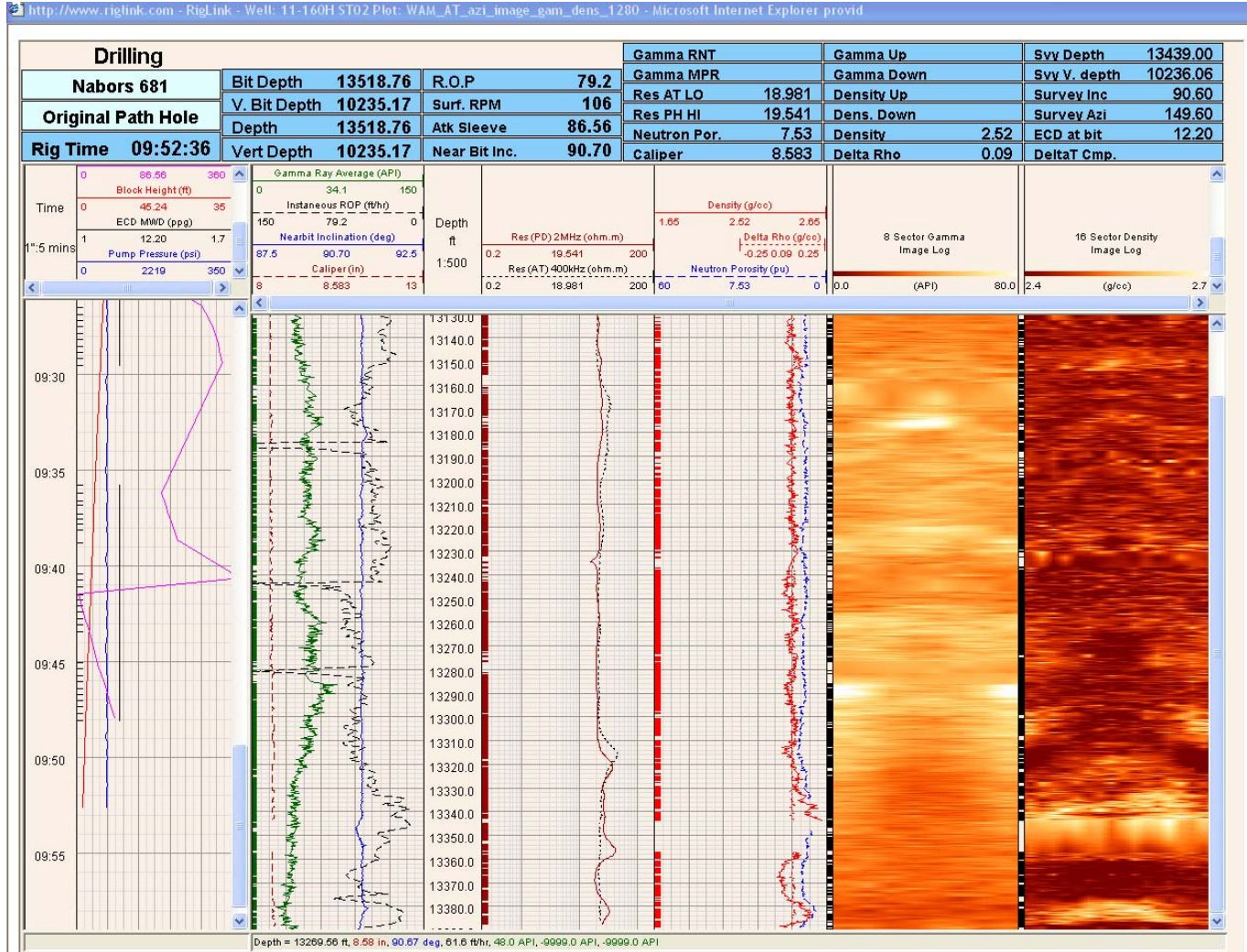
- Real-time wellbore stability monitoring/diagnosis using high resolution image logs and caliper data (including time lapse imaging).
- High Resolution PWD data for wellbore pressure management (possible future managed pressure drilling)
- Wellbore placement/geosteering using high resolution images (can see sedimentary features while drilling)
- Better wellbore quality/placement using 2 way linking to RSS
- Maximizing Drilling Efficiency using downhole high frequency drilling dynamics (WOB, TQ, RPM etc..)
- Improving downhole tool reliability – minimizing shocks and monitoring diagnostics, MWD back-up.

Field Trial Results



- Image Logs

Rig-link Screen Grab – 16 Sector GR and Density Images



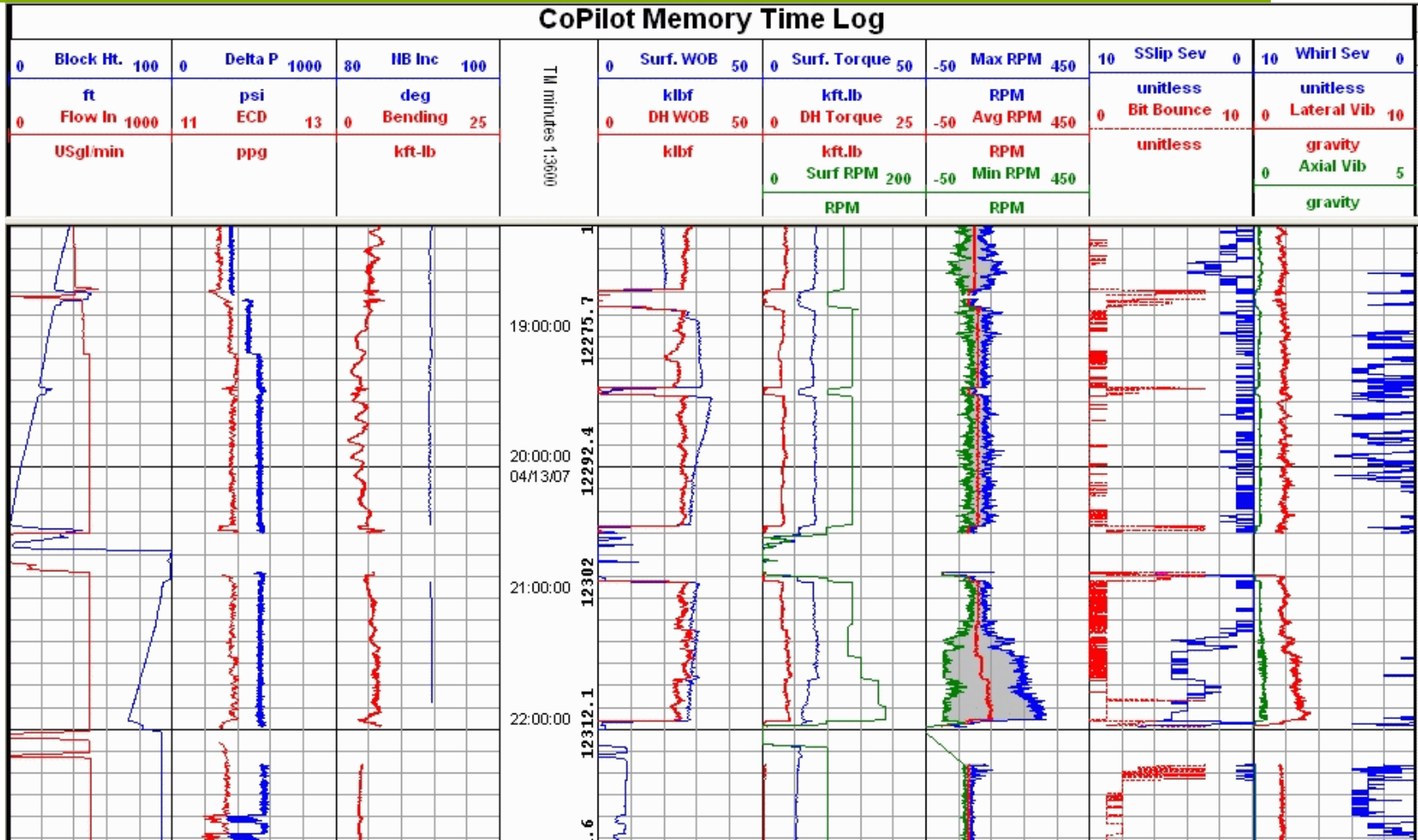
Reset Acknowledge

Field Trial Results

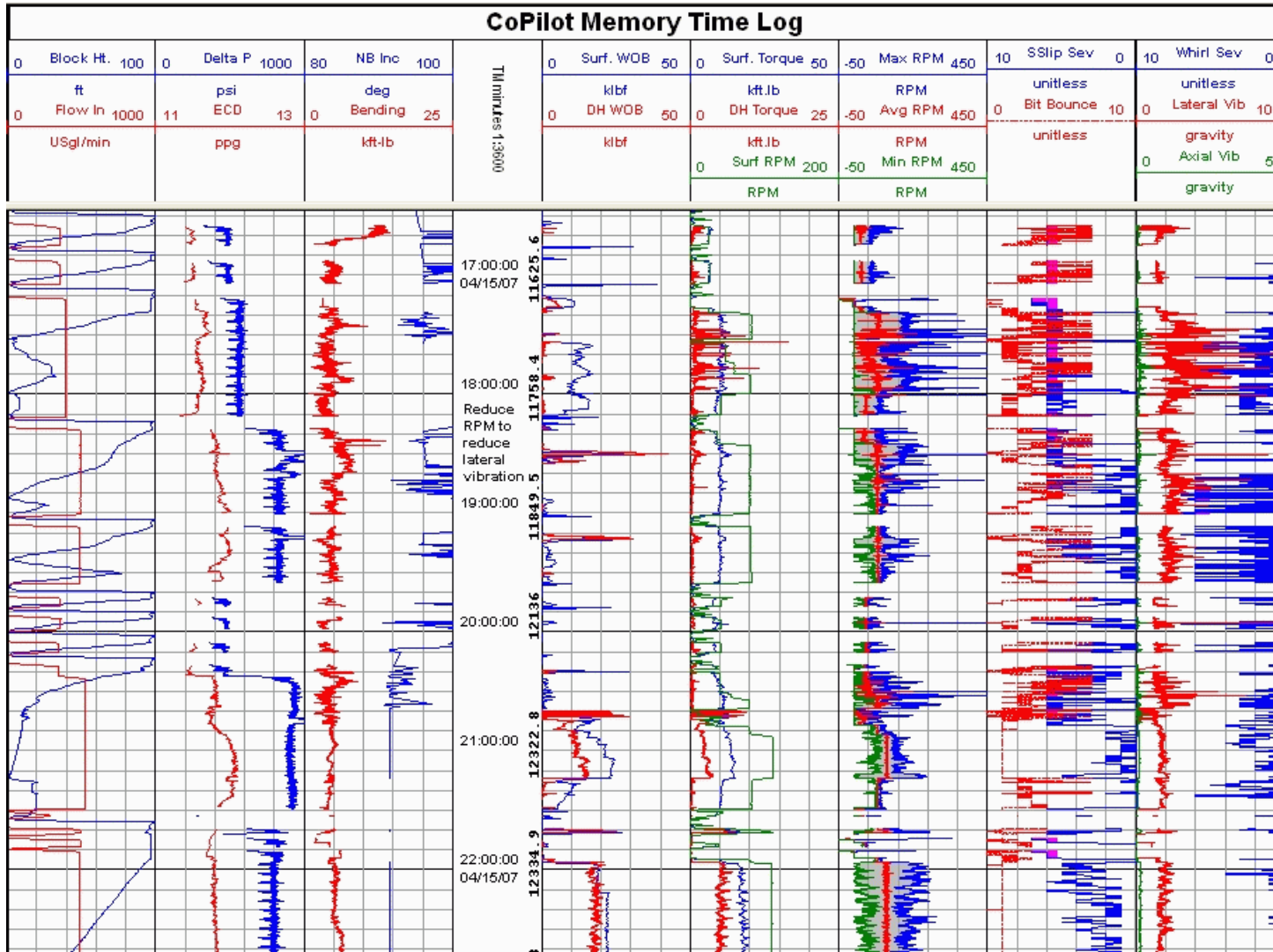


- Co-pilot – Real-time Drilling Mechanics Data

Stick-Slip at end of run 4 – Onset of Stick-slip



Ream at the start of run 5 – Lateral vibration

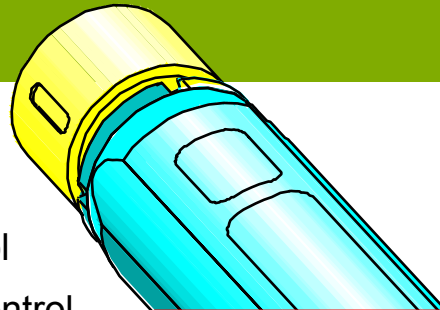


Field Trial Results



- Auto-Trak Rotary Steerable Tool

AutoTrak[®] Steering Unit



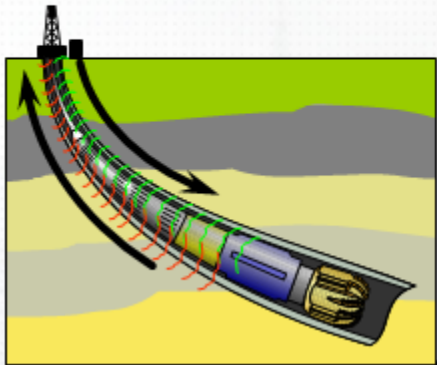
Non

Steering Control

- Steering Precision
 - Closed loop steering control
 - Closed loop rib pressure control
 - High accuracy near bit inclination

- RSS Modes:
- Hold Mode, Steer Mode, Ribs-off mode

10 second direct link with wired pipe



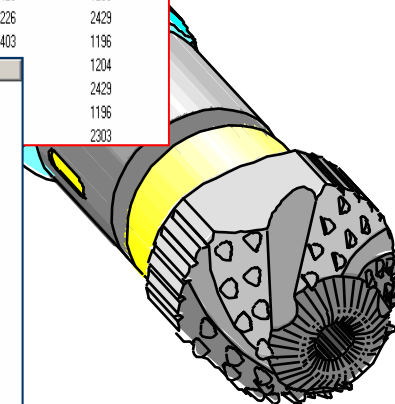
Time	AT2_GTFM (deg)	AT2_TCDM (degF)
04/17/2007 22:26:36	117.50	194.2
04/17/2007 22:26:54	138.25	194.2
04/17/2007 22:27:28	157.50	194.2
04/17/2007 22:27:52	158.05	194.0
04/17/2007 22:28:30	163.50	194.0
04/17/2007 22:28:52	169.00	194.2
04/17/2007 22:29:29	180.00	194.2
04/17/2007 22:29:56	185.75	194.2
04/17/2007 22:30:28	188.75	194.2
04/17/2007 22:30:52	194.25	194.2
04/17/2007 22:31:52	207.50	194.2
04/17/2007 22:32:28	214.25	194.2
04/17/2007 22:32:52	220.75	194.2

Time	C_PRES1M (psi)	C_PRES2M (psi)	C_PRES3M (psi)	T_PRES1M (psi)	T_PRES2M (psi)	T_PRES3M (psi)
04/17/2007 23:05:33	2140	2216	2220	1195	1962	2414
04/17/2007 23:06:30	1971	1796	1200	2424	1286	1445
04/17/2007 23:07:28	2352	1783	1143	2431	1687	1209
04/17/2007 23:07:58	2394	1672	908	2422	1388	1326
04/17/2007 23:08:31	2047	1347	2365	2030	1197	2389
04/17/2007 23:08:59	2007	1198	2543	2015	1196	2403
04/17/2007 23:09:29	1825	1962	2627	1894	2423	1195
04/17/2007 23:11:00	1360	1506	2017	1275	1935	2422
04/17/2007 23:11:58	1126	2233	1571	1011	1611	2354
04/17/2007 23:12:28	1337	2204	2157	1202	2342	2177
04/17/2007 23:12:58	1228	2389	1986	1196	2408	1992
04/17/2007 23:13:30	1185	2408	2006	1196	2411	1979
04/17/2007 23:13:59	1241	2393	2008	1195	2412	1972
04/17/2007 23:14:58	1226	2343	2057	1195	2414	1963
04/17/2007 23:16:00	763	3055	2198	2412	1195	1969
04/17/2007 23:16:30	1702	2586	1541	1698	2431	1207
04/17/2007 23:17:28	1745	2092	586	2245	2295	1204
04/17/2007 23:17:58	2771	1346	1174	2423	1426	1298
04/17/2007 23:19:32	1570	2602	1319	1597	1226	2429
04/17/2007 23:20:03	1284	1536	2171	2014	2403	1196

Rib Pressure

Time	INNMM (deg)	AT2_TCDM (degF)
04/18/2007 00:48:12	90.50	192.4
04/18/2007 00:48:39	90.38	192.4
04/18/2007 00:49:10	90.38	192.4
04/18/2007 00:49:42	90.50	192.2
04/18/2007 00:50:10	90.50	192.2
04/18/2007 00:50:39	90.63	192.2
04/18/2007 00:51:10	90.63	192.0
04/18/2007 00:51:39	90.63	192.0
04/18/2007 00:52:10	90.63	192.0
04/18/2007 00:53:10	90.63	191.5
04/18/2007 00:53:39	90.50	191.8
04/18/2007 00:54:43	90.63	191.5
04/18/2007 00:55:10	90.63	191.5
04/18/2007 00:56:10	90.50	191.5
04/18/2007 00:56:39	90.50	191.5
04/18/2007 00:57:15	90.50	191.5
04/18/2007 00:58:39	90.50	191.5
04/18/2007 00:59:10	90.50	191.5
04/18/2007 00:59:10	90.50	191.5
04/18/2007 00:59:42	90.50	191.5

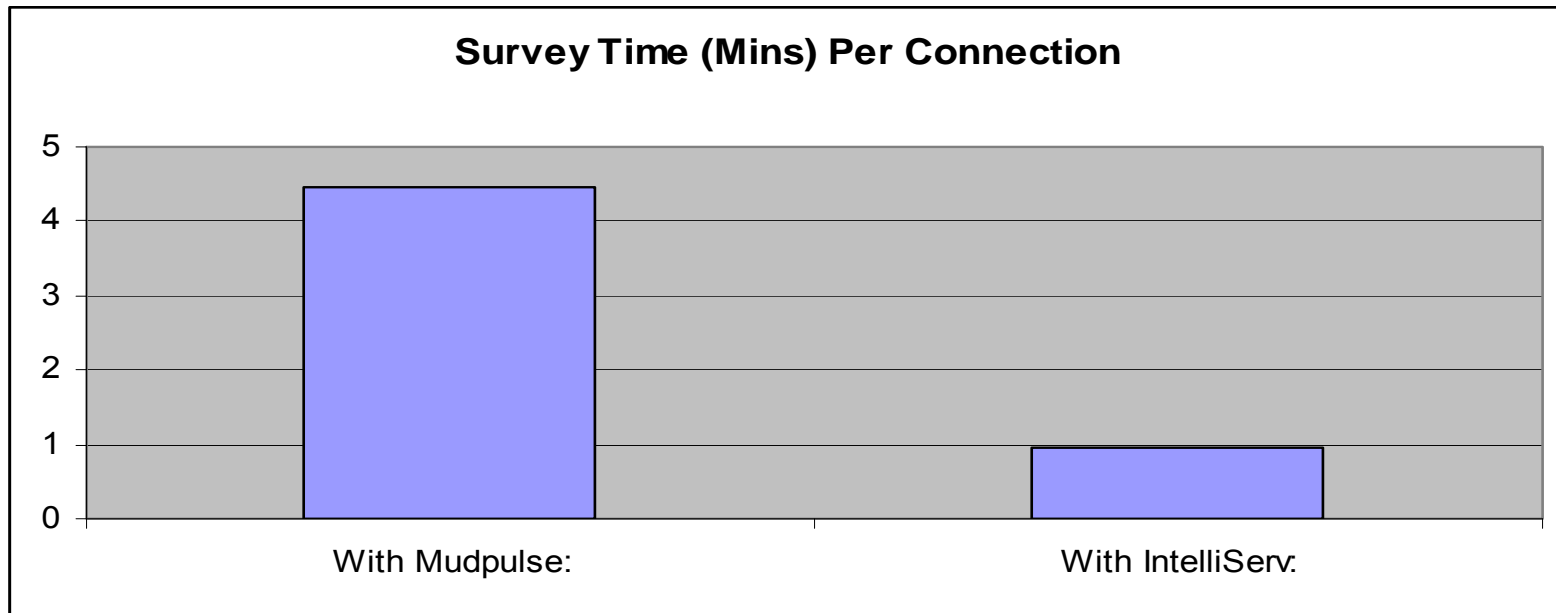
Near Bit



Survey Times



•Reduction in Survey Time on Wamsutter Well



WITSML Data back to BP office



- Display of all data in “ACE”
- All depth based and time based data displayed in Rig-link from any internet connection
- WITSML data fed into:
 - Visualization (Landmark’s Decision Space)
 - Wellbore Stability Modeling – 3D Go-Cad model
 - Intellifield’s “Discovery Wells”
 - Landmark EDM applications (WellPlan – Torque and Drag, Hydraulics)