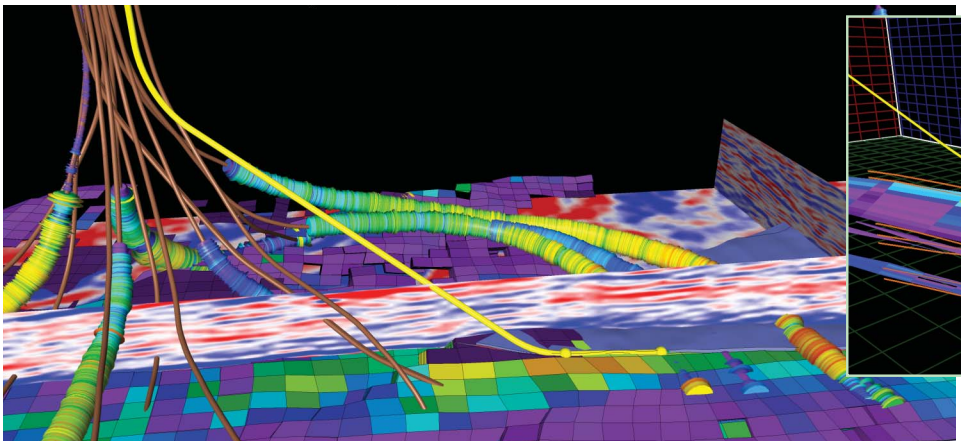
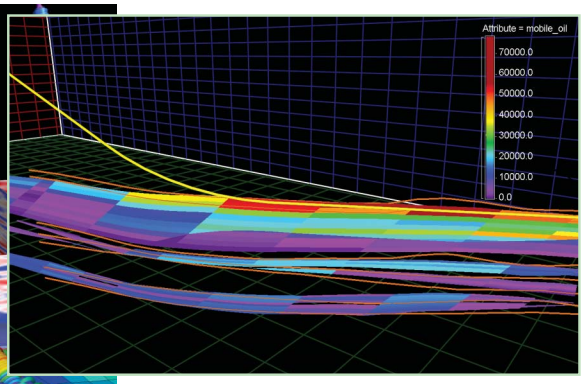
WellArchitect Software

by Dynamic Graphics, Inc.

WellArchitect®, developed in conjunction with Baker Hughes, is an advanced well planning and survey management system for integrated planning and drilling of directional wellpaths with or without earth models. Devised to seamlessly accommodate the needs of sidetracking, multi-lateral wellpaths, and re-entry drilling, WellArchitect is used at both the office and wellsite, by all personnel levels in the industry. Trajectory calculations, target erosion by positional uncertainty, reporting, plotting, and 3D visualization are all included in this package.



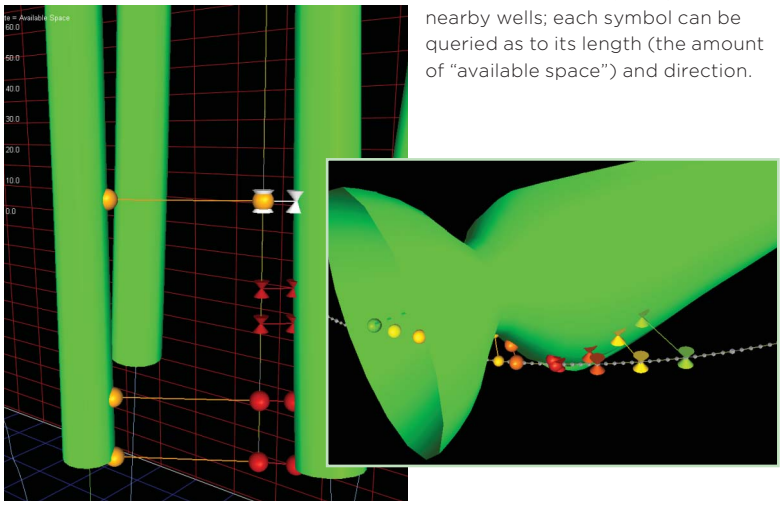
Planning and monitoring of drilling can be done in an integrated visualization environment, especially when run with Dynamic Graphics' CoViz® 4D



Wellpaths can be juxtaposed against earth models, reservoir models, and more

- Combines powerful directional drilling software with advanced 3D visualization and modeling capabilities -- a major step forward for the drilling and oil and gas industries
- Handles a range of applications from single wellpath survey calculation through multi-wellsite, multi-well planning, collision risk analysis, and data management
- Visualize reference wellpath, offset paths, geologic and driller's targets, ellipsoids of uncertainty, and collision avoidance scans in 3D, as well as the geologic or cellular model, for optimal wellbore placement
- Safety-critical automated clearance calculations, using industry positional uncertainty models, on "look ahead" while drilling
- Hazard avoidance: be alerted when a path intersects a horizon or fault below a user-specified angle, or comes within a user-specified distance

3D Collision Avoidance: Tubes displayed around each offset well show the minimum allowable separation distance (MASD) from the reference wellpath, and are colored by the pass (green)/fail (red; not shown) criteria of an ACR (anti-collision rule). Collision-avoidance symbols indicate the space available for steering away from nearby wells; each symbol can be queried as to its length (the amount of "available space") and direction.



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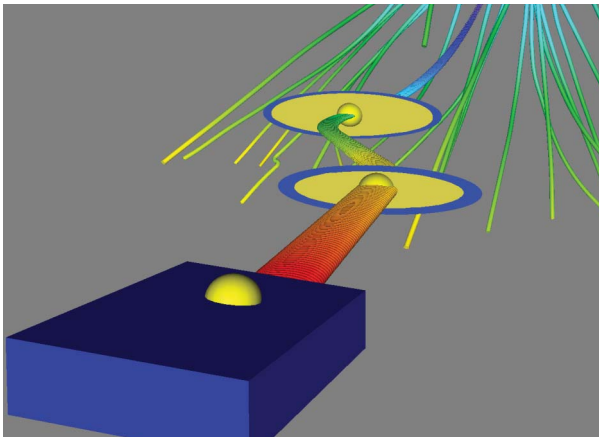
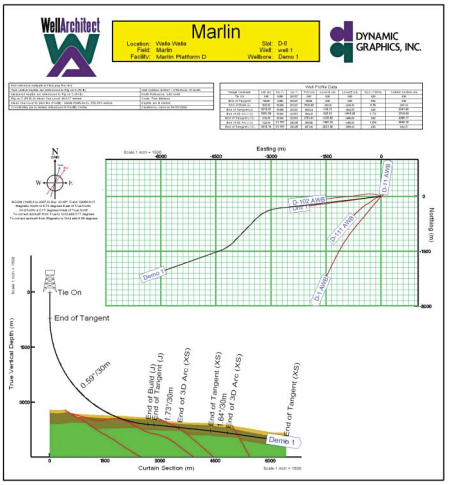
LEGAL NOTICE

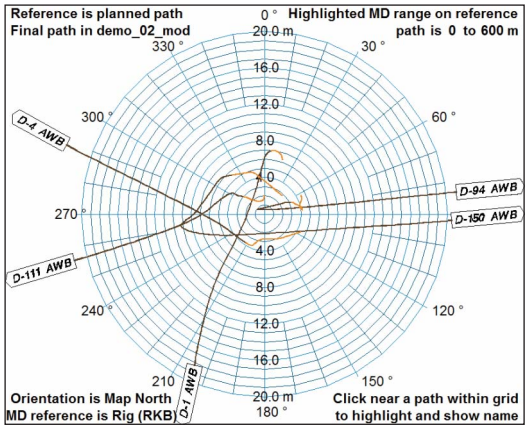
- Target sizing based on positional uncertainty, special return-to-plan capabilities, trajectory planning in basic and advanced modes, as well as easy data transfer from the office to the wellsite (and back), are among the many features designed to improve the well planning and survey management experience
- Sophisticated Graphic Editor facilitates plotting for wall maps and page-sized scale drawings
- Complete reporting package covering data management and transfer reports as well as wellpath and clearance calculation reporting



Planned wellpath with ellipsoids of uncertainty, geologic (blue) and "eroded" driller's (yellow) targets, and surrounding actual wellpaths colored by depth



Sample page-sized driller's plot



Interactive traveling cylinder diagram showing plans and actuals; highlighted sections represent a user-selected MD range

Clearance Report
C14 pwp Rev D.0 Final
Closest Approach
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REFERENCE WELLPATH IDENTIFICATION			
Operator	**Aviemore -- ISCWSA**	Slot	**Slot C14 (Plan)**
Area	**Aviemore**	Well	**Well C14**
Field	**Aviemore**	Wellbore	**C14 PWB**
Facility	**Platform C**		

CALCULATION RANGE & CUTOFF		
From: **0.00m MD**	To: **3378.45m MD**	C-C Cutoff: **(none)**

OFFSET WELL CLEARANCE SUMMARY (24 Offset Wellpaths selected) Ratios are calculated in Closest Approach plane

					C-C Clearance Distance			ACR Separation Ratio			
Offset Facility	Offset Slot	Offset Well	Offset Wellbore	Offset Wellpath	Ref MD [m]	Min C-C Clear Dist [m]	Diverging from MD [m]	Ref MD of Min Ratio [m]	Min Ratio	Min Ratio Dvrg from [m]	ACR Status
Platform C	C01(P27)	Well C01Z(P27)	AWB C01Z(P27)	C01Z(P27)	3378.45	43.74	3378.45	3378.45	0.91	3378.45	FAIL
Platform C	C04(W24)	Well C04(W24)	AWB C04(W24)	AWP C04(W24)	1290.00	31.11	1290.00	1282.35	2.91	2550.00	PASS
Platform C	C12Z(P210)	Well C12Z(P210)	AWB C12Z(P210)	AWP C12Z(P210)	1140.00	158.08	2700.00	2891.41	3.44	2891.41	PASS
Platform C	C12(P210)	Well C12(P210)	AWB C12(P210)	AWP C12(P210)	1140.00	161.75	2700.00	2892.16	3.51	2892.16	PASS
Platform C	C01(P27)	Well C01Y(P27Y)	AWB C01Y(P27Y)	C01Y(P27Y)	1036.17	57.58	3378.45	3378.45	4.71	3378.45	PASS
Platform C	C10Z(P28)	Well C10Z(P28)	AWB C10Z(P28)	AWP C10Z(P28)	1050.00	41.62	2310.00	1070.31	5.17	3378.45	PASS
Platform C	C10A(P28)	Well C10A(P28)	AWB C10A(P28)	AWP C10A(P28)	1050.00	41.64	1050.00	1070.29	5.18	1860.00	PASS
Platform C	C01(P27)	Well C01(P27)	AWB C01(P27)	AWP C01(P27)	1036.17	57.58	1036.17	1060.78	7.20	2670.00	PASS
Platform C	C06Z(P25)	Well C06Z(P25)	AWB C06Z(P25)	AWP C06Z(P25)	1037.02	94.34	3378.45	3378.45	8.60	3378.45	PASS
Platform C	C06Y(P25)	Well C06Y(P25)	AWB C06Y(P25)	AWP C06Y(P25)	1037.02	94.34	3378.45	3378.45	8.82	3378.45	PASS
Platform C	C02Z(P21)	Well C02Z(P21)	AWB C02Z(P21)	AWP C02Z(P21)	648.75	171.24	648.75	1026.05	23.77	2550.00	PASS

Portion of a clearance report showing which paths fail the specified anti-collision rule (ACR)