



User Guide for iPad version

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About



Revision using version: 1.5

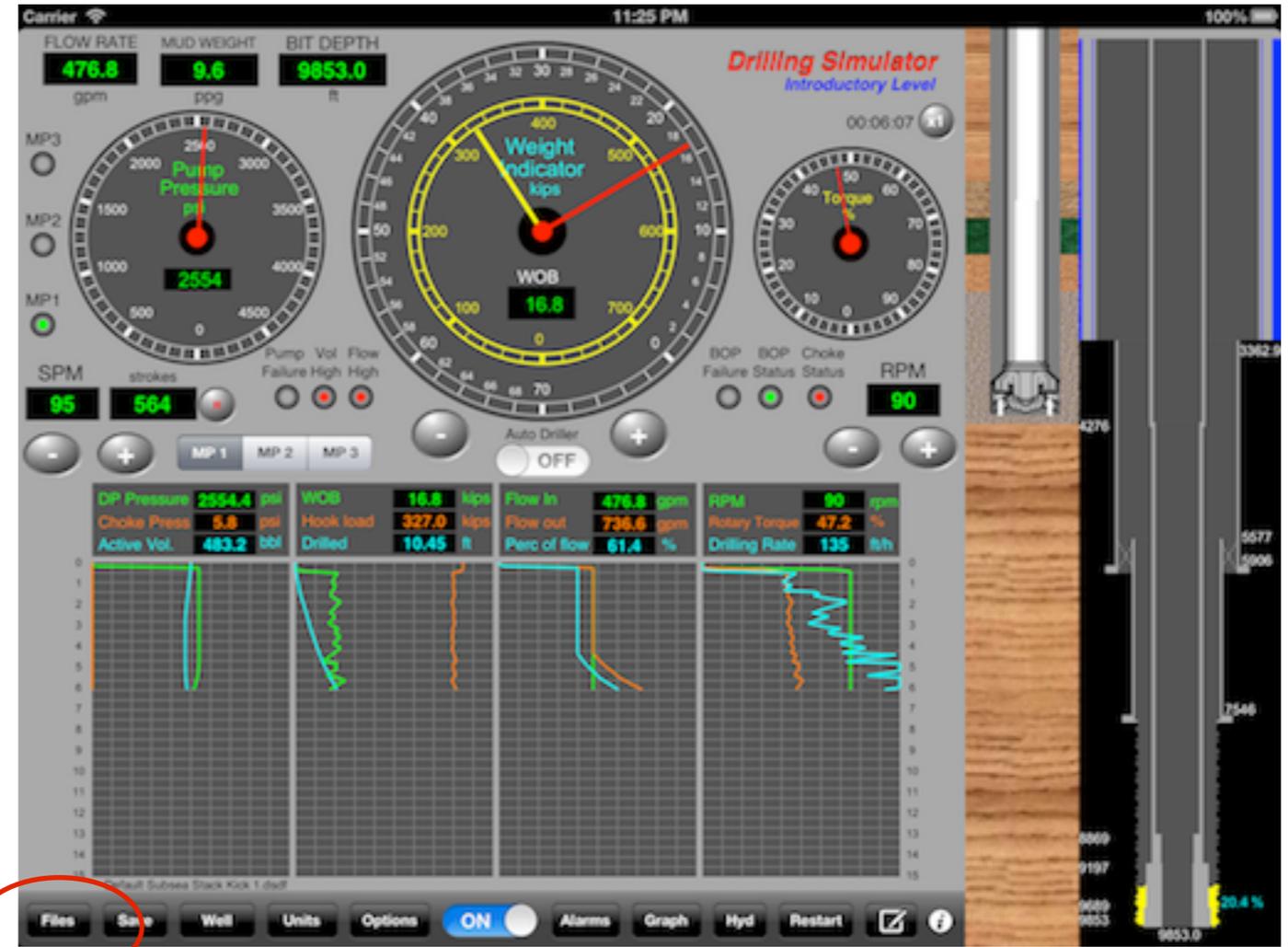
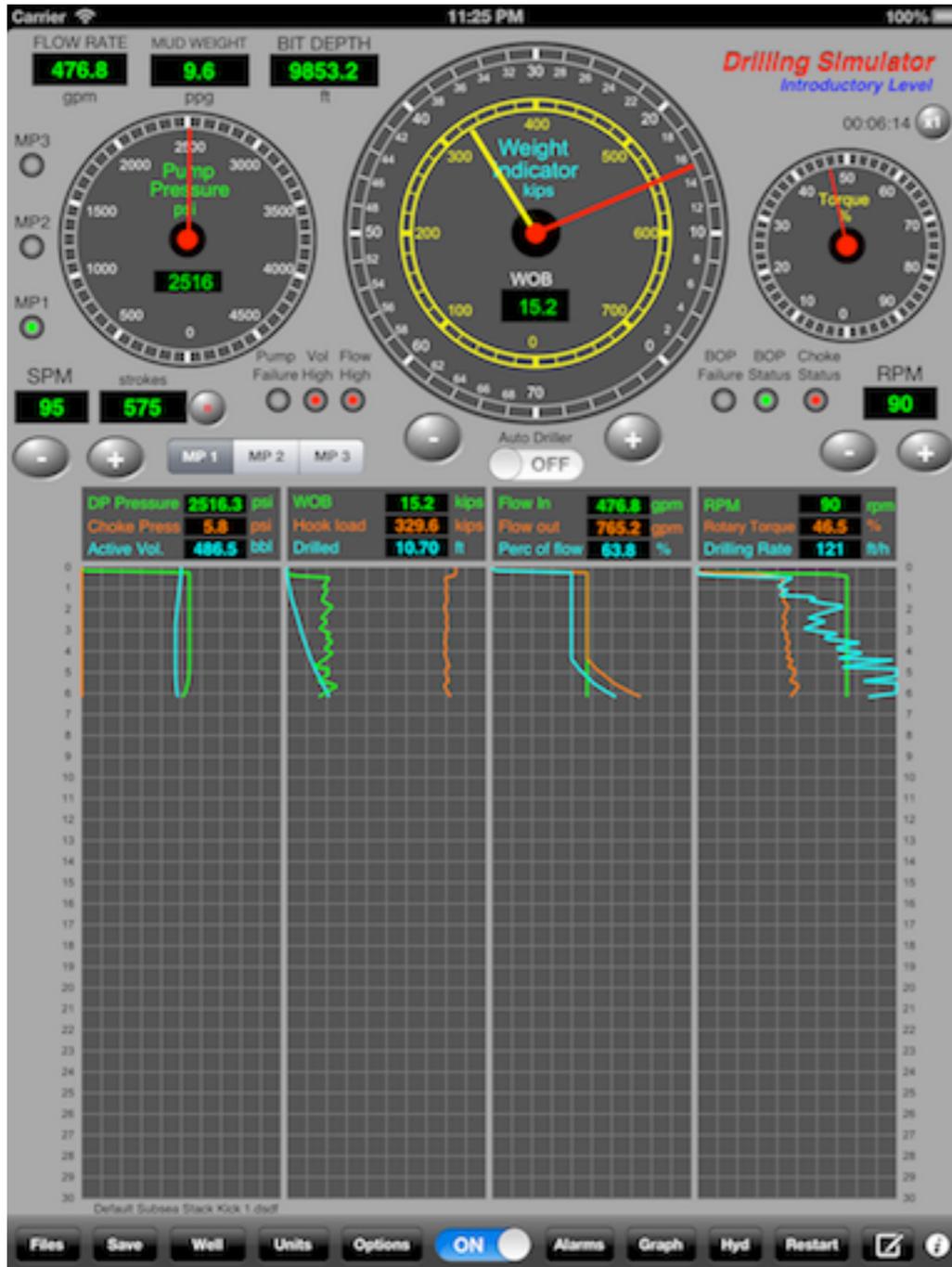
- 1) Panel with the following parameters: pump pressure, mud pump speed, strokes totalizer, flow rate, mud weight, bit depth, rotary speed, hookload and weight on the bit;
- 2) Instruments with pointers to the parameters: pump pressure, hookload, weight on the bit and rotary torque;
- 3) Geograph with parameters: drillpipe pressure, choke pressure, active volume, hookload, weight on the bit, length drilled, flow in, flow out, percent of flow, rotary torque, rotary speed and drilling rate.
- 4) Panel with alarms: pump failure, vol high, flow high, bop failure, bop status and choke status;
- 5) Toolbar with buttons: Well Config, Circulation Options, Set Alarms, Graph Limits, X-times faster, Pause/Continue, Restart, Send by email, about;
- 6) set drillstring with drillpipe1, drillpipe2, heavy-weight, drillcollar1 and drillcollar2;
- 7) Select floating rig or land rig;
- 8) Select unit systems: International, field1 (imperial) and field2 (mix);
- 9) set fluid parameters: mud weight, plastic viscosity, yield point and initial gel;
- 10) Select rheological models: Power or Bingham;
- 11) Set gradients: absorption, fracture and temperature;
- 12) Set jet nozzles or fixed TFA;
- 13) Set choke parameters and BOP test pressure;
- 14) Set Surface circulation volume;
- 15) Set surface circulation equipments (mud pump and lines);
- 16) Set four formations to drilling (height, pore gradient, fluid density and sof/hard);
- 17) Save configuration to data files and share by iCloud;
- 18) Select circulation options: drillpipe -> Riser, Kill -> Riser, and Close BOP;
- 19) Set alarms: pit gain, flow rate out, max pump pressure and max pump power;
- 20) Register the kill line losses and pump pressure at the kill speed;
- 21) show the well with drillstring and the drillbit on rotating;
- 22) Show schematic of well with drillstring, kick and neutral point (%);
- 23) Adjust pump speed, weight on the bit and rotary speed to drilling until kick detection;
- 24) Shut-in the well using hard method;
- 25) Register shut-in drillpipe pressure (SIDPP) and choke pressure (SICP) and gain volume;
- 26) behavior of the kick: keeping the well closed and keeping the well opened;
- 27) Simulations: Drilling, Kick detection, Shut-In, Underground Blowout at shoe and blowout with failure of bop;
- 28) Capacities and Volumes calculations;
- 29) Hydrostatic and critical pressures calculations;
- 30) Hydraulics calculations;

Note: This Drilling Simulator NOT allows to control the well after the kick detection and shut-in. The simulation ends after the simulations of underground blowout and blowout to surface.

- For well control simulation, use another app "[Well Control Simulator](#)".
- For simulation of leak-off test, use another app "[Leak-Off Test Simulator](#)";
- For methods to control, use another app "[Well Control Methods](#)";
- For kick tolerance calculations, use another app "[Kick Tolerance](#)";
- For hydraulic calculations, use another app "[Drilling Hydraulics](#)";

iPad on vertical position

Use on landscape position to see the well bore



Tap on 'Files' button to set a data file



iCloud Settings

Data Files on iCloud

Creating a New Data File

Saving the New Data File

Default Surface Stack

Default Subsea Stack

Opening a Data File

Saving a Data File

Removing a Data File

Sending a Data File by Email

It's recommended first create a data file for work with this app => The "Save" button is enabled on views.
But this is unnecessary because this app uses data in the ram memory. The data can be saved on any time.

First, use the Local Option for create data files for better performance and later to save it on iCloud.

for iCloud unavailable

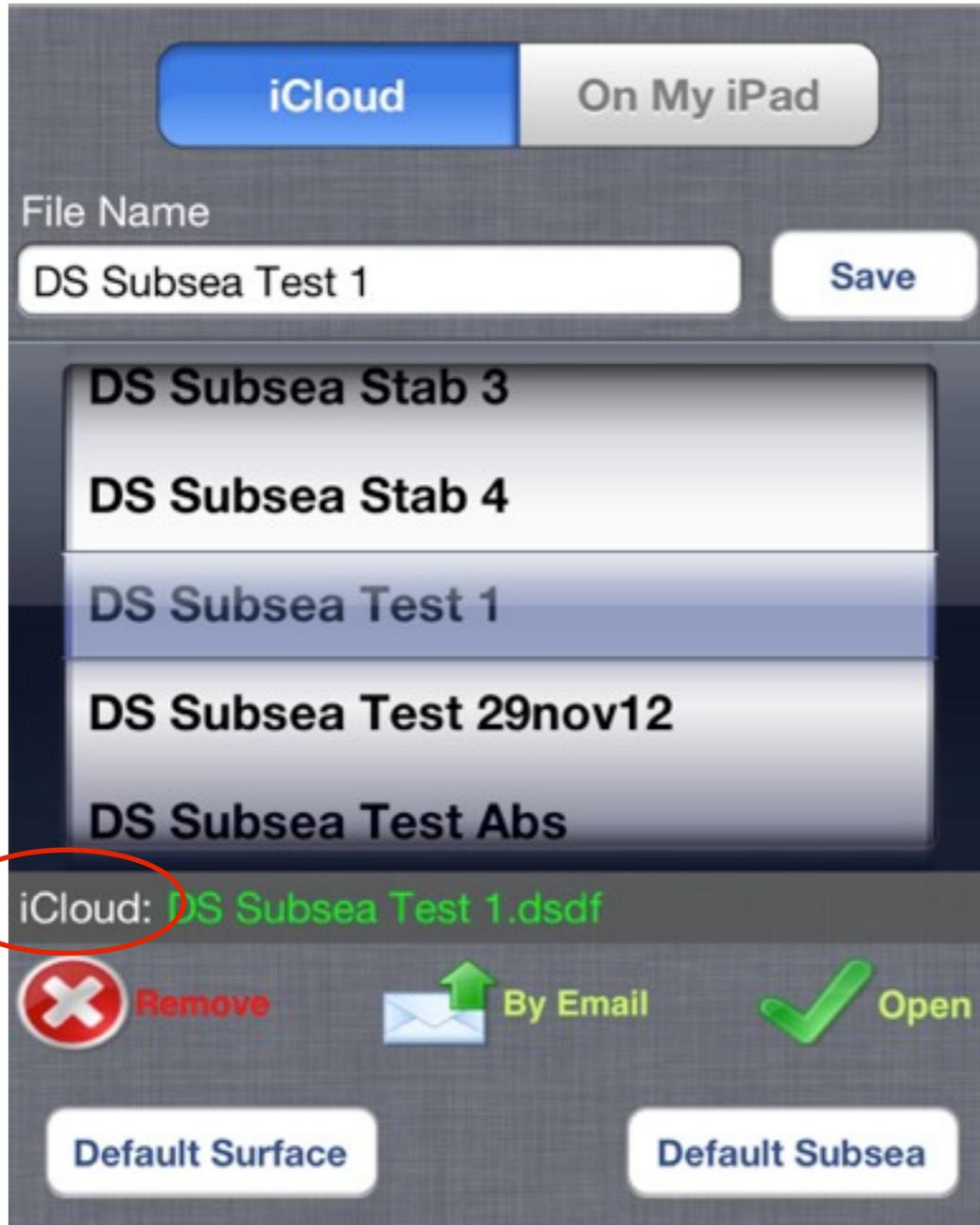


Check iCloud Configuration: **Settings => iCloud**

Documents & Data must be ON

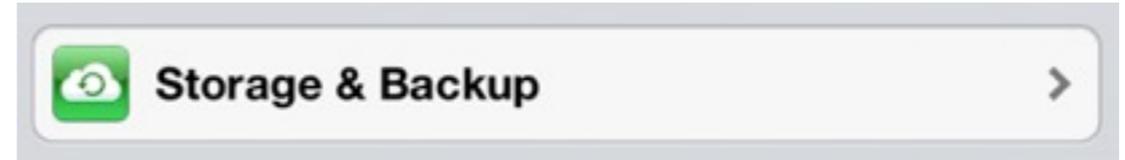


If iCloud is available on iPad:



After create any data file in iCloud:

Settings => Storage & Backup => Manage Storage

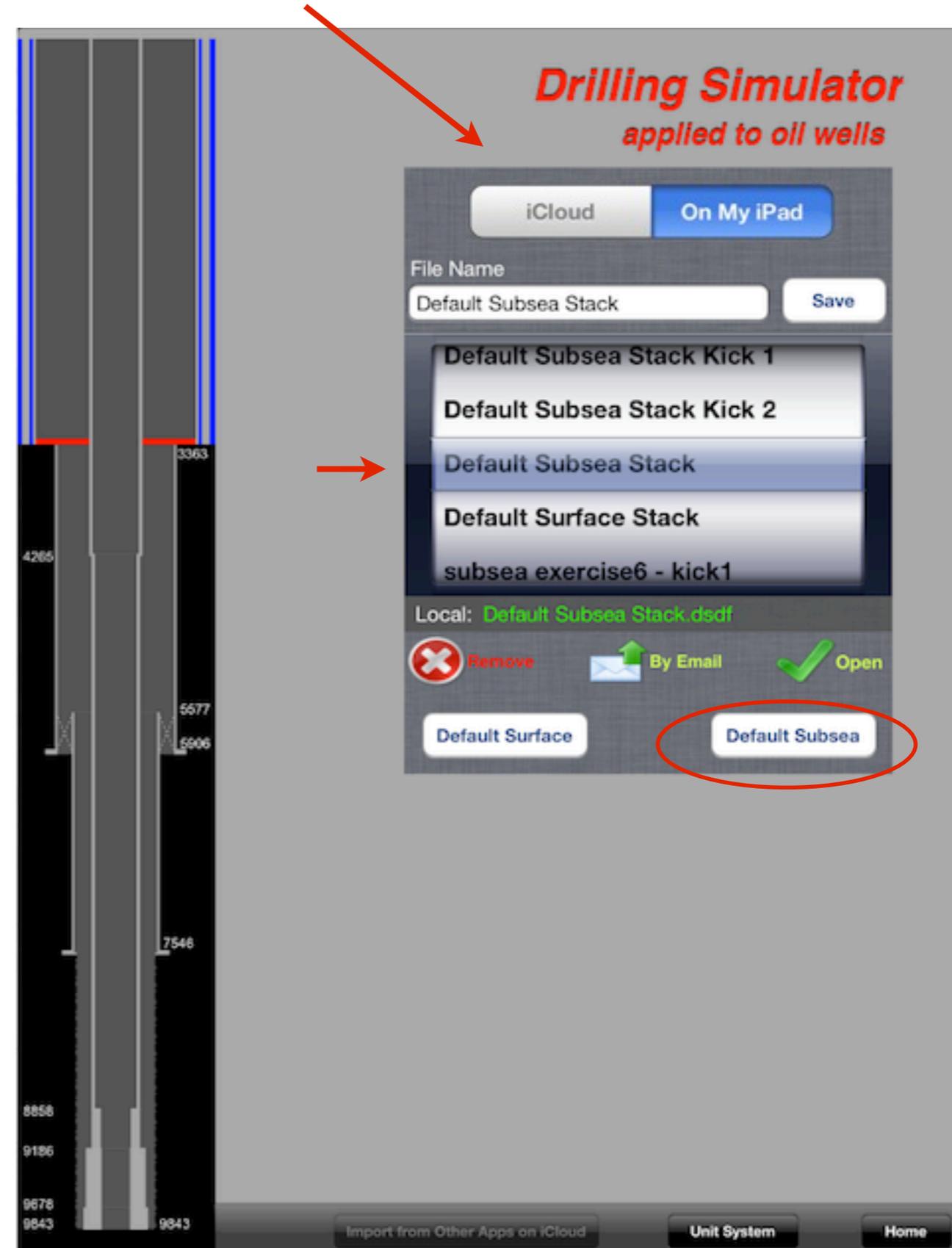


This application needs a complete well to work. For create a new Data File, select a default well on buttons “**Default Surface**” or “**Default Subsea**”

File extension:

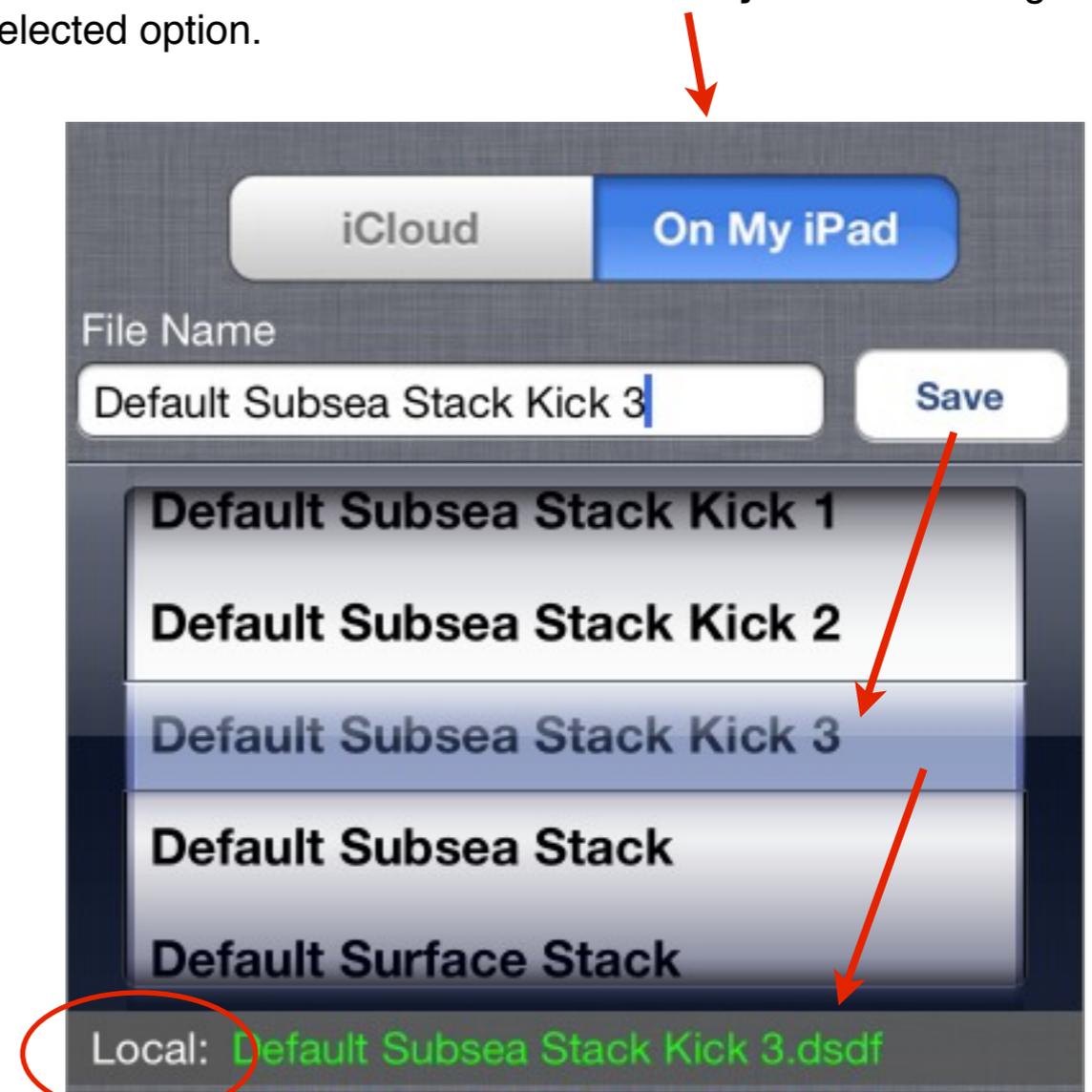
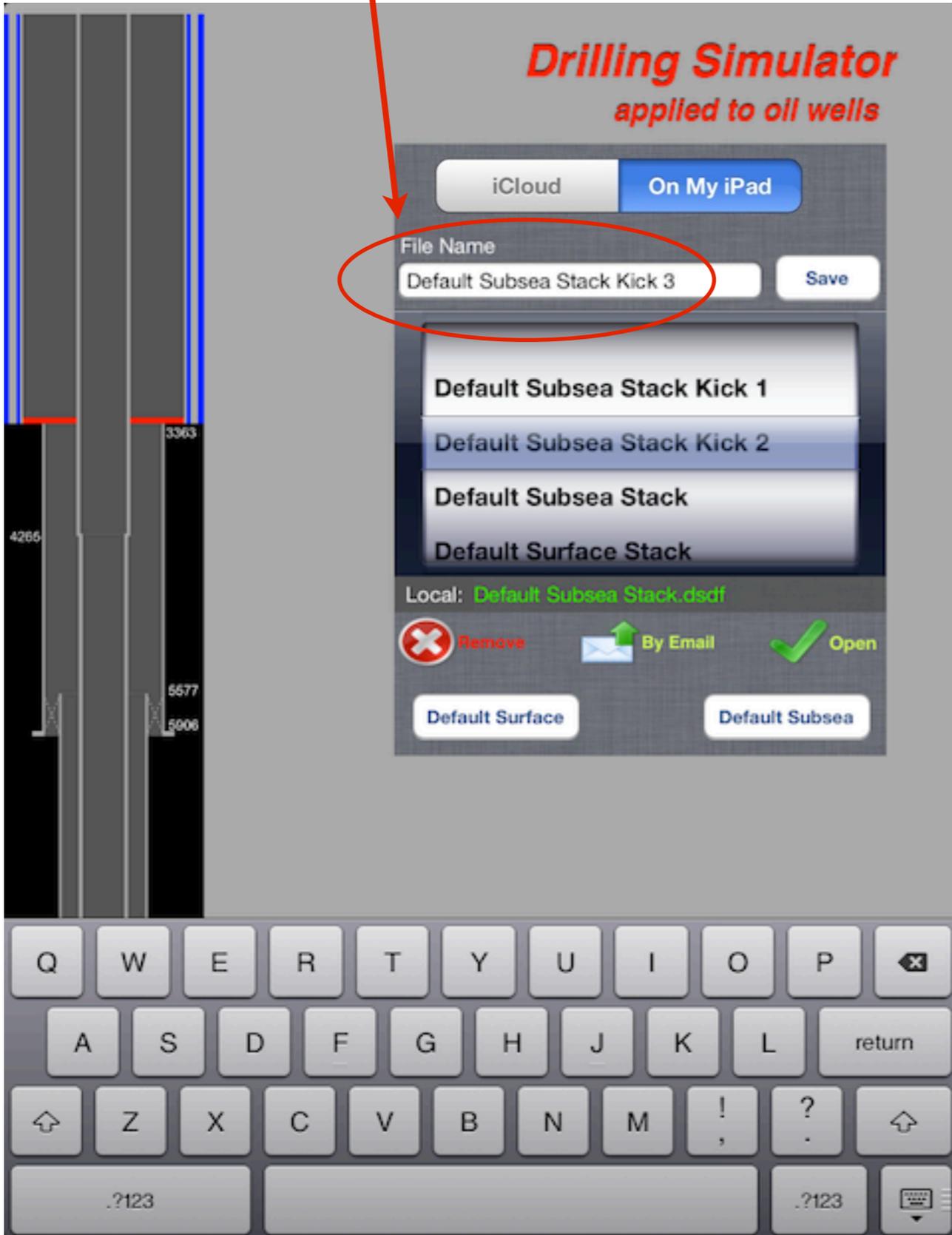
This application uses the file extension *.**d sdf** (Drilling Simulator Data File). The user does not need to edit this extension.

The data file is saved with the default name (ex. **Default Subsea Stack**) on **iCloud** or **On My iPad** according to the selected option.



Save the data file with other name. Input the file name and Tap on "Save" button

The new data file is saved on **iCloud** or **On My iPad** according to the selected option.



iCloud
Local
No File

Local → On My iPad

Well Configuration

Vertical Well
Directional Well

Well Configuration

Surface Stack
Subsea Stack

Casing shoe: ft

Well depth: ft

Casing ID: in

Hole size: in

without Liner
with Liner

	Length ft	OD in	ID in	Weight lb/ft	Cap Int bbl/ft	Vol Int bbl	Displac bbl/ft	Vol Steel bbl
DP 1	2985.56	5.0000	4.2760	19.50	0.0178	53.03	0.0065	19.48
DP 2	0.00	5.0000	4.2760	19.50	0.0178	0.00	0.0065	0.00
HW	328.08	5.0000	3.0000	49.30	0.0087	2.87	0.0155	5.10
DC 1	459.32	6.2500	2.8125	83.90	0.0077	3.53	0.0303	13.90
DC 2	164.04	6.7500	2.8125	101.30	0.0077	1.26	0.0366	6.00
bit depth: 3937.01					Total	60.69		44.48

	Internal		Annulus Drill Pipe 1		Annulus Drill Pipe 2	
	ft	bbl/ft	ft	bbl/ft	ft	bbl/ft
Riser						
Casing	2296.59	0.0745	2296.59	0.0502		0.0502
Liner						
Hole	1640.42	0.0702	688.98	0.0459		0.0459

	Annulus Heavy Weight		Annulus Drill Collar 1		Annulus Drill Collar 2	
	ft	bbl/ft	ft	bbl/ft	ft	bbl/ft
Riser						
Casing		0.0502		0.0365		0.0302
Liner						
Hole	328.08	0.0459	459.32	0.0322	164.04	0.0259

Choke Line: bbl

Surface to Bit: bbl

Bit to BOP: bbl

Surface Equip: bbl

Bit to Choke: bbl

Strokes w/

MP 1	MP 2	Surface to Bit	Riser Annular	Choke Line
		<input type="text" value="630"/>	<input type="text" value=""/>	<input type="text" value=""/>
		<input type="text" value="660"/>	<input type="text" value="1817"/>	<input type="text" value="1817"/>

Default Surface Stack.dsd

Save
Unit System
Mud / Grad
Bit / Equip
Forms
Email
Print
Home

Mud & Gradients

Vertical Well
Directional Well

Mud & Gradients

Surface Stack
Subsea Stack

Mud Weight: ppg

Plastic Viscosity: cP

Initial Gel: lb/100ft²

MW Gradient: psi/ft

Yield Point: lb/100ft²

Rheological Model: Power Bingham

Leak-Off Test at Shoe Depth

Absorption Gradient: ppg psi/ft

Fracture Gradient: ppg psi/ft

Porosity: % Permeability: mD

Temperature Gradient: F/100ft

Surface Temperature: °C °F K R

Buoyancy Factor:

Shoe Depth Hydrostatic: psi

Absorption Pressure: psi

Fracture Pressure: psi

Bottom Hole Hydrostatic: psi

Bottom Hole Temperature: °C °F K R

Default Surface Stack.dsd

Save
Unit System
Send By Email
Print
Return

Bit, Mud Pumps, Bop, Choke and Surface Connections

Formations

* Choke Diameter, Max in

* Choke Coefficient %

Maximum BOP Pressure psi

Active Pit Volume bbl

Surface Circulation Volume:

Circ. by flowline @ 100 spm bbl

* Circ. by choke @ 40 spm bbl

* for compatibility with the app "Well Control Simulator"

BIT NOZZLES

Coefficient

Total Flow Area sq.in

	Qty.	Size (1/32) in	cm
<input type="range"/>	<input type="text" value="1"/>	<input type="range"/>	<input type="text" value="12"/> 0.9525
<input type="range"/>	<input type="text" value="1"/>	<input type="range"/>	<input type="text" value="12"/> 0.9525
<input type="range"/>	<input type="text" value="1"/>	<input type="range"/>	<input type="text" value="12"/> 0.9525
<input type="range"/>	<input type="text" value="0"/>	<input type="range"/>	<input type="text" value="0"/> 0.0000

Equipments

MUD PUMPS	#1	#2 / #3 **
Liner diameter	<input type="text" value="6.5000"/>	<input type="text" value="6.5000"/> in
Max Pressure	<input type="text" value="4200.0"/>	<input type="text" value="4200.0"/> psi
Piston Length	<input type="text" value="10.0000"/>	<input type="text" value="10.0000"/> in
Piston diameter	<input type="text" value="2.0000"/>	<input type="text" value="2.0000"/> in
Power	<input type="text" value="1600.0"/>	<input type="text" value="1300.0"/> hp
Efficiency	<input type="text" value="97.0"/>	<input type="text" value="97.0"/> %
Pump Type	<input type="button" value="Triplex"/> <input type="button" value="Duplex"/>	<input type="button" value="Triplex"/> <input type="button" value="Duplex"/>
Maximum Speed	<input type="text" value="120"/>	<input type="text" value="120"/> spm
Discharge volume (true pump output)	<input type="text" value="0.0996"/>	<input type="text" value="0.0996"/> bbl/stk
	<input type="text" value="4.1827"/>	<input type="text" value="4.1827"/> gal/stk

** Mud Pump #3 used to Booster Line of the riser (Subsea only).

Default Surface Stack.dsd

Formations

data file: Default Surface Stack.dsd

F1

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

F2

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

F3

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

F4

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

Default Surface Stack.dsd

Well Configuration

Vertical Well
Directional Well

Well Configuration

Casing shoe: 5905.51 ft

Well depth: 9842.52 ft

Casing ID: 12.4150 in

Hole size: 8.5000 in

without Liner | with Liner | **LINER**

Surface Stack | Subsea Stack

Water depth: 3280.84 ft

Riser ID: 18.7500 in

Air Gap: 82.02 ft

Choke line ID: 3.0000 in

Booster line ID: 4.0000 in

	Length ft	OD in	ID in	Weight lb/ft	Cap Int bbl/ft	Vol Int bbl	Displac bbl/ft	Vol Steel bbl
DP 1	4265.09	5.5000	4.7780	21.90	0.0222	94.59	0.0072	30.75
DP 2	4593.18	5.0000	4.2760	19.50	0.0178	24.87	0.0065	29.97
HW	328.08	5.0000	3.0000	49.30	0.0087	2.87	0.0155	5.10
DC 1	492.13	6.2500	2.8125	83.90	0.0077	3.78	0.0303	14.89
DC 2	164.04	6.7500	2.8125	101.30	0.0077	1.26	0.0366	6.00
bit depth: 9842.52					Total	184.09		86.71

	Internal		w/o steel		w/ steel		Annulus Drill Pipe 1			Annulus Drill Pipe 2		
	ft	bbl/ft	bbl	ft	bbl/ft	bbl	ft	bbl/ft	bbl	ft	bbl/ft	bbl
Riser	3362.86	0.3415	1124.31	3362.86	0.3122	1049.72		0.3173				
Casing	2214.57	0.1497	316.54	902.23	0.1204	108.58	1312.34	0.1255	164.63			
Liner	1968.50	0.0745	133.74		0.0451		1968.50	0.0502	98.77			
Hole	2296.59	0.0702	126.64		0.0408		1312.34	0.0459	60.24			

	Annulus Heavy Weight		Annulus Drill Collar 1		Annulus Drill Collar 2			
	ft	bbl/ft	bbl	ft	bbl/ft	bbl		
Riser		0.3173			0.3036			
Casing		0.1255			0.1118			
Liner		0.0502			0.0365			
Hole	328.08	0.0459	15.06	492.13	0.0322	15.87		
Choke	0.0087	bbl/ft	Surface to Bit	186.09	bbl	Surface Equip	2.00	bbl
Line	29.40	bbl	Bit to BOP	467.41	bbl	Bit to Choke	496.81	bbl

Strokes w/

MP 1	MP 2	Surface to Bit	Riser Annular	Choke Line
		1557	8784	246
		Bit to Shoe	Bit to BOP	Bit to Choke
		798	3911	4157

Default Subsea Stack.dsd

Save
Unit System
Mud / Grad
Bit / Equip
Forms
Email
Print
Home

Mud & Gradients

Mud & Gradients

Mud Weight: 9.60 ppg

Plastic Viscosity: 15.0 cP

Initial Gel: 5.0 lb/100ft²

Rheological Model: **Power** | Bingham

MW Gradient: 0.4987 psi/ft

Yield Point: 10.0 lb/100ft²

Leak-Off Test at Shoe Depth

Absorption Gradient: 12.00 ppg 0.6234 psi/ft

Fracture Gradient: 12.00 ppg 0.6234 psi/ft

Porosity: 35.0 % Permeability: 300 mD

Temperature Gradient: 1.400 F/100ft

Surface Temperature: 28.0 °C | 82.4 °F | 301.1 K | 542.0 R

Sea Mudline Temperature: 4.0 °C | 39.2 °F | 277.1 K | 498.9 R

Buoyancy Factor: 0.8534

Shoe Depth Hydrostatic: 3763.2 psi

Absorption Pressure: 4704.0 psi

Fracture Pressure: 4704.0 psi

Bottom Hole Hydrostatic: 4908.5 psi

Bottom Hole Temperature: 54.4 °C | 129.9 °F | 327.5 K | 589.6 R

Default Subsea Stack.dsd

Save
Unit System
Send By Email
Print
Return

Bit, Mud Pumps, Bop, Choke and Surface Connections

Formations

* Choke Diameter, Max in

* Choke Coefficient %

Maximum BOP Pressure psi

Active Pit Volume bbl

Surface Circulation Volume:

Circ. by flowline @ 100 spm bbl

* Circ. by choke @ 40 spm bbl

* for compatibility with the app "Well Control Simulator"

BIT NOZZLES

Coefficient

Total Flow Area sq.in

	Qty.	Size (1/32) in	cm
<input type="range"/>	<input type="text" value="1"/>	<input type="range"/>	<input type="text" value="12"/> 0.9525
<input type="range"/>	<input type="text" value="1"/>	<input type="range"/>	<input type="text" value="12"/> 0.9525
<input type="range"/>	<input type="text" value="1"/>	<input type="range"/>	<input type="text" value="12"/> 0.9525
<input type="range"/>	<input type="text" value="0"/>	<input type="range"/>	<input type="text" value="0"/> 0.0000

Equipments

MUD PUMPS

	#1	#2 / #3 **
Liner diameter	<input type="text" value="6.5000"/>	<input type="text" value="6.5000"/> in
Max Pressure	<input type="text" value="4200.0"/>	<input type="text" value="4200.0"/> psi
Piston Length	<input type="text" value="12.0000"/>	<input type="text" value="12.0000"/> in
Piston diameter	<input type="text" value="2.0000"/>	<input type="text" value="2.0000"/> in
Power	<input type="text" value="1300.0"/>	<input type="text" value="1300.0"/> hp
Efficiency	<input type="text" value="97.0"/>	<input type="text" value="97.0"/> %
Pump Type	<input type="button" value="Triplex"/> <input type="button" value="Duplex"/> <input type="button" value="Triplex"/> <input type="button" value="Duplex"/>	
Maximum Speed	<input type="text" value="120"/>	<input type="text" value="120"/> spm
Discharge volume	<input type="text" value="0.1195"/>	<input type="text" value="0.1195"/> bbl/stk
<small>(true pump output)</small>	<input type="text" value="5.0192"/>	<input type="text" value="5.0192"/> gal/stk

** Mud Pump #3 used to Booster Line of the riser (Subsea only).

Default Subsea Stack.dsdfl

data file: Default Subsea Stack.dsdfl

Formations

F1

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

F2

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

F3

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

F4

Height ft

Pore Equiv. Weight ppg

%

Fluid Density ppg

Soft Hard

Default Subsea Stack.dsdfl



When TAP on “**Open**” button, the data that is on the Data File Highlighted on Wheel is loaded in the RAM memory and can be saved with other file name.

Method to transfer data file between iCloud and Local:

The user can open a data file on **Local (On My iPad)** and after save it on iCloud or the opposite.

iCloud Message:



On the first time that the user taps on “Open” button, the download of the data file is started from the iCloud to a local address with internal access only. When the download is completed, it's possible open the data file.

The user must tap again on the “Open” button for checking. When OK, the data file is loaded in RAM memory and shown on the well schematic.



When TAP on “**Save**” button the data that are loaded in the RAM memory is saved to the data file named with the content of the File Name TextBox.

The data file is created in **iCloud** or **Local (On My iPad)** according to the selected option.



Recommendation

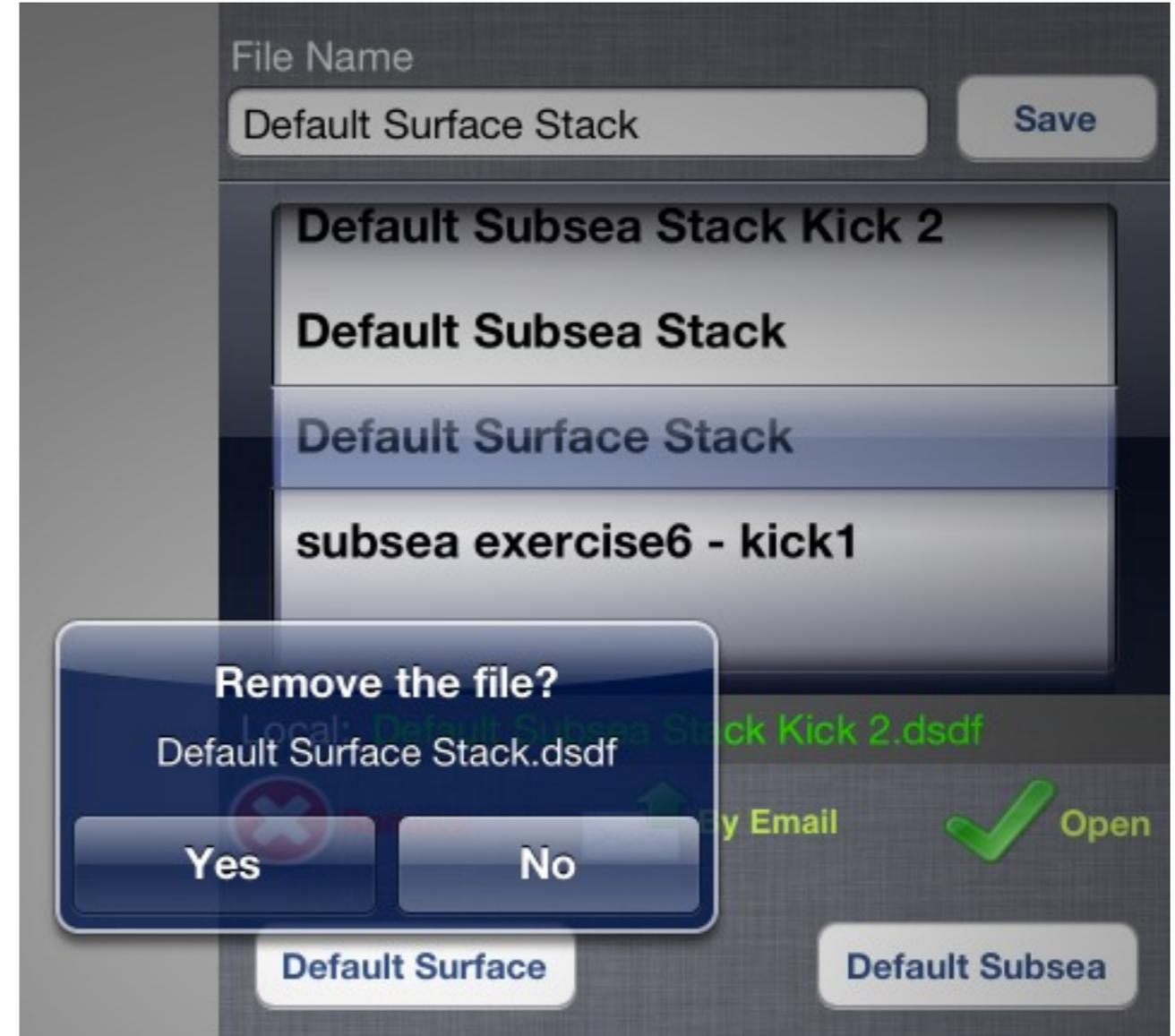
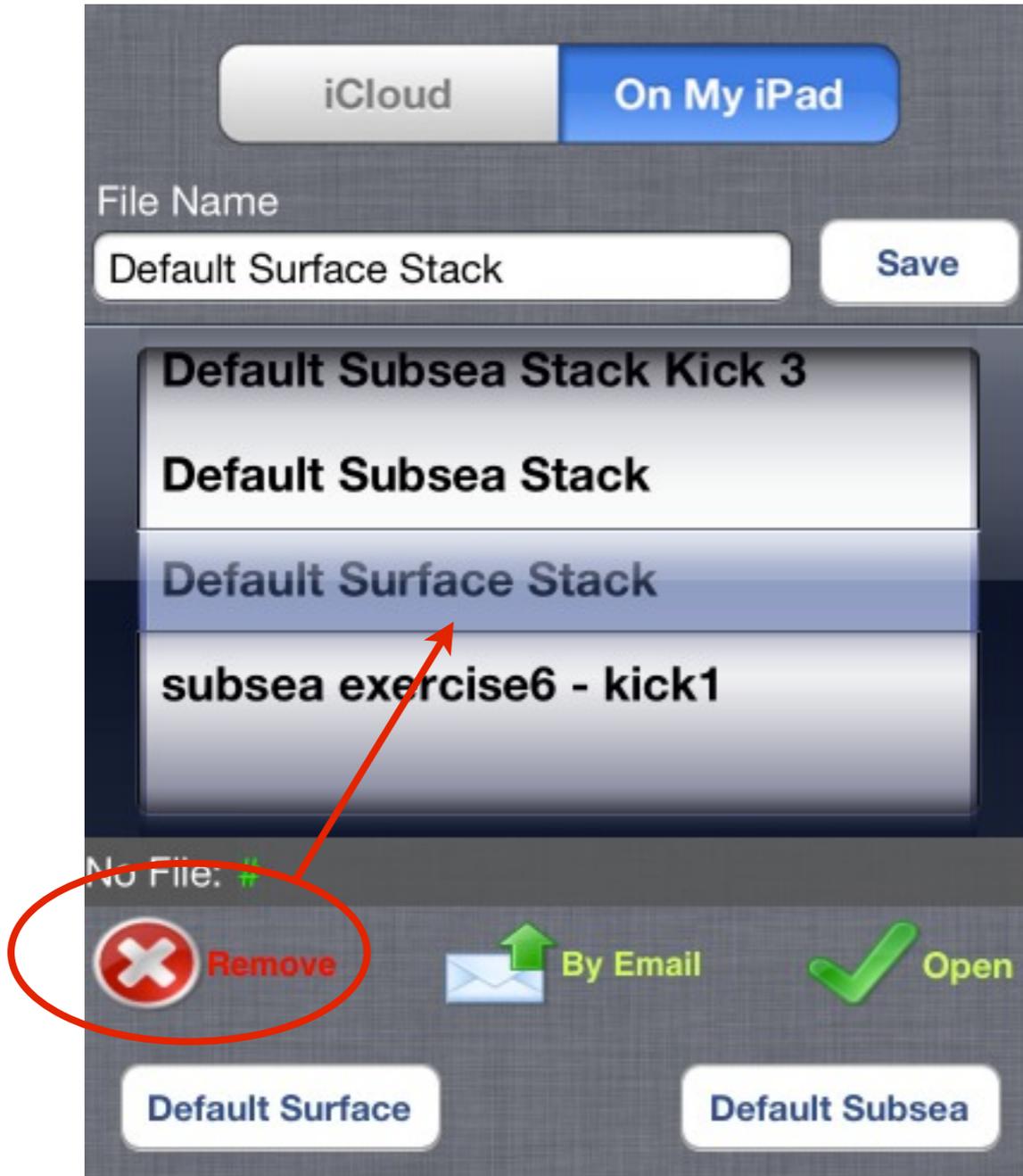
Save your exercise with different filenames at the points of interest for analyzes later.

When the status is “No File”: “#”, the data loaded not been saved but remain in ram memory.



No File: #

Select the data file and Tap on “**Remove**” button.



Attention:

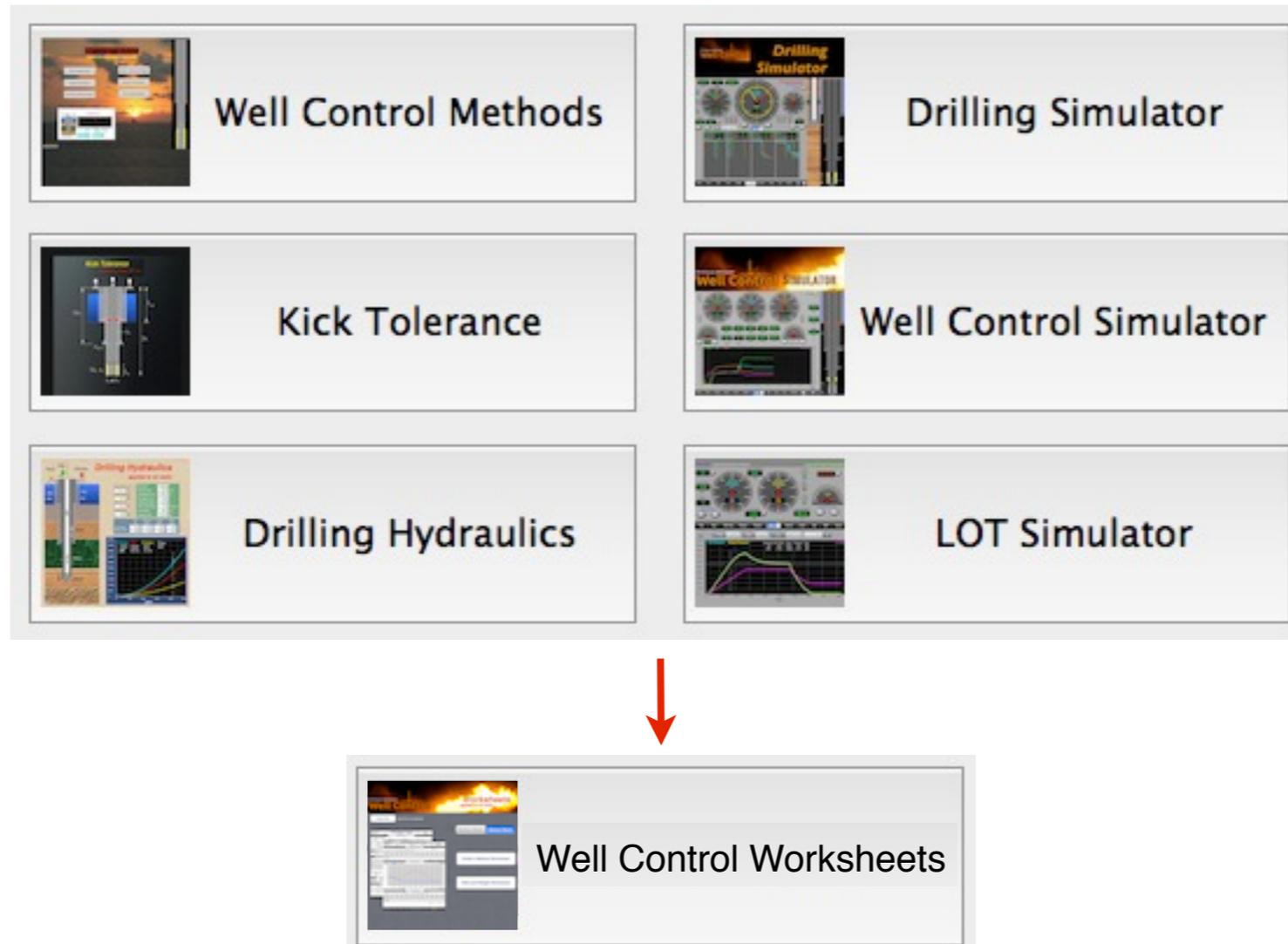
When a data file is removed, the data is lost.

Select the data file and TAP on “By Email” button.

In the email view, fill the fields of the email header and edit the email text if necessary. Tap on “Send” or “Cancel” button.



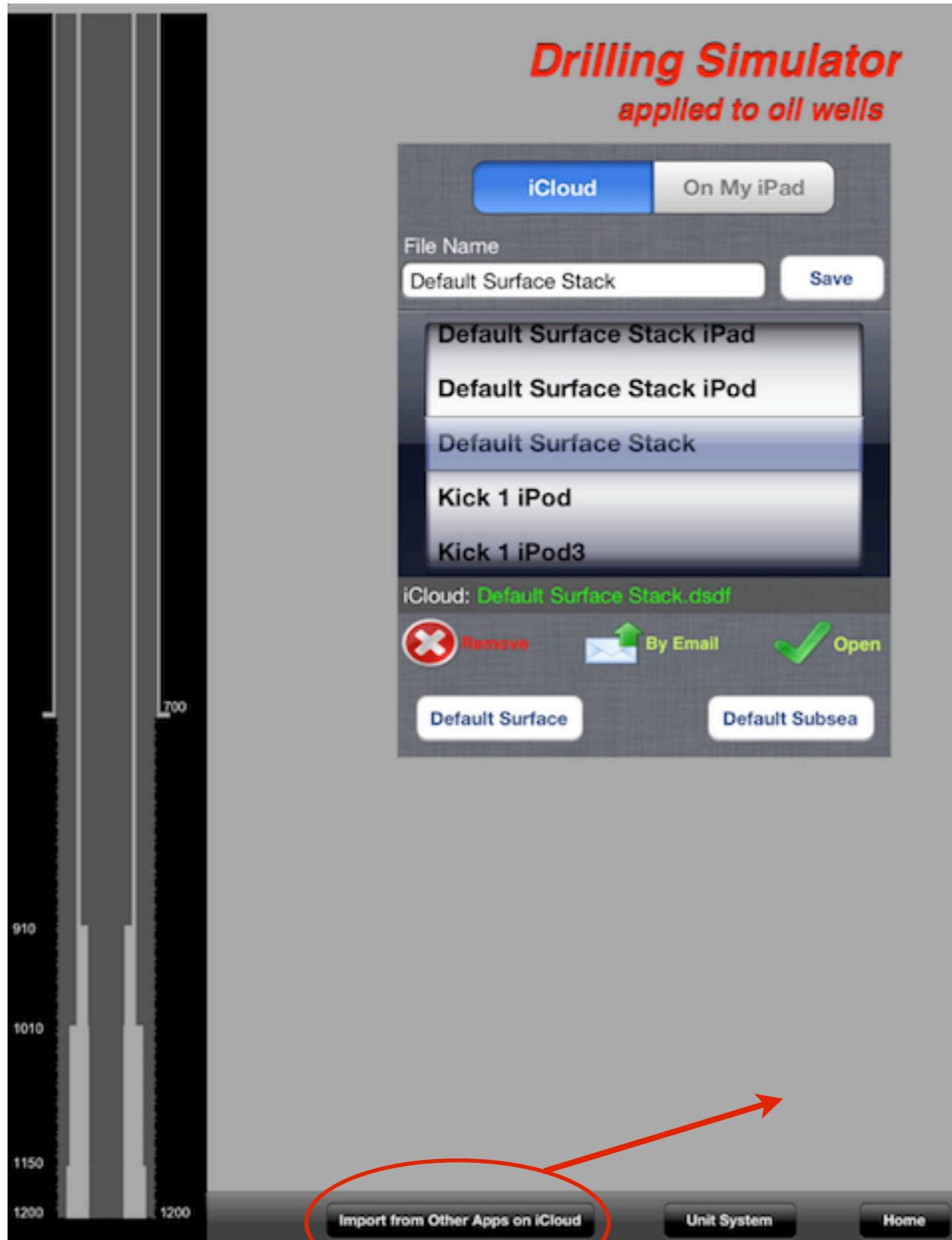
In this time, the follow apps can to share the same well data and also some operational parameters.



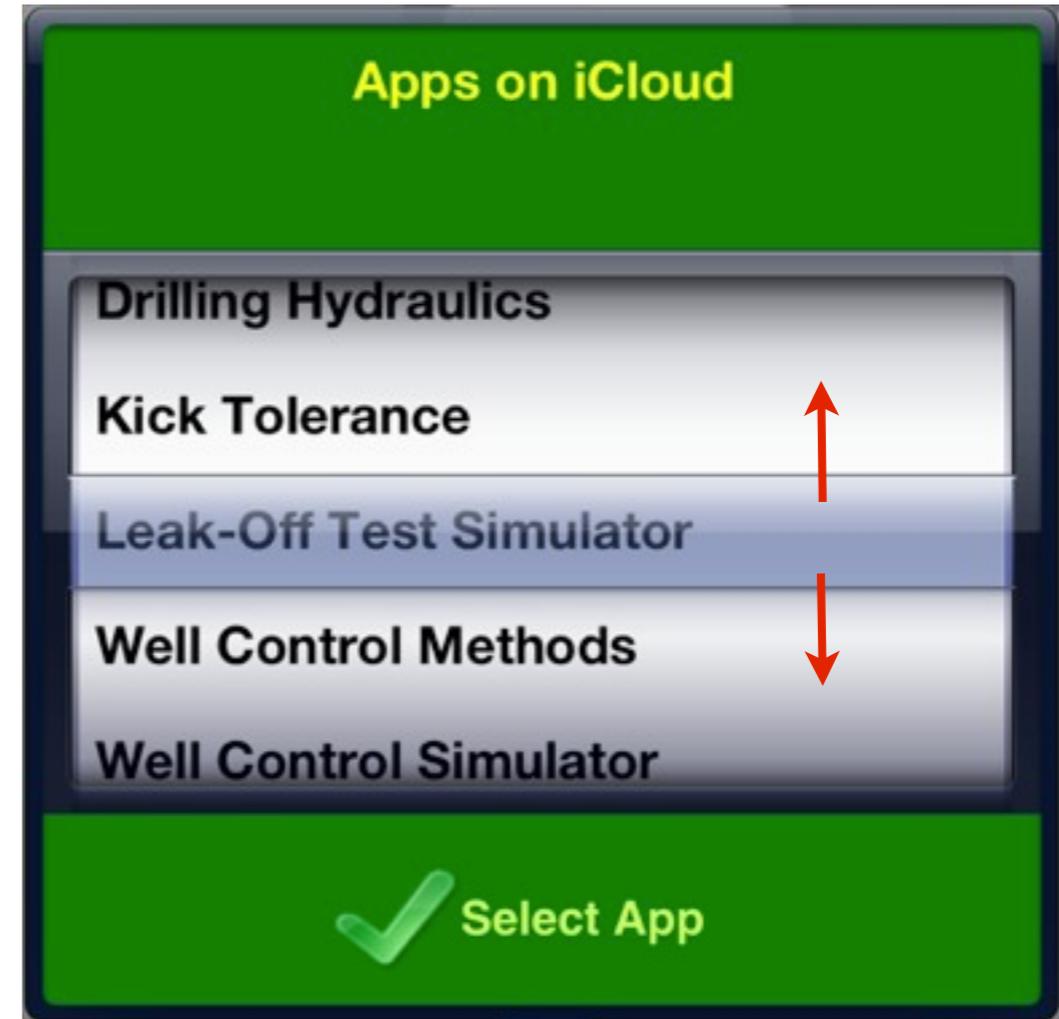
Notes:

- The well data is common for the 6 apps (Well Control Methods, Kick Tolerance, Drilling Hydraulics, Drilling Simulator, Well Control Simulator and Leak-Off Test Simulator).
- The Drilling Simulator and Well Control Simulator have the same parameters. They have some exclusive parameters (drill string pipe weight, etc).
- The Drilling Hydraulics has exclusively the parameters: mup pumps #3 and #4 and drilling motor.
- The Well Control Worksheets only import data from other apps to fill the kill sheets.

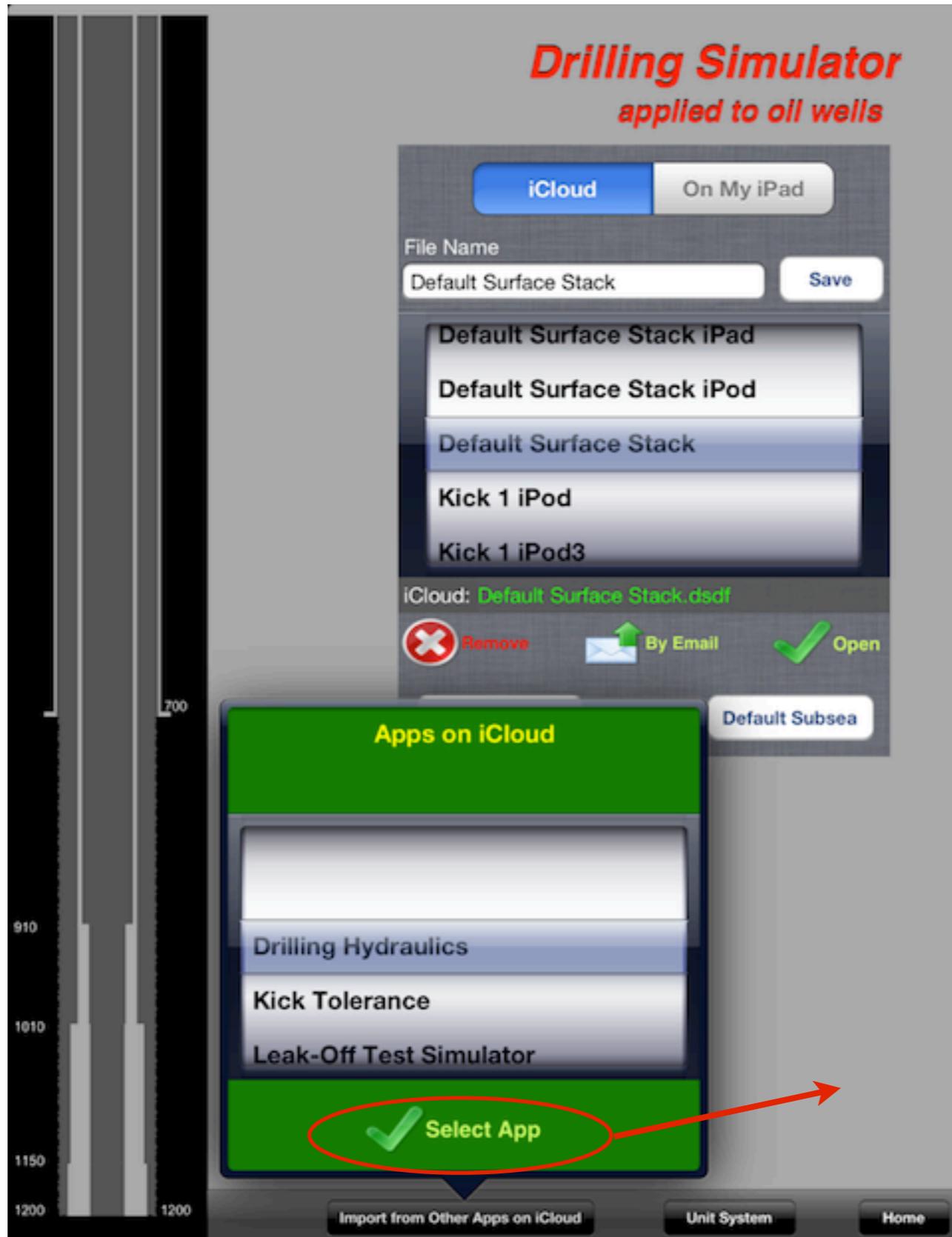
In this example, we will import data from **Drilling Hydraulics** App. Tap on “**Import from Other Apps on iCloud**” button at toolbar.



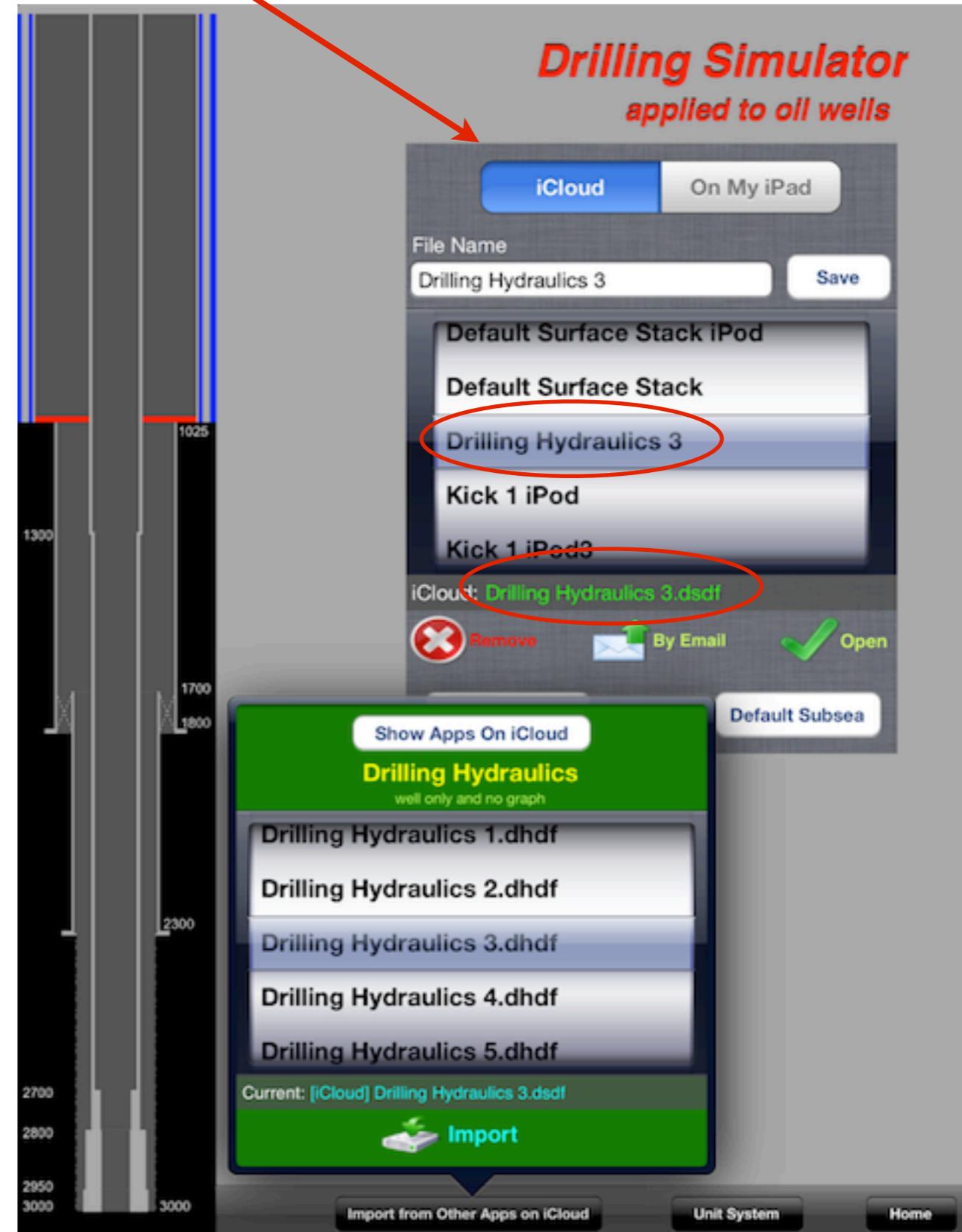
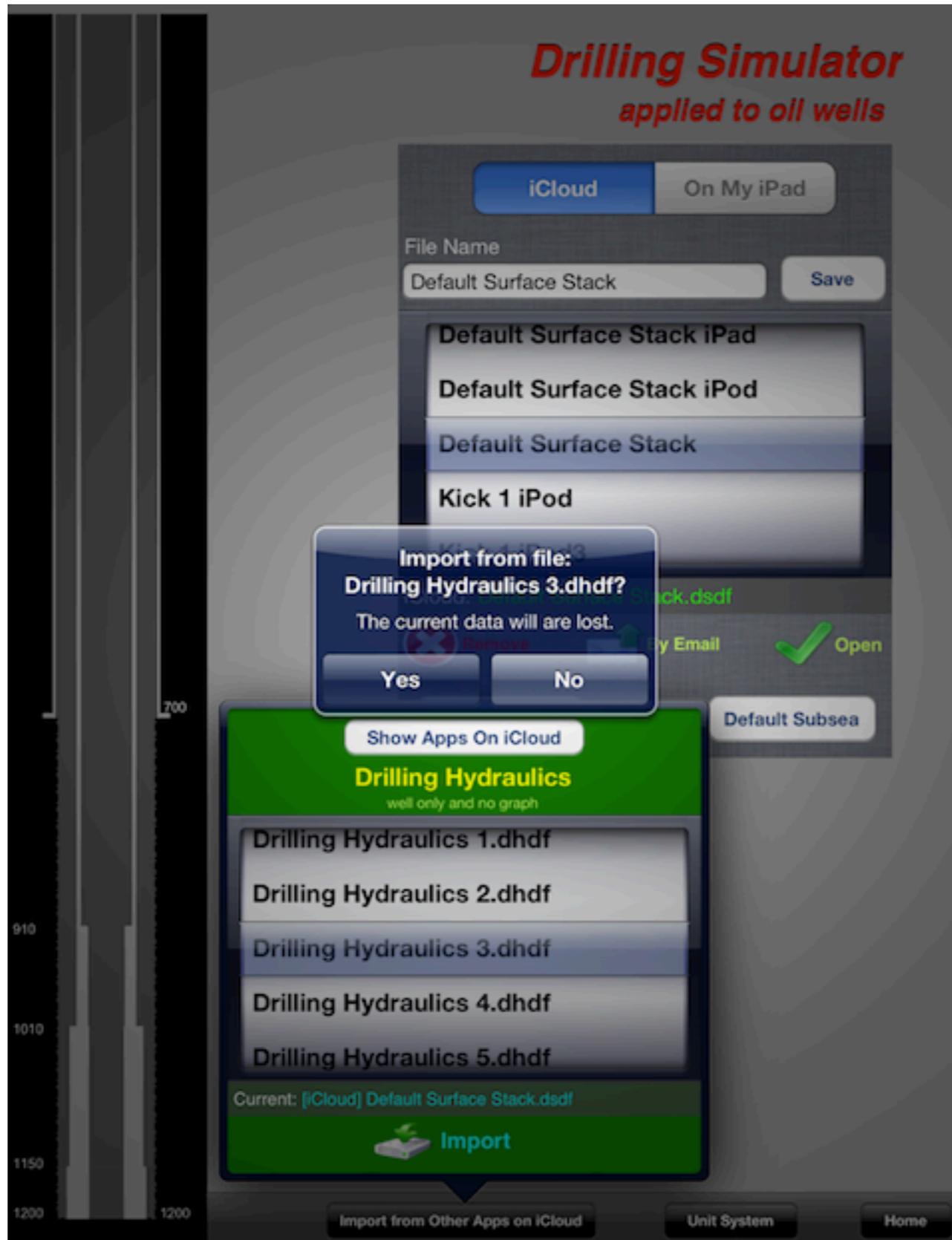
The apps on the User iCloud are listed on the data wheel. Select the App to list the data files.



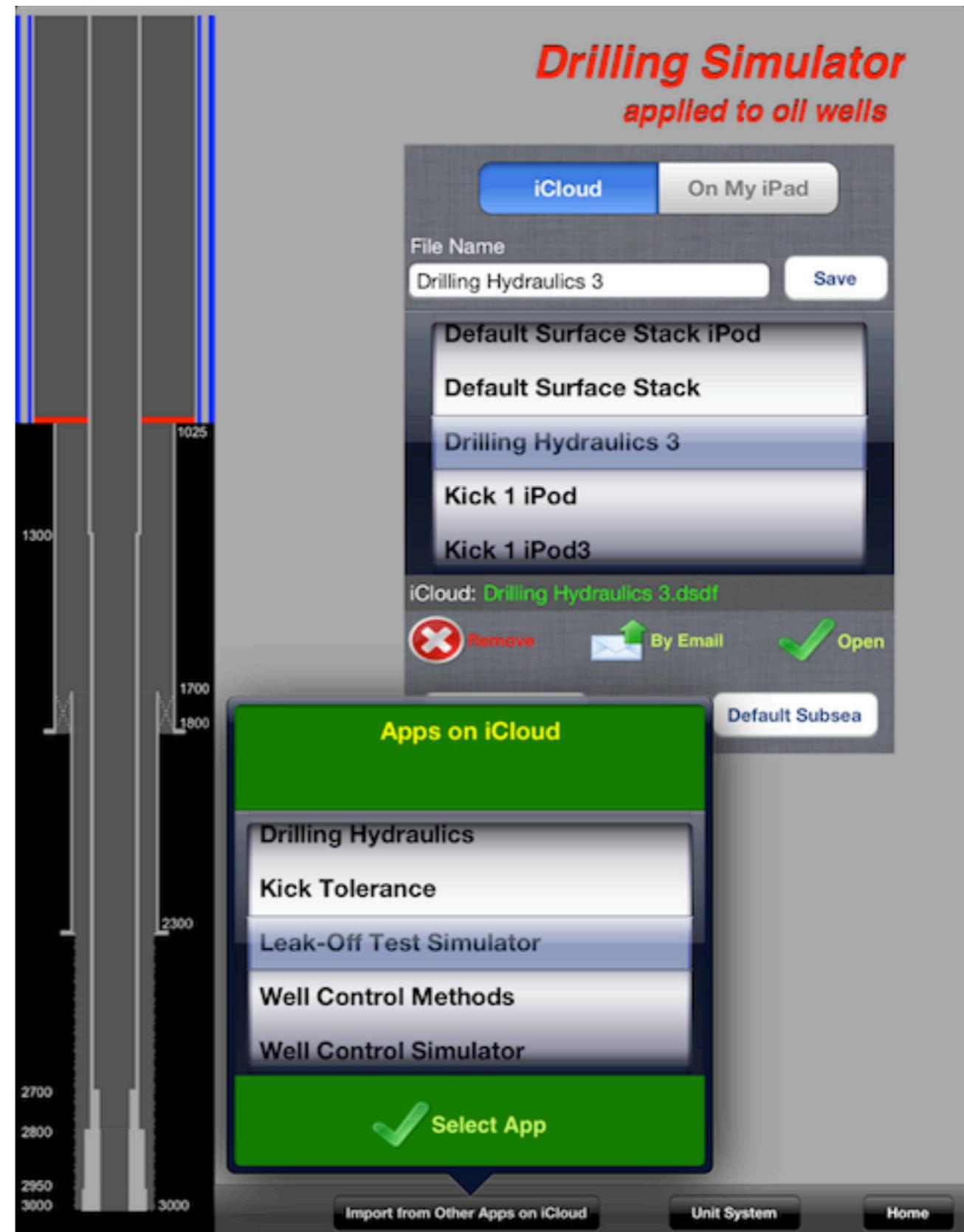
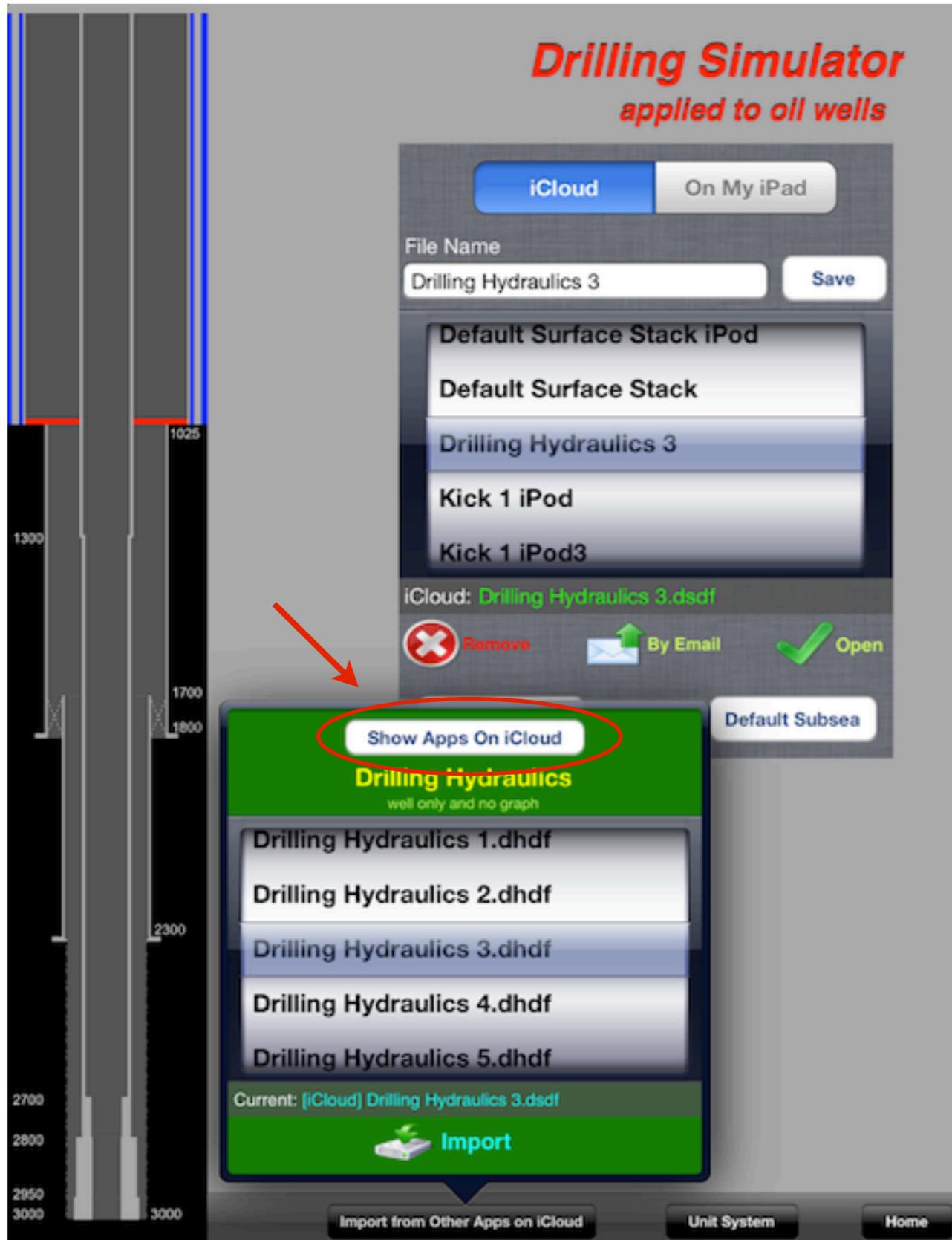
Select the App to list the data files. Move the wheel up/down to select the data file and Tap on "Import" button.



After to import, the data file is saved with the same filename (*.dshf) on **iCloud** or **On My iPad** according to the selected option.



Tap on "Show Apps on iCloud" to select other app or Tap on "Import from Other Apps on iCloud" button to close the popup view



Select the 'Unit System' option:

	Metric	SI	Imperial	Mix
Pressure	bar	kPa	psi	psi
Density	kg/l	kg/m ³	ppg	ppg
Gradient	bar/m	kPa/m	psi/ft	psi/m
Length	m	m	ft	m
Diameter	mm	mm	inch	inch
Area	mm ²	mm ²	sq. in	sq. in
Volume	liter	m ³	bbl	bbl
Capacity	liter/m	m ³ /m	bbl/ft	bbl/m
Flow Rate	l/min	m ³ /min	gpm	gpm
Power	kw	kw	hp	hp
Force	kgf	daN	lbf	lbf
Jet Velocity	m/s	m/s	ft/s	ft/s
Temp Grad	C/100m	C/100m	F/100ft	F/100ft
Plastic Visc	mPa.s	mPa.s	cP	cP
Yield Point	kg/m ²	N/m ²	lb/100ft ²	lb/100ft ²
Weight Ind	ton	ton	kips	ton
Pipe Weight	kg/m	kg/m	lb/ft	lb/ft

Or select the unit for each parameter

Note: available on other views

On **Main View**, tap on “**Well**” button on toolbar to edit the Well Configuration.

The screenshot displays the 'Well Configuration' screen with the following data:

Well Type: Vertical Well (selected), Directional Well

Stack Type: Surface Stack (selected), Subsea Stack

General Parameters:

- Casing shoe: 5905.51 ft
- Well depth: 9842.52 ft
- Casing ID: 12.4150 in
- Hole size: 8.5000 in
- Liner: **LINER** (selected)

Subsea Stack Parameters:

- Water depth: 3280.84 ft
- Riser ID: 18.7500 in
- Air Gap: 82.02 ft
- Choke line ID: 3.0000 in
- Booster line ID: 4.0000 in

	Length ft	OD in	ID in	Weight lb/ft	Cap Int bbl/ft	Vol Int bbl	Displac bbl/ft	Vol Steel bbl
DP 1	4265.09	5.5000	4.7780	21.90	0.0222	94.59	0.0072	30.75
DP 2	4593.18	5.0000	4.2760	19.50	0.0178	24.87	0.0065	29.97
HW	328.08	5.0000	3.0000	49.30	0.0087	2.87	0.0155	5.10
DC 1	492.13	6.2500	2.8125	83.90	0.0077	3.78	0.0303	14.89
DC 2	164.04	6.7500	2.8125	101.30	0.0077	1.26	0.0366	6.00
Total						184.09		86.71

Annulus Drill Pipe 1

	Internal ft	w/o steel bbl/ft	w/ steel bbl
Riser	3362.86	0.3415	1124.31
Casing	2214.57	0.1497	316.54
Liner	1968.50	0.0745	133.74
Hole	2296.59	0.0702	126.64

Annulus Drill Pipe 2

	ft	bbl/ft	bbl
Riser		0.3173	
Casing	1312.34	0.1255	164.63
Liner	1968.50	0.0502	98.77
Hole	1312.34	0.0459	60.24

Annulus Heavy Weight

	ft	bbl/ft	bbl
Riser		0.3173	
Casing		0.1255	
Liner		0.0502	
Hole	328.08	0.0459	15.06

Annulus Drill Collar 1

	ft	bbl/ft	bbl
Riser		0.3036	
Casing		0.1118	
Liner		0.0365	
Hole	492.13	0.0322	15.87

Annulus Drill Collar 2

	ft	bbl/ft	bbl
Riser		0.2973	
Casing		0.1055	
Liner		0.0302	
Hole	164.04	0.0259	4.25

Choke Line

	ft	bbl/ft	bbl
Choke Line	29.40	0.0087	0.256

Strokes w/

	Surface to Bit	Riser Annular	Choke Line
MP 1	1557	8784	246
MP 2	798	3911	4157

Additional parameters: Surface to Bit 186.09 bbl, Surface Equip 2.00 bbl, Bit to BOP 467.41 bbl, Bit to Choke 496.81 bbl.

- Well Configuration
- Well Types: Vertical x Directional
- Well with Liner
- Stack Types: Surface x Subsea
- Drill String
- Capacities & Volumes
- Mud & Gradients
- Drill Bit & Equipments
- Surface Circulation Volume
- Formations to Drill
- iCloud Settings
- iCloud Settings

On **Main View**, tap on “**Well**” button on toolbar to edit the Well Configuration.

Well Configuration

Vertical Well | Directional Well

Surface Stack | Subsea Stack

Casing shoe: 5905.51 ft
Well depth: 9842.52 ft
Casing ID: 12.4150 in
Hole size: 8.5000 in

without Liner | with Liner | **LINER**

	Length ft	OD in	ID in	Weight lb/ft	Cap Int bbl/ft	Vol Int bbl	Displac bbl/ft	Vol Steel bbl
DP 1	4265.09	5.5000	4.7780	21.90	0.0222	94.59	0.0072	30.75
DP 2	4593.18	5.0000	4.2760	19.50	0.0178	24.87	0.0065	29.97
HW	328.08	5.0000	3.0000	49.30	0.0087	2.87	0.0155	5.10
DC 1	492.13	6.2500	2.8125	83.90	0.0077	3.78	0.0303	14.89
DC 2	164.04	6.7500	2.8125	101.30	0.0077	1.26	0.0366	6.00
bit depth: 9842.52						Total	184.09	86.71

	Internal ft	w/o steel bbl/ft	w/ steel bbl	Annulus Drill Pipe 1 ft	Annulus Drill Pipe 1 bbl/ft	Annulus Drill Pipe 1 bbl	Annulus Drill Pipe 2 ft	Annulus Drill Pipe 2 bbl/ft	Annulus Drill Pipe 2 bbl
Riser	3362.86	0.3415	1124.31	3362.86	0.3122	1049.72		0.3173	
Casing	2214.57	0.1497	316.54	902.23	0.1204	108.58	1312.34	0.1255	164.63
Liner	1968.50	0.0745	133.74		0.0451		1968.50	0.0502	98.77
Hole	2296.59	0.0702	126.64		0.0408		1312.34	0.0459	60.24

	Annulus Heavy Weight ft	Annulus Heavy Weight bbl/ft	Annulus Heavy Weight bbl	Annulus Drill Collar 1 ft	Annulus Drill Collar 1 bbl/ft	Annulus Drill Collar 1 bbl	Annulus Drill Collar 2 ft	Annulus Drill Collar 2 bbl/ft	Annulus Drill Collar 2 bbl
Riser		0.3173			0.3036			0.2973	
Casing		0.1255			0.1118			0.1055	
Liner		0.0502			0.0365			0.0302	
Hole	328.08	0.0459	15.06	492.13	0.0322	15.87	164.04	0.0259	4.25

Choke Line: 0.0087 bbl/ft
Surface to Bit: 186.09 bbl
Surface Equip: 2.00 bbl
Bit to BOP: 467.41 bbl
Bit to Choke: 496.81 bbl

Strokes w/ MP 1 MP 2
Surface to Bit: 1557
Riser Annular: 8784
Choke Line: 246
Bit to Shoe: 798
Bit to BOP: 3911
Bit to Choke: 4157

iPad on Landscape position

Vertical Well
Directional Well

Well Configuration

Surface Stack
Subsea Stack

Casing shoe: 5905.51 ft

Well depth: 9842.52 ft

Casing ID: 12.4150 in

Hole size: 8.5000 in

without Liner | with Liner | **LINER**

Water depth: 3280.84 ft

Riser ID: 18.7500 in

Air Gap: 82.02 ft

Choke line ID: 3.0000 in

Booster line ID: 4.0000 in

	Internal			Annulus Drill Pipe 1			Annulus Drill Pipe 2		
	ft	w/o steel bbl/ft	w/ steel bbl	ft	bbl/ft	bbl	ft	bbl/ft	bbl
Riser	3362.86	0.3415	1124.31	3362.86	0.3122	1049.72		0.3173	
Casing	2214.57	0.1497	316.54	902.23	0.1204	108.58	1312.34	0.1255	164.63
Liner	1968.50	0.0745	133.74		0.0451		1968.50	0.0502	98.77
Hole	2296.59	0.0702	126.64		0.0408		1312.34	0.0459	60.24

	Annulus Heavy Weight			Annulus Drill Collar 1			Annulus Drill Collar 2		
	ft	bbl/ft	bbl	ft	bbl/ft	bbl	ft	bbl/ft	bbl
Riser		0.3173			0.3036			0.2973	
Casing		0.1255			0.1118			0.1055	
Liner		0.0502			0.0365			0.0302	
Hole	328.08	0.0459	15.06	492.13	0.0322	15.87	164.04	0.0259	4.25

Choke Line: 0.0087 bbl/ft

29.40 bbl

Surface to Bit: 186.09 bbl

Bit to BOP: 467.41 bbl

Surface Equip: 2.00 bbl

Bit to Choke: 496.81 bbl

Strokes w/

MP 1 | MP 2

Surface to Bit: 1557

Bit to Shoe: 798

Riser Annular: 8784

Bit to BOP: 3911

Choke Line: 246

Bit to Choke: 4157

in

Drill Pipe 1 OD: 5.5000

4265.09 ft ID: 4.7780

Drill Pipe 2 OD: 5.0000

4593.18 ft ID: 4.2760

Heavy Weight OD: 5.0000

328.08 ft ID: 3.0000

Drill Collar 1 OD: 6.2500

492.13 ft ID: 2.8125

Drill Collar 2 OD: 6.7500

164.04 ft ID: 2.8125

bit depth: 9842.52

	Cap Int bbl/ft	Vol Int bbl	Displac bbl/ft	Vol Steel bbl
DP1	0.0222	94.59	0.0072	30.75
DP2	0.0178	24.87	0.0065	29.97
HW	0.0087	2.87	0.0155	5.10
DC1	0.0077	3.78	0.0303	14.89
DC2	0.0077	1.26	0.0366	6.00
Total		184.09		86.71

Drilling Hydraulics 3.dsd

Save Unit System Mud / Grad Bit / Equip Forms Email Print Home

Vertical Well

Vertical Well		Directional Well	
Casing shoe	<input type="text" value="5905.51"/>	ft	
Well depth	<input type="text" value="9842.52"/>	ft	
Casing ID	<input type="text" value="12.4150"/>	in	
Hole size	<input type="text" value="8.5000"/>	in	
without Liner		with Liner	
		LINER	

Directional Well

Vertical Well		Directional Well	
Kick-Off Point		<input type="text" value="0.00"/>	ft
	Measured		TVD
Casing shoe	<input type="text" value="5905.51"/>	ft	<input type="text" value="5905.51"/>
Well depth	<input type="text" value="9842.52"/>	ft	<input type="text" value="9842.52"/>
Casing ID	<input type="text" value="12.4150"/>	in	
Hole size	<input type="text" value="8.5000"/>	in	
without Liner		with Liner	
		LINER	

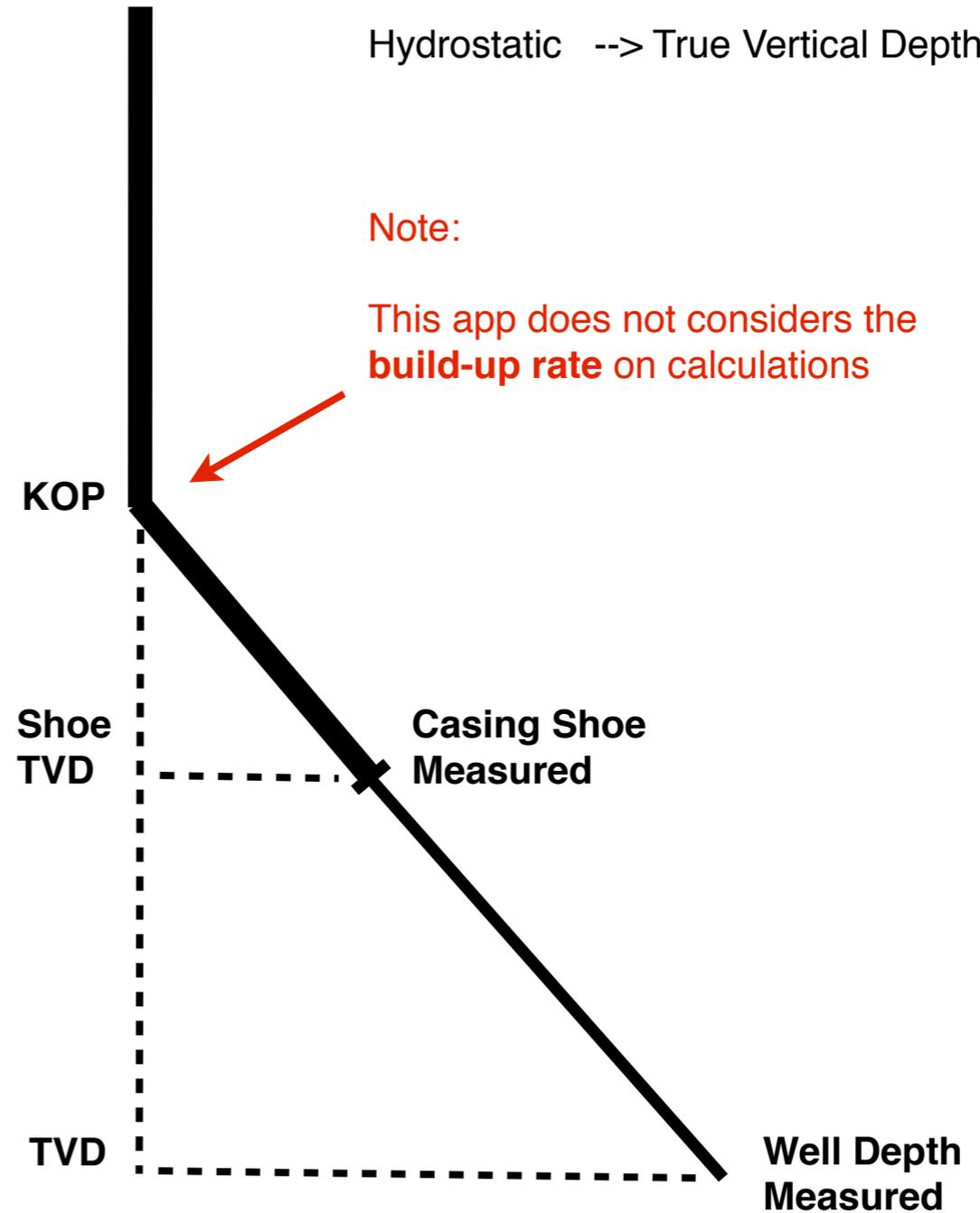
Calculations:

Friction Loss --> Measured Depth

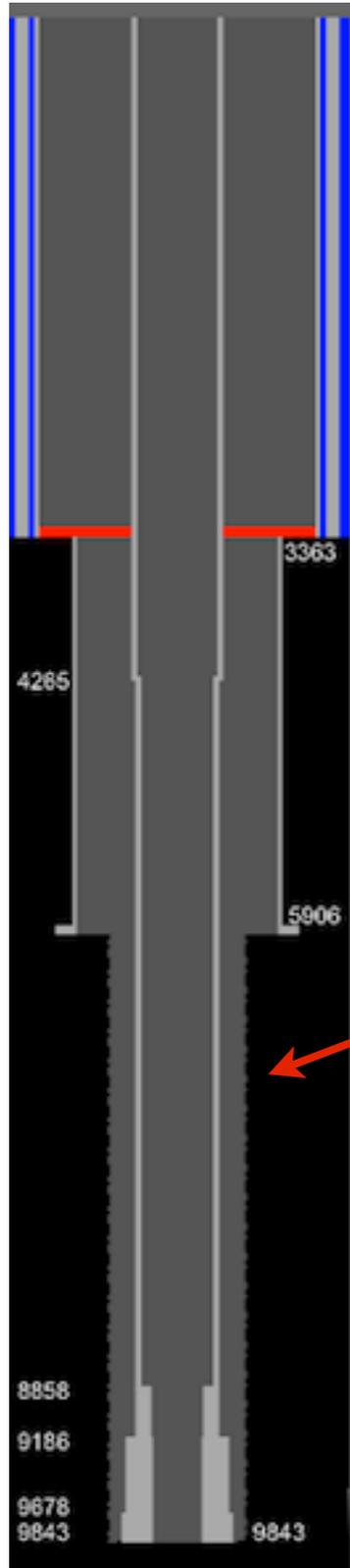
Hydrostatic --> True Vertical Depth

Note:

This app does not consider the **build-up rate** on calculations



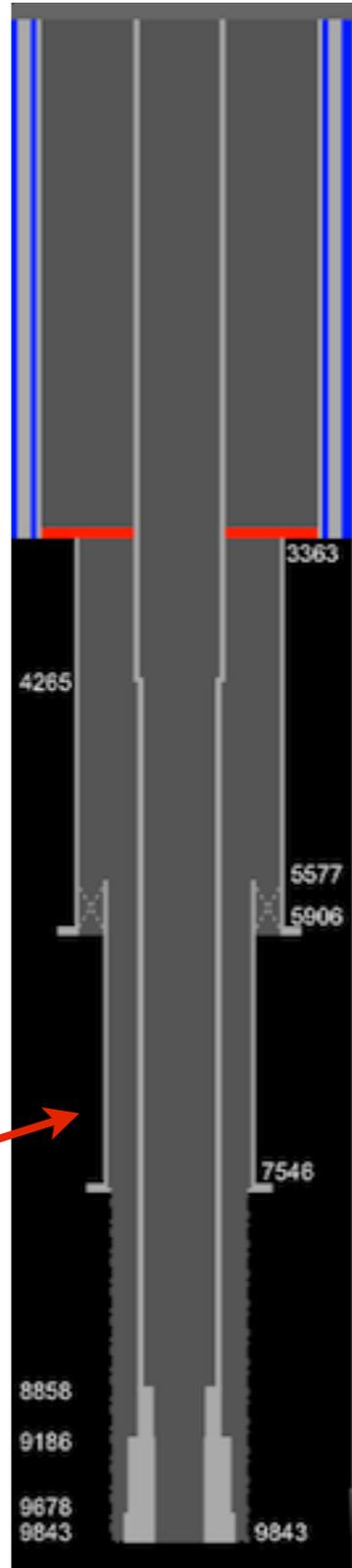
without Liner with Liner



Without Liner

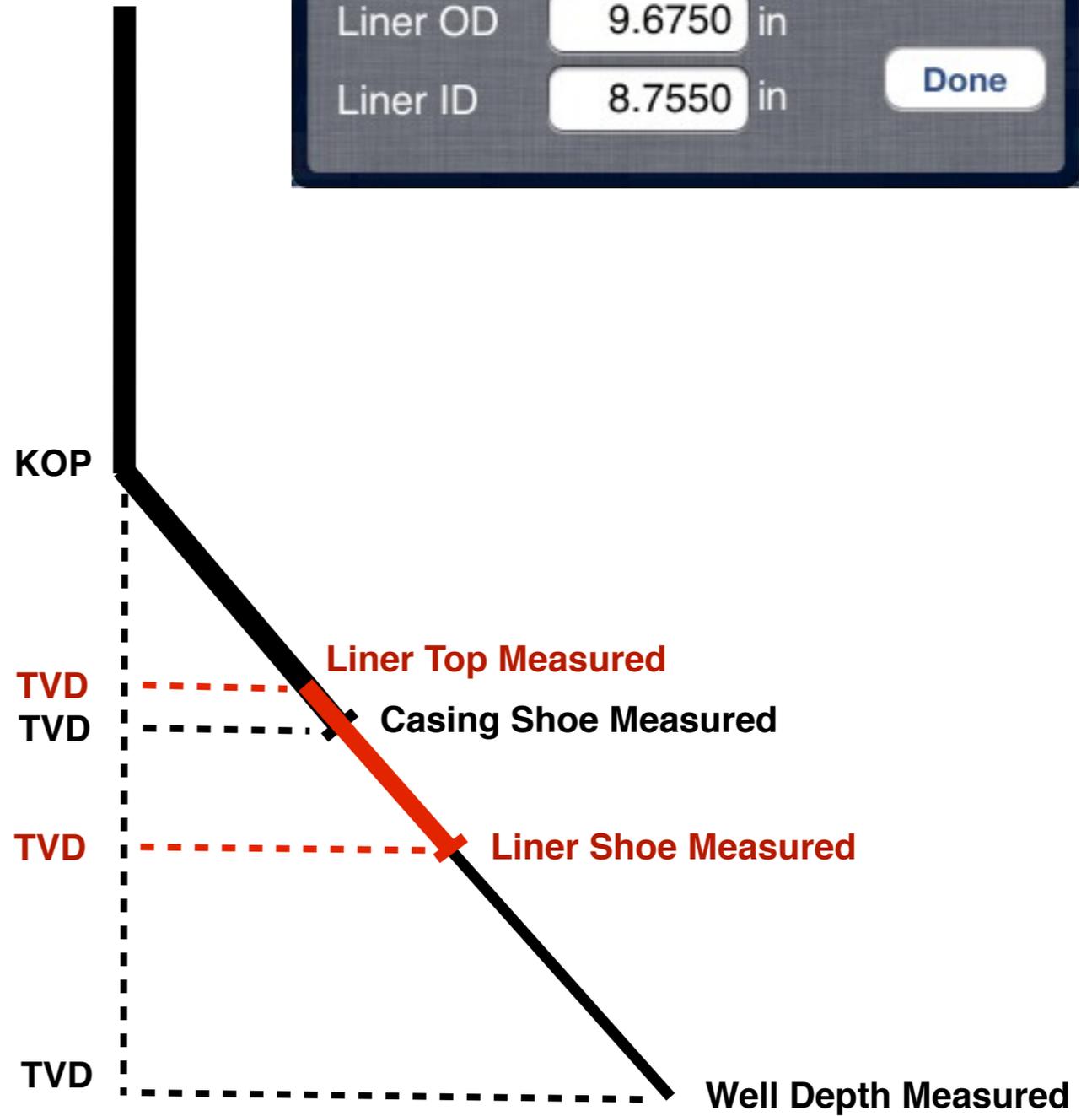
With Liner

without Liner with Liner LINER



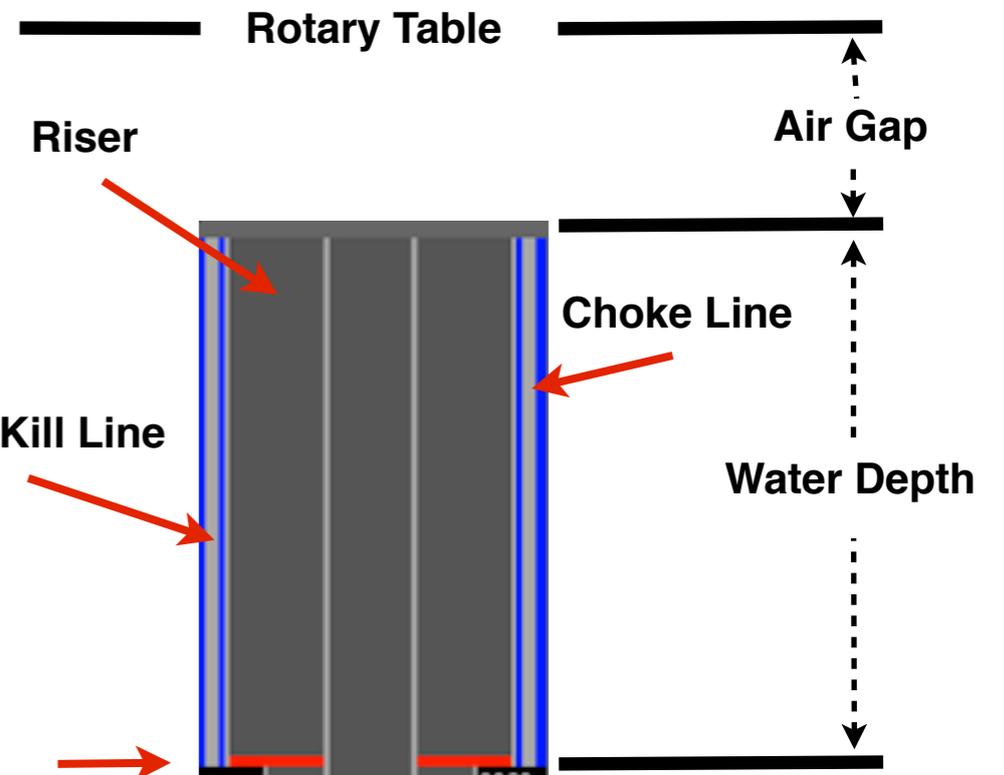
	Measured	TVD
Liner Top	5577.43 ft	5577.43
Liner Shoe	7545.93 ft	7545.93
Liner OD	9.6750 in	
Liner ID	8.7550 in	

Done

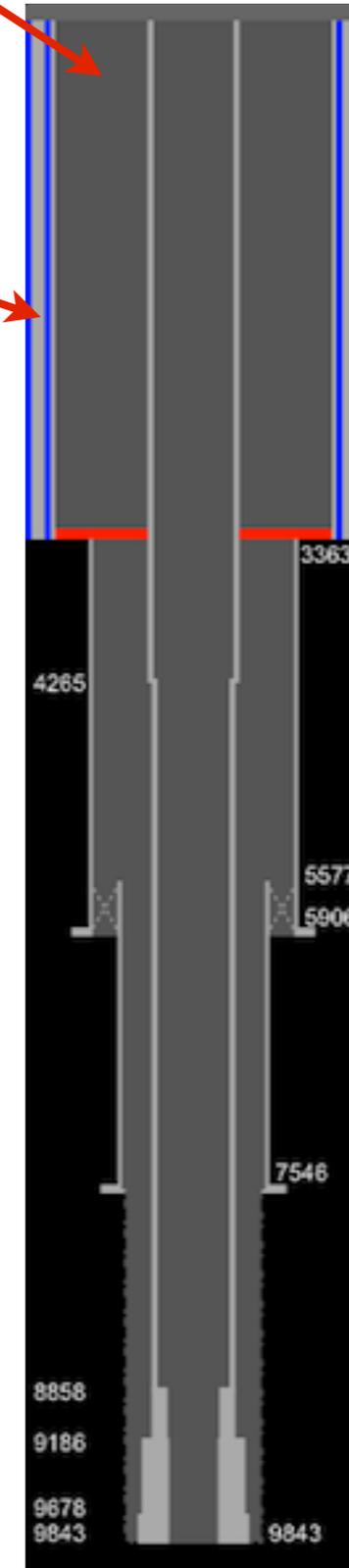
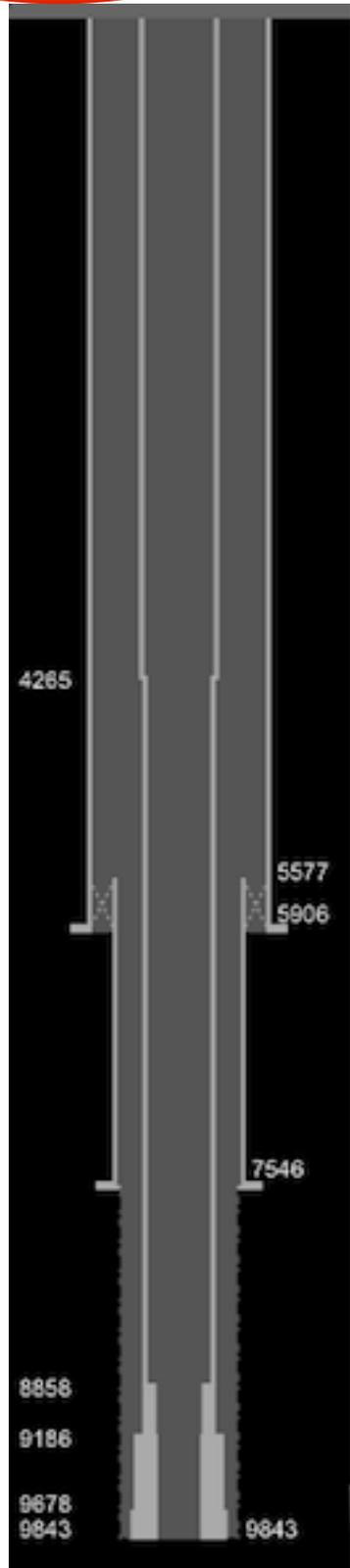




Surface Stack	Subsea Stack
Water depth	3280.84 ft
Riser ID	19.7500 in
Air Gap	82.02 ft
Choke line ID	3.0000 in
Booster line ID	4.0000 in

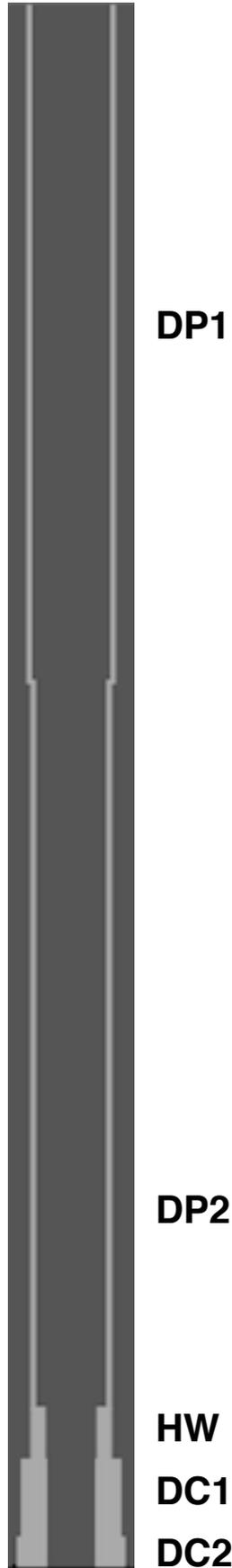


$$\text{BOP Depth} = \text{Water Depth} + \text{Air Gap}$$



The drill string can be configured with:

- 2 types of drill pipes (DP1 and DP2)
- 1 heavy weight drill pipe (HW)
- 2 drill collars (DC1 and DC2)



iPad on **vertical** position

	Length ft	OD in	ID in	Weight lb/ft
DP 1	4265.09	5.5000	4.7780	21.90
DP 2	4593.18	5.0000	4.2760	19.50
HW	328.08	5.0000	3.0000	49.30
DC 1	492.13	6.2500	2.8125	83.90
DC 2	164.04	6.7500	2.8125	101.30
bit depth: 9842.52				

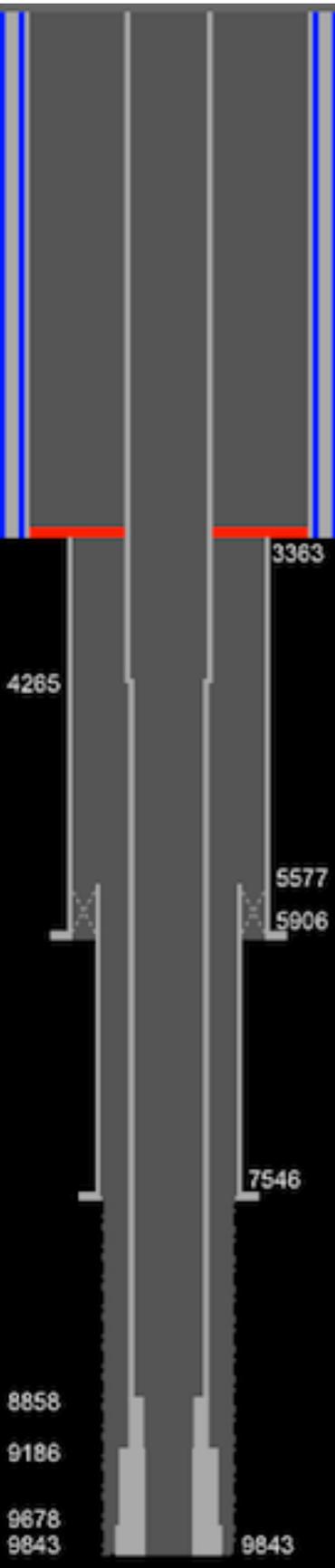
iPad on **Horizontal** position

	Length ft	OD in	ID in
Drill Pipe 1	4265.09	5.5000	4.7780
Drill Pipe 2	4593.18	5.0000	4.2760
Heavy Weight	328.08	5.0000	3.0000
Drill Collar 1	492.13	6.2500	2.8125
Drill Collar 2	164.04	6.7500	2.8125
bit depth: 9842.52			

Note:
The Pipe Nominal Weight Parameter just can be edited with iPad on vertical Position

iPad on **vertical** position

iPad on **Horizontal** position



	Length ft	OD in	ID in	Weight lb/ft	Cap Int bbl/ft	Vol Int bbl	Displac bbl/ft	Vol Steel bbl
DP 1	4265.09	5.5000	4.7780	21.90	0.0222	94.59	0.0072	30.75
DP 2	4593.18	5.0000	4.2760	19.50	0.0178	24.87	0.0065	29.97
HW	328.08	5.0000	3.0000	49.30	0.0087	2.87	0.0155	5.10
DC 1	492.13	6.2500	2.8125	83.90	0.0077	3.78	0.0303	14.89
DC 2	164.04	6.7500	2.8125	101.30	0.0077	1.26	0.0366	6.00
bit depth: 9842.52					Total		184.09	86.71

	Internal			Annulus Drill Pipe 1			Annulus Drill Pipe 2		
	ft	w/o steel bbl/ft	w/ steel bbl	ft	bbl/ft	bbl	ft	bbl/ft	bbl
Riser	3362.86	0.3789	1250.08	3362.86	0.3496	1175.50		0.3547	
Casing	2214.57	0.1497	316.54	902.23	0.1204	108.58	1312.34	0.1255	164.63
Liner	1968.50	0.0745	133.74		0.0451		1968.50	0.0502	98.77
Hole	2296.59	0.0702	126.64		0.0408		1312.34	0.0459	60.24

	Annulus Heavy Weight			Annulus Drill Collar 1			Annulus Drill Collar 2				
	ft	bbl/ft	bbl	ft	bbl/ft	bbl	ft	bbl/ft	bbl		
Riser		0.3547			0.3410			0.3347			
Casing		0.1255			0.1118			0.1055			
Liner		0.0502			0.0365			0.0302			
Hole	328.08	0.0459	15.06	492.13	0.0322	15.87	164.04	0.0259	4.25		
Choke Line	0.0087	bbl/ft	Surface to Bit			186.09	bbl	Surface Equip		2.00	bbl
	29.40	bbl	Bit to BOP			467.41	bbl	Bit to Choke		496.81	bbl

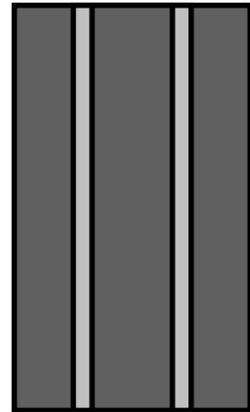
Strokes w/		Surface to Bit		Riser Annular		Choke Line	
MP 1	MP 2	1557	798	9836	3911	246	4157

		in		
Drill Pipe 1	OD	5.5000		
4265.09 ft	ID	4.7780		
Drill Pipe 2	OD	5.0000		
4593.18 ft	ID	4.2760		
Heavy Weight	OD	5.0000		
328.08 ft	ID	3.0000		
Drill Collar 1	OD	6.2500		
492.13 ft	ID	2.8125		
Drill Collar 2	OD	6.7500		
164.04 ft	ID	2.8125		
bit depth: 9842.52				
	Cap Int bbl/ft	Vol Int bbl	Displac bbl/ft	Vol Steel bbl
DP1	0.0222	94.59	0.0072	30.75
DP2	0.0178	24.87	0.0065	29.97
HW	0.0087	2.87	0.0155	5.10
DC1	0.0077	3.78	0.0303	14.89
DC2	0.0077	1.26	0.0366	6.00
Total	184.09			86.71

Internal Volume (just volume of fluid)
Calculated without the steel volume (drill string)

Total Internal Volume
(volume of fluid + volume of steel)

Well bore
←-- ID -->



Drill String
ID

	Internal	w/o steel	w/ steel
	ft	bbbl/ft	bbbl
Riser	3362.86	0.3789	1250.08
Casing	2214.57	0.1497	316.54
Liner	1968.50	0.0745	133.74
Hole	2296.59	0.0702	126.64

Well bore
←-- ID -->



	Internal	w/o steel	w/ steel
	ft	bbbl/ft	bbbl
Riser	3362.86	0.3789	1274.33
Casing	2214.57	0.1497	331.60
Liner	1968.50	0.0745	146.58
Hole	2296.59	0.0702	161.20

Strokes with Mud Pump #1

Strokes w/		Surface to Bit	Riser Annular	Choke Line
MP 1	MP 2	1557	9836	246
		Bit to Shoe	Bit to BOP	Bit to Choke
		798	3911	4157

Strokes with Mud Pump #2

Strokes w/		Surface to Bit	Riser Annular	Choke Line
MP 1	MP 2	1573	9939	249
		Bit to Shoe	Bit to BOP	Bit to Choke
		807	3952	4201

This app works just with parameters used in the hydraulics calculations:

→ **Mud Weight, Plastic Viscosity, Yield Point and Initial Gel**

Mud Weight	9.60 ppg	MW Gradient	0.4987 psi/ft
Plastic Viscosity	15.0 cP	Yield Point	10.0 lb/100ft ²
Initial Gel	5.0 lb/100ft ²		
Rheological Model	Power	Bingham	
Leak-Off Test at Shoe Depth			
Absorption Gradient	11.80 ppg	0.6130 psi/ft	
Fracture Gradient	12.00 ppg	0.6234 psi/ft	
Porosity	35.0 %	Permeability	300 mD
Temperature Gradient	1.400 F/100ft		
Surface Temperature	28.0 °C	82.4 °F	301.1 K 542.0 R
Sea Mudline Temperature	4.0 °C	39.2 °F	277.1 K 498.9 R
Buoyancy Factor	0.8534		
Shoe Depth Hydrostatic	3763.2 psi		
Absorption Pressure	4625.6 psi		
Fracture Pressure	4704.0 psi		
Bottom Hole Hydrostatic	4908.5 psi		
Bottom Hole Temperature	54.4 °C	129.9 °F	327.5 K 589.6 R

Temperature Gradient	1.400 F/100ft
Surface Temperature	28.0 °C 82.4 °F 301.1 K 542.0 R
Sea Mudline Temperature	4.0 °C 39.2 °F 277.1 K 498.9 R

iPad on **Horizontal** Position

← iPad on **Vertical** Position

Absorption Gradient:

For use with this “Drilling Simulator” app, normally:

Absorption Gradient = Fracture Gradient

This parameter is used just for compatibility with the apps "Well Control Simulator" and "LOT Simulator".

The parameters marked with * are used just for compatibility with the app "Well Control Simulator".

Note: This simulator does not allow circulation through the choke.

Mud Pump #3:

The same parameters of the mud pump #2. It is used to **Booster Line** of the riser (Subsea only).

* Choke Diameter, Max in

* Choke Coefficient %

Maximum BOP Pressure psi

Active Pit Volume bbl

Surface Circulation Volume:

Circ. by flowline @ 100 spm bbl

* **Circ. by choke @ 40 spm** bbl

* for compatibility with the app "Well Control Simulator"

BIT NOZZLES

Coefficient

Total Flow Area sq.in

	Qty.	Size (1/32) in	cm
<input type="range"/>	<input type="text" value="1"/>	<input type="text" value="12"/>	<input type="text" value="0.9525"/>
<input type="range"/>	<input type="text" value="1"/>	<input type="text" value="12"/>	<input type="text" value="0.9525"/>
<input type="range"/>	<input type="text" value="1"/>	<input type="text" value="12"/>	<input type="text" value="0.9525"/>
<input type="range"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0.0000"/>

Equipments

MUD PUMPS	#1	#2 / #3 **	
Liner diameter	<input type="text" value="6.5000"/>	<input type="text" value="6.5000"/>	in
Max Pressure	<input type="text" value="4200.0"/>	<input type="text" value="4200.0"/>	psi
Piston Length	<input type="text" value="12.0000"/>	<input type="text" value="12.0000"/>	in
Piston diameter	<input type="text" value="2.5"/>	<input type="text" value="2.5"/>	in
Power	<input type="text" value="1600"/>	<input type="text" value="1600"/>	hp
Efficiency	<input type="text" value="97.0"/>	<input type="text" value="97.0"/>	%
Pump Type	<input type="button" value="Triplex"/> <input type="button" value="Duplex"/>	<input type="button" value="Triplex"/> <input type="button" value="Duplex"/>	
Maximum Speed	<input type="text" value="120"/>	<input type="text" value="120"/>	spm
Discharge volume	<input type="text" value="0.1195"/>	<input type="text" value="0.1195"/>	bbl/stk
<small>(true pump output)</small>	<input type="text" value="5.0192"/>	<input type="text" value="5.0192"/>	gal/stk

** Mud Pump #3 used to Booster Line of the riser (Subsea only).

SURFACE CONNECTIONS

	Length ft	ID in
Stand pipe	<input type="text" value="49.21"/>	<input type="text" value="4.0000"/>
Hose	<input type="text" value="59.06"/>	<input type="text" value="3.0000"/>
Swivel	<input type="text" value="6.56"/>	<input type="text" value="3.0000"/>
Kelly	<input type="text" value="42.65"/>	<input type="text" value="4.0000"/>
Volume *	<input type="text" value="2.00"/>	<input type="text" value="bbl"/>

* Volume included on drill string strokes.

Elevation System Weight

	<input type="text" value="120"/>	kip
DS Nominal Weight	<input type="text" value="257.1"/>	kip
DS w/ Buoyancy	<input type="text" value="219.4"/>	kip
Hook Load	<input type="text" value="339.4"/>	kip

Surface Connections and Elevation System:
Just visible with iPad on horizontal position

About the Surface Circulation Volume (SCV):

Surface Circulation Volume = Volume of the flow line, pipes, etc when circulating at the surface.

When occur a kick on the drilling, the driller stops the mud pump and the "Surface Circulation Volume" return to tank.

The calculation of the real volume of the kick = Static Vol. after shut-in the well - Dynamic Volume on drilling - Surface Circulation Volume.

Surface Circulation Volume:

Circ. by flowline @ 100 spm bbl

Example: Static Volume (mud pump stopped) = 100 bbl
 Drilling with mud pump @ 100 spm => Dynamic Volume = 70 bbl

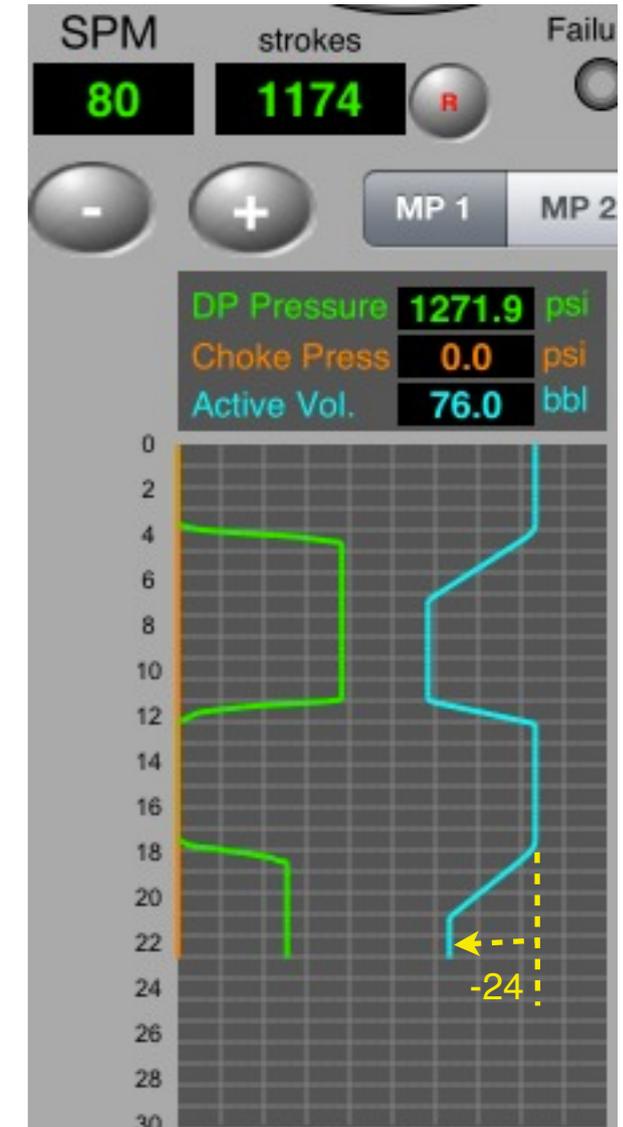
- Surface Circulation Volume @ 100 spm = 30 bbl
- Shut-in the well => pit volume = 110 bbl
- Kick Volume = 110 - 70 - 30 = 10 bbl

SPM = 0 (mud pump stopped)
 Active Volume = 100 bbl
 SCV = 0 bbl

SPM = 100
 Dynamic Volume = 70 bbl
 SCV = 30 bbl

SPM = 0
 Static Volume = 100 bbl
 SCV = 0 bbl

SPM = 80
 Dynamic Volume = 76 bbl
 SCV = 24 bbl



Formation #1 →

Formation #2 →

Formation #3 →

Formation #4 →



Set 4 parameters for each formation:

- Height
- Pore Equivalent Weight
- Soft <--> Hard to drill
- Fluid Density in the formation

Note:

Fluid Density minimum = 8.50 ppg to the formations 1, 2 and 3

Only to the formation #4:

Fluid Density \geq 1.0 ppg

Formations

data file:

Formation	Height (ft)	Pore Equiv. Weight (ppg)	Fluid Density (ppg)	Soft to Hard
F1	3.04	9.20	8.50	Soft
F2	3.29	9.40	8.50	Hard
F3	3.21	9.50	8.50	Hard
F4	8.20	10.75	2.00	Hard



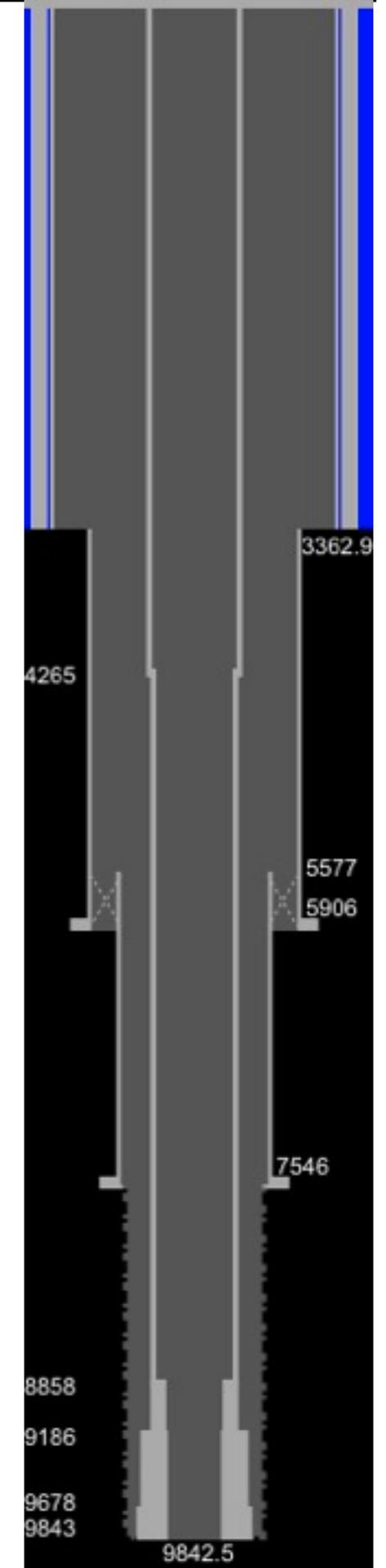
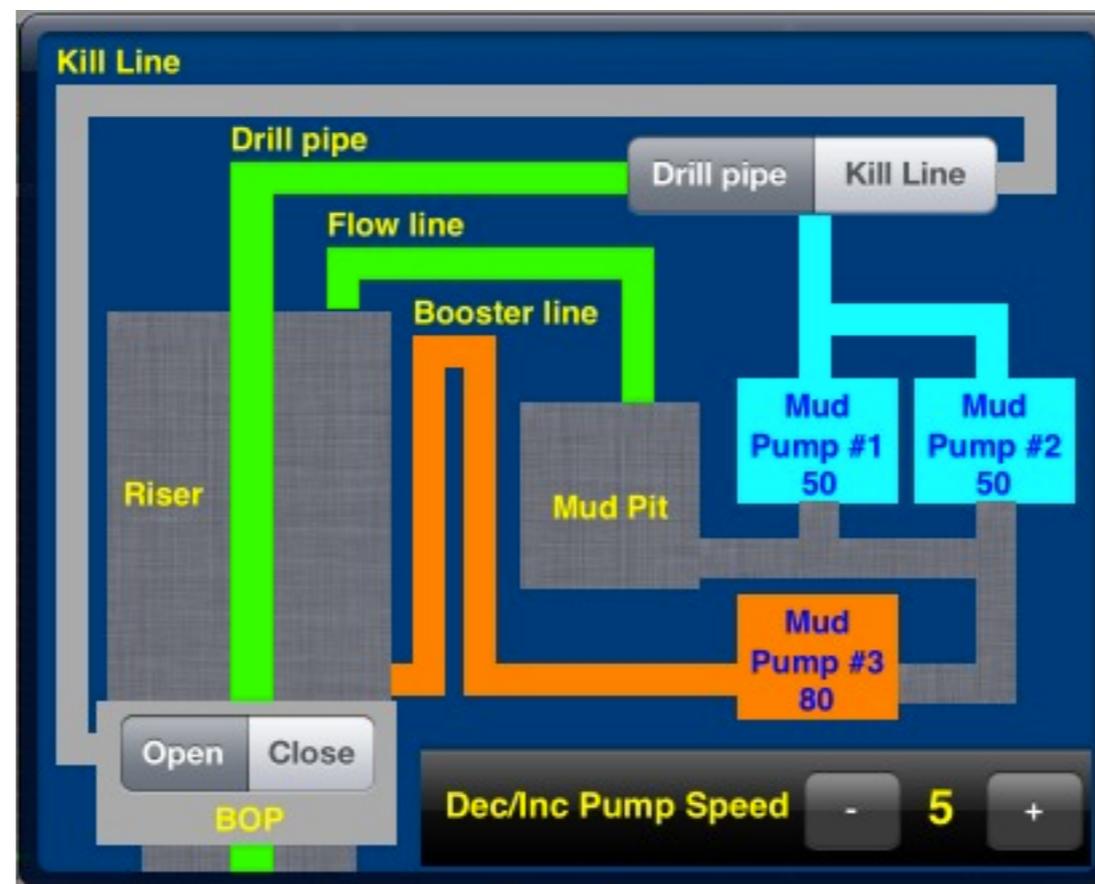
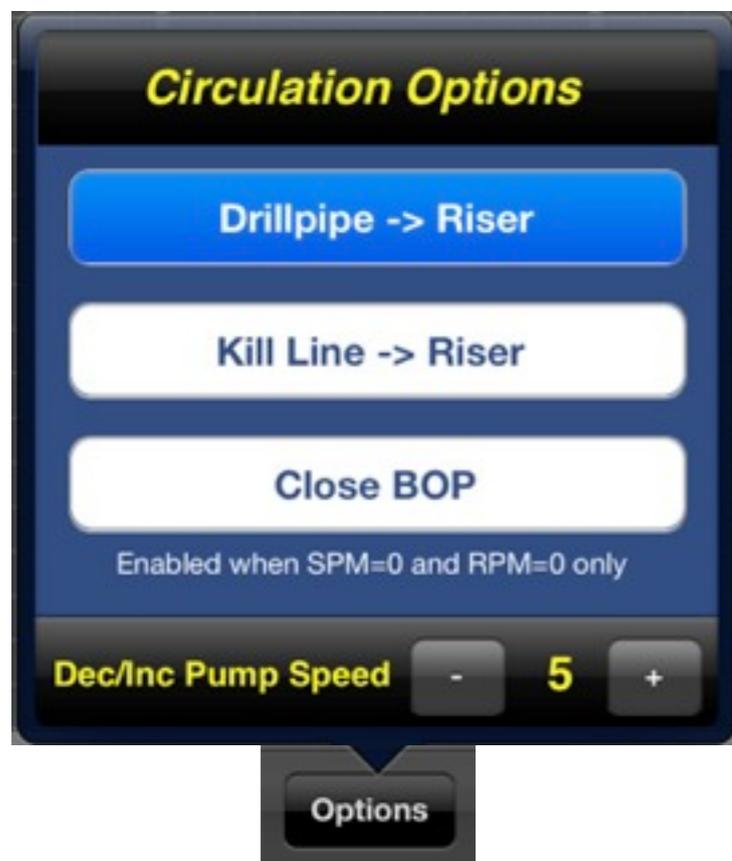
Tap on “**Options**” button on toolbar to select a circulation option:

- 1) Drill pipe -> Flow line (“Riser” on subsea): **circulation option for drilling**
- 2) Kill Line -> Flow Line (“Riser” on subsea): circulation option for pressure losses in kill / choke lines
- 3) Close BOP: No Circulation: option to shut-in the well after to detect kick and to wait stabilization of the pressures (SIDPP and SICP)

Note: This simulator does not allow circulation through the choke.

It is possible to use two mud pumps in parallel (MP #1 and MP #2)

The MP #3 is used to **Booster Line** of the riser (Subsea only) during the drilling to increase the flow in the riser.



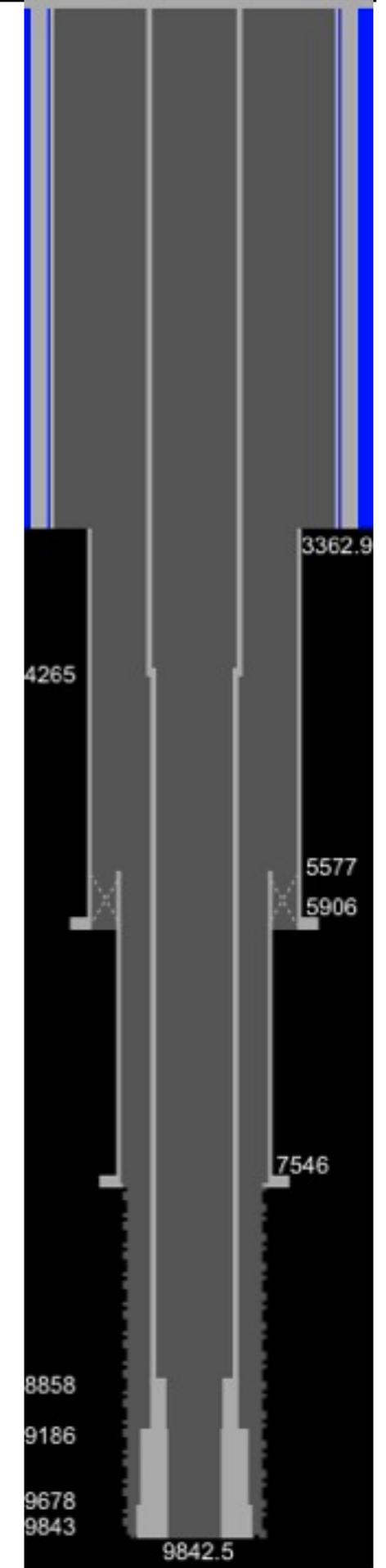
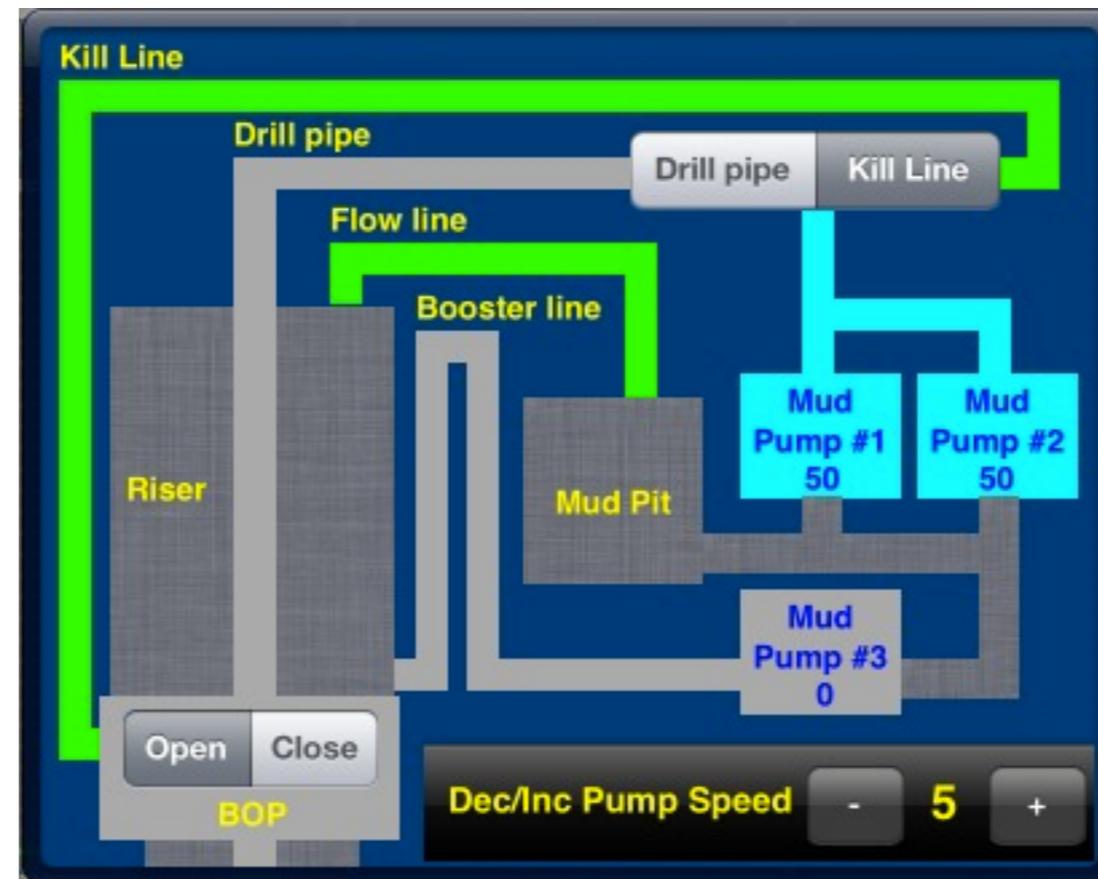
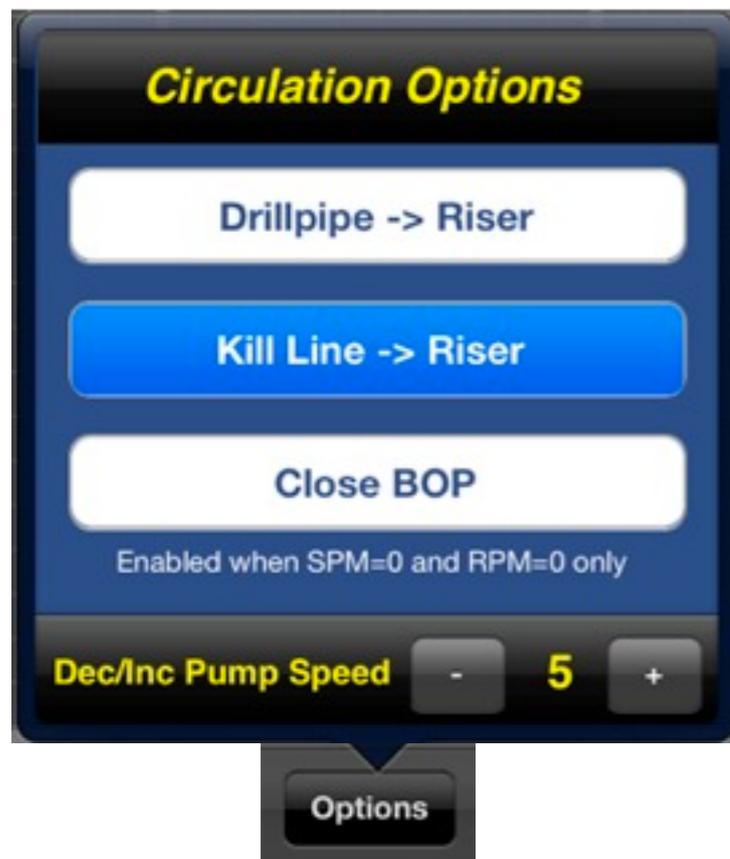
Tap on “Options” button on toolbar to select a circulation option:

- 1) Drill pipe -> Flow line (“Riser” on subsea): circulation option for drilling
- 2) Kill Line -> Flow Line (“Riser” on subsea): **circulation option for pressure losses in kill / choke lines**
- 3) Close BOP: No Circulation: option to shut-in the well after to detect kick and to wait the stabilization of the pressures (SIDPP and SICP)

Note: This simulator does not allow circulation through the choke.

To register the pressure losses in kill / choke lines (subsea only), normally is circulated through the kill line returning by riser (flow line) with the mud pump in the kill rate speed.

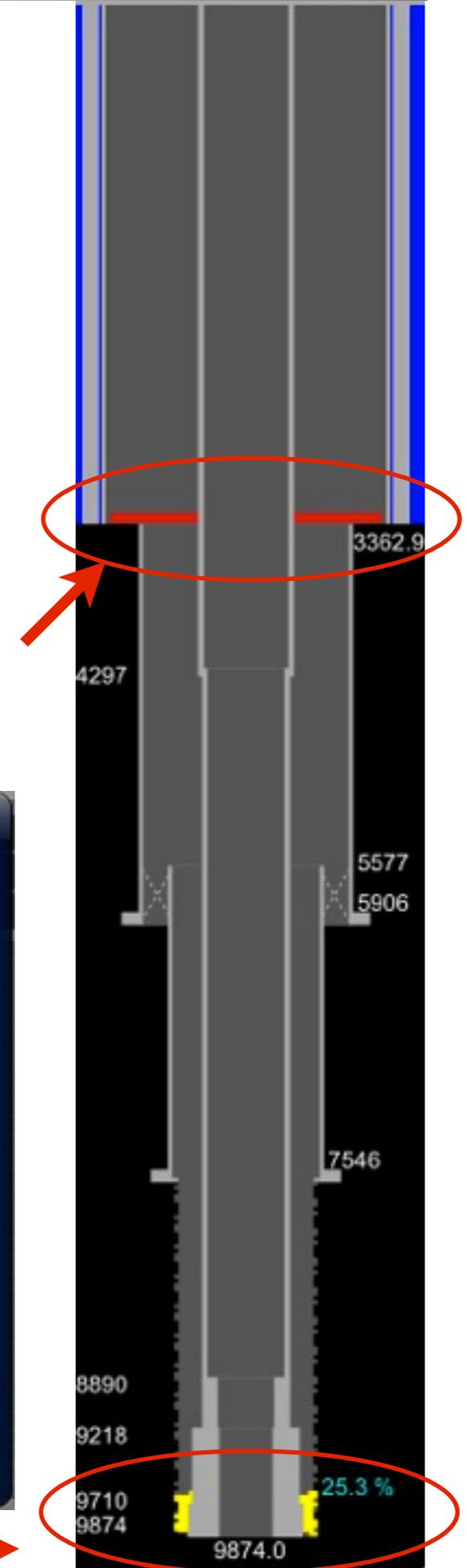
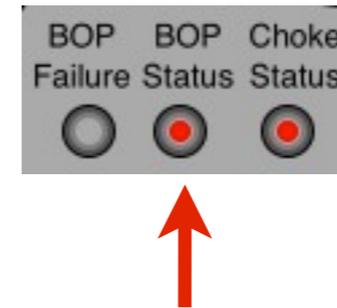
Kill Pump Pressure => Pressure Loss in Choke line (normally this lines have the same ID) and the pressure losses in the riser are close to zero.



Tap on “Options” button on toolbar to select a circulation option:

- 1) Drill pipe -> Flow line (“Riser” on subsea): circulation option for drilling
- 2) Kill Line -> Flow Line (“Riser” on subsea): circulation option for pressure losses in kill / choke lines
- 3) Close BOP: No Circulation: **option to shut-in the well after to detect kick and to wait the stabilization of the pressures (SIDPP and SICP)**

Note: This simulator does not allow circulation through the choke.



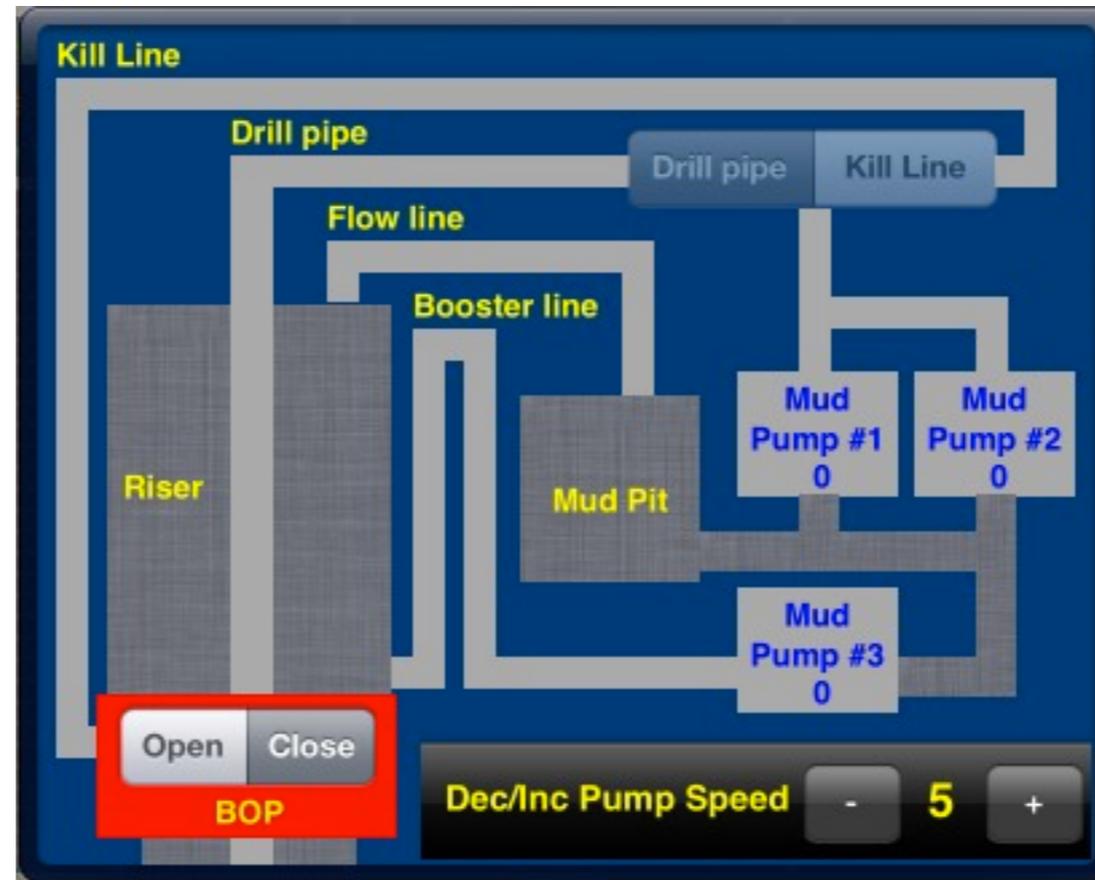
Circulation Options

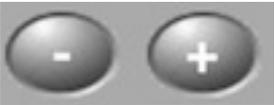
- Drillpipe -> Riser
- Kill Line -> Riser
- Close BOP**

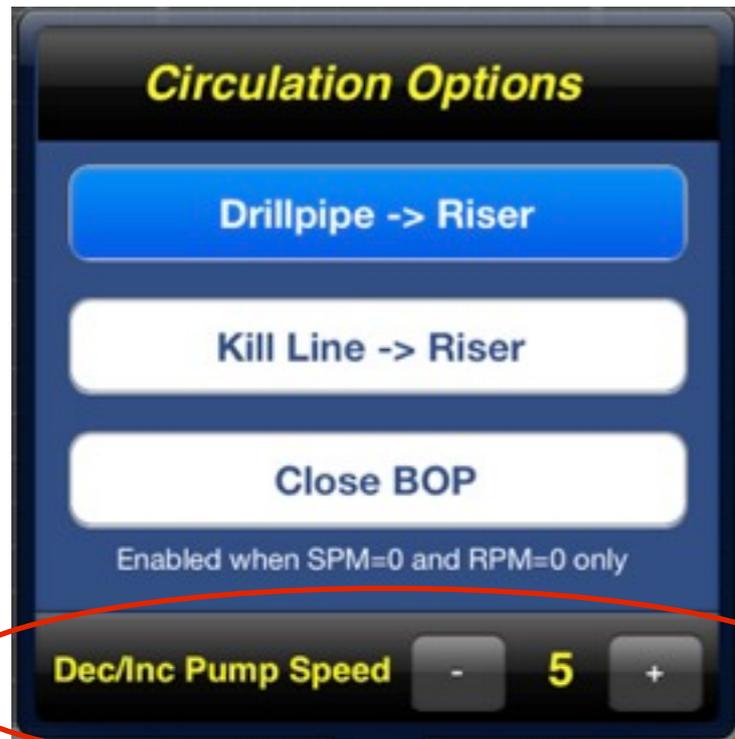
Enabled when SPM=0 and RPM=0 only

Dec/Inc Pump Speed - 5 +

Options



Tap on  buttons to set the pump speed for each mud pump:

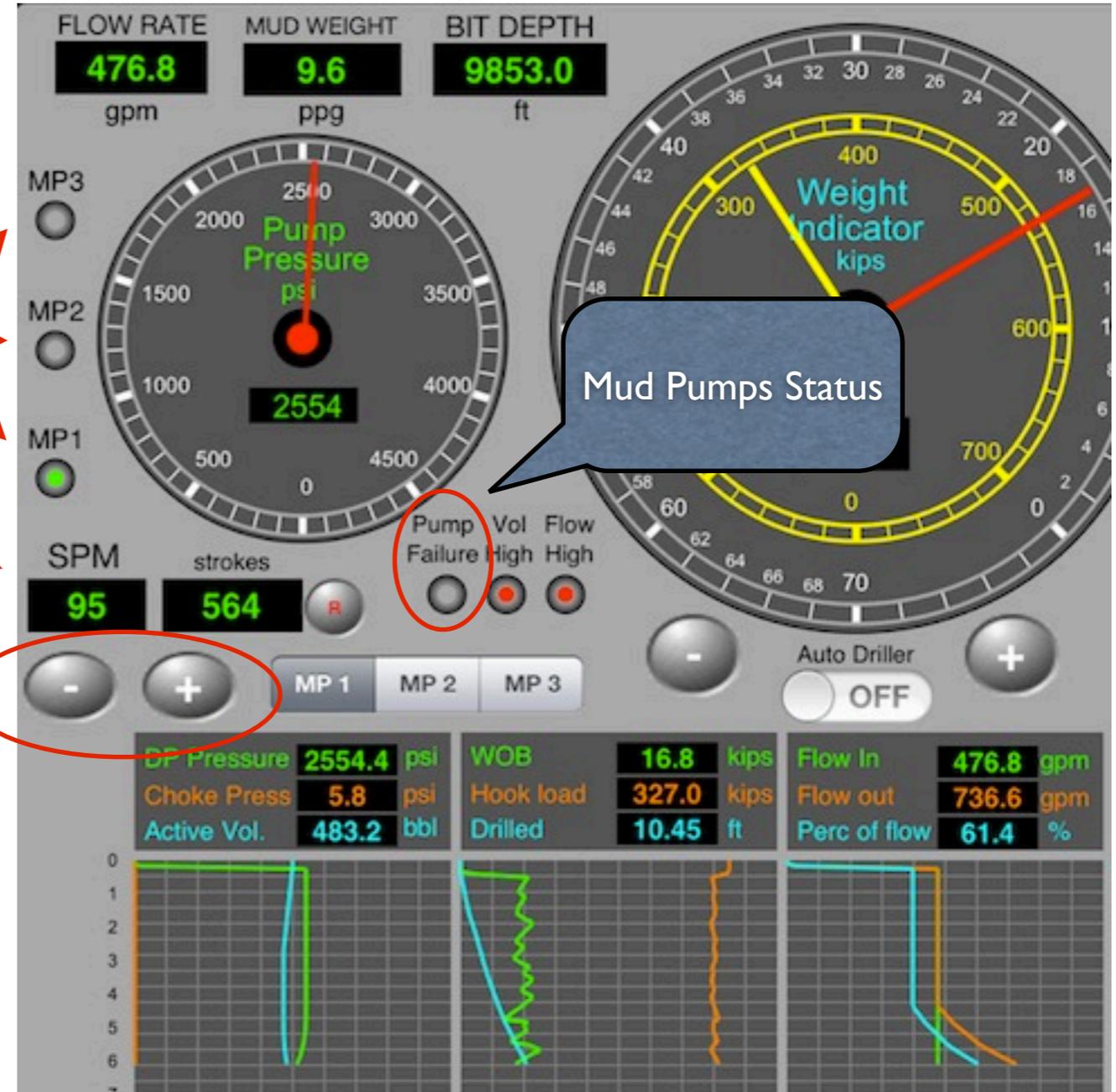


Set the decrement / increment of the pump speed for adjust on buttons. Default: 5 spm

Flow Rate →

Mud Pump SELECTED →

SPM and Strokes with "Reset" button →



Mud Pumps Status



Manometer:

Always shows the pump pressure of the mud pumps #1 and #2 in parallel.

Booster Line (Mud Pump #3):

The pump pressure and pressure losses in booster line are not shown in this application.

↑
Drill pipe pressure
Choke pressure
Active volume

↑
Flow in
Flow out
Percent of flow on the flow line (relative value)

Tap on "Alarms" button to set alarms for kick detection and to reset failure alarms like failure on the mud pump #2 (for example)

Flow In: 476.8 gpm
Flow out: 724.6 gpm
Perc of flow: 60.4 %

Increment of volume on the mud pit > 5 bbl

Increment of flow on the flow line > 500 gpm

The diagram shows a wellbore with a red circle highlighting a section of the flow line.

MP3
MP2
MP1

Pump Pressure psi: 1025

SPM: 80
strokes: 2565

Pump Failure High High

failure on mud pump #2

The gauge shows a red needle pointing to 1025 psi. The MP2 control panel has a red indicator light.

Set/Reset Alarms

Maximum Pit Gain: 5.0 bbl
0 ————— 20

Maximum Flow Out: 500 gpm
0 ————— 1000

Pump 1 Pump 2 BOP Kick Fracture

Alarms

Set/Reset Alarms

Maximum Pit Gain: 5.0 bbl
0 ————— 20

Maximum Flow Out: 500 gpm
0 ————— 1000

Pump 1 **Pump 2** BOP Kick Fracture

Alarms

Reset failure on mud pump #2

Tap on “**Graph**” button on toolbar to set the maximum values for the geolograph

With iPad on horizontal position, the graph show 15 min on graph

and 30 min on vertical position

Until the 15 min on simulation, there is no problem for both positions.

Graph Historical:

This app works with the last 120 min of simulation. After 120 min, occur a shift from begin.

Reset Graph:

Tap on “Reset Graph” button to reset just the graph.

Attention:

The current graph data will be lost !



Graph Maximum Values

Pressure	<input type="text" value="5000"/>	psi	Flow Rate	<input type="text" value="1000"/>	gpm
Active Volume	<input type="text" value="1000"/>	bbl	Drilled	<input type="text" value="50"/>	ft
Weight On Bit	<input type="text" value="100"/>	kips	Drilling Rate	<input type="text" value="150"/>	ft/h
Hook Load	<input type="text" value="400"/>	kips	Rotary Speed	<input type="text" value="120"/>	rpm

Time to min

OFF Auto Time +3 minutes

Instruments Scale

Max Manometer Pressure	<input type="button" value="1000"/>	<input type="button" value="2000"/>	<input type="button" value="3000"/>	<input type="button" value="5000"/>	<input type="button" value="10000"/>	psi
Max on Weight Indicator	<input type="button" value="200"/>	<input type="button" value="400"/>	<input type="button" value="800"/>	<input type="button" value="1200"/>	kips	

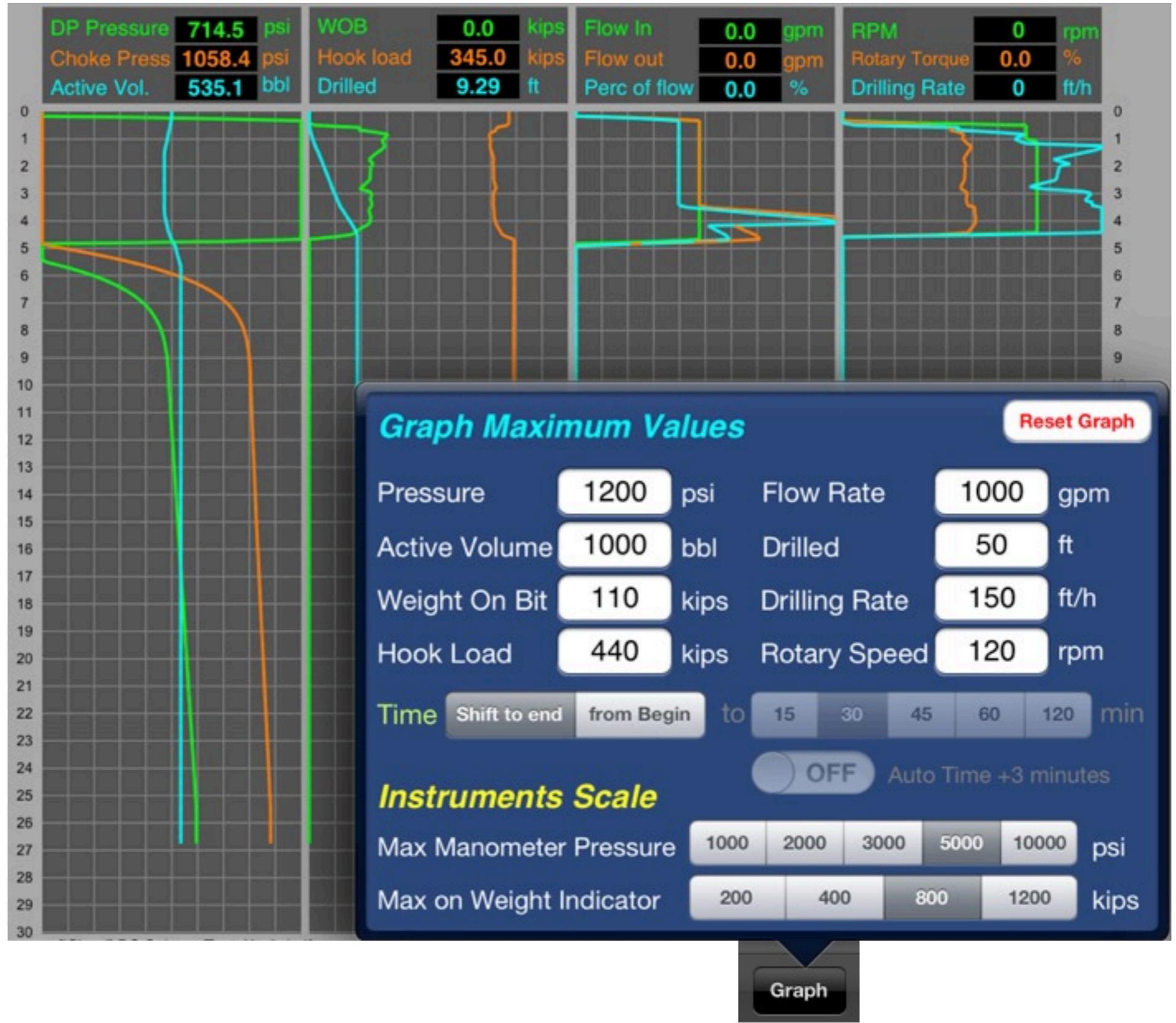


Tap on “**Graph**” button on toolbar to set the maximum values for the geolograph

With iPad on horizontal position, the graph show 15 min on graph

and 30 min on vertical position

Until the 15 min on simulation, there is no problem for both positions.



For a interval > 15 min on simulation, rotate iPad to vertical position or select Time on Graph to "from Begin" to 30, 45, 60 or 120 min

Graph Maximum Values Reset Graph

Pressure	1200	psi	Flow Rate	1000	gpm
Active Volume	1000	bbl	Drilled	50	ft
Weight On Bit	110	kips	Drilling Rate	150	ft/h
Hook Load	440	kips	Rotary Speed	120	rpm

Time Shift to end **from Begin** to 15 30 45 60 120 min

Instruments Scale

Max Manometer Pressure 1000 2000 3000 **5000** 10000 psi

Max on Weight Indicator 200 400 **800** 1200 kips

OFF Auto Time +3 minutes

Graph

to 30 min selected

Autotime:

Set this switch to **ON** to set a automatic increment of 3 min on graph. It is enabled only when **Time** is selected "**from Begin**".

Set the instruments scale for Pump Pressure Manometer and Weight Indicator

Example:

Manometer: 0 to **3000** psi

Weight Indicator: 0 to **400** kips



Graph Maximum Values

Reset Graph

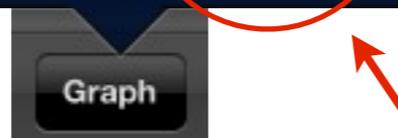
Pressure	5000	psi	Flow Rate	1000	gpm
Active Volume	300	bbl	Drilled	66	ft
Weight On Bit	100	kips	Drilling Rate	164	ft/h
Hook Load	400	kips	Rotary Speed	120	rpm

Time: to min

Auto Time +3 minutes

Instruments Scale

Max Manometer Pressure	1000	2000	3000	5000	10000	psi
Max on Weight Indicator	200	400	800	1200	kips	

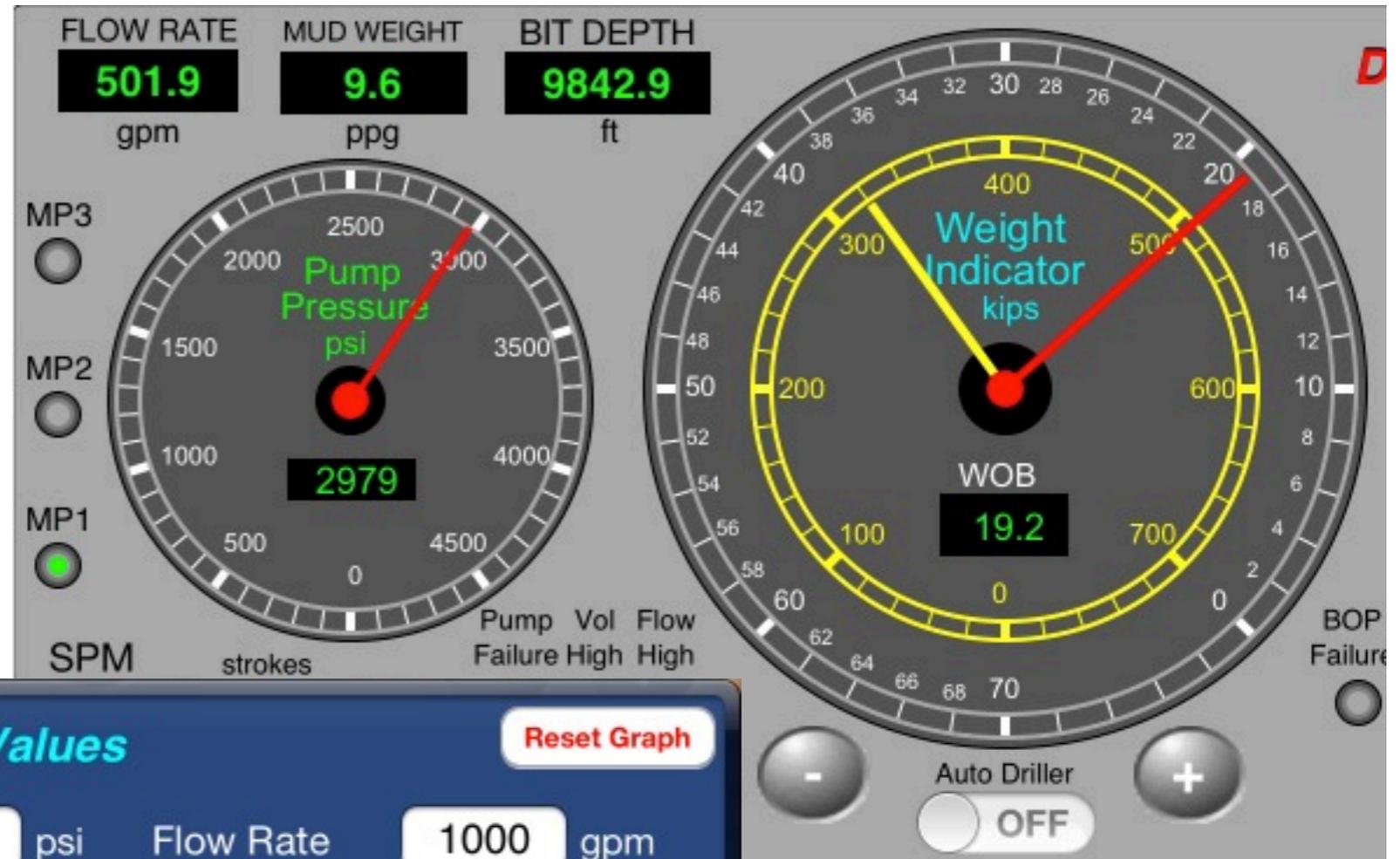


Set the instruments scale for Pump Pressure Manometer and Weight Indicator

Example:

Manometer: 0 to **5000** psi

Weight Indicator: 0 to **800** kips



Graph Maximum Values

Reset Graph

Pressure	5000	psi	Flow Rate	1000	gpm
Active Volume	1000	bbl	Drilled	50	ft
Weight On Bit	100	kips	Drilling Rate	150	ft/h
Hook Load	400	kips	Rotary Speed	120	rpm

Time: to min

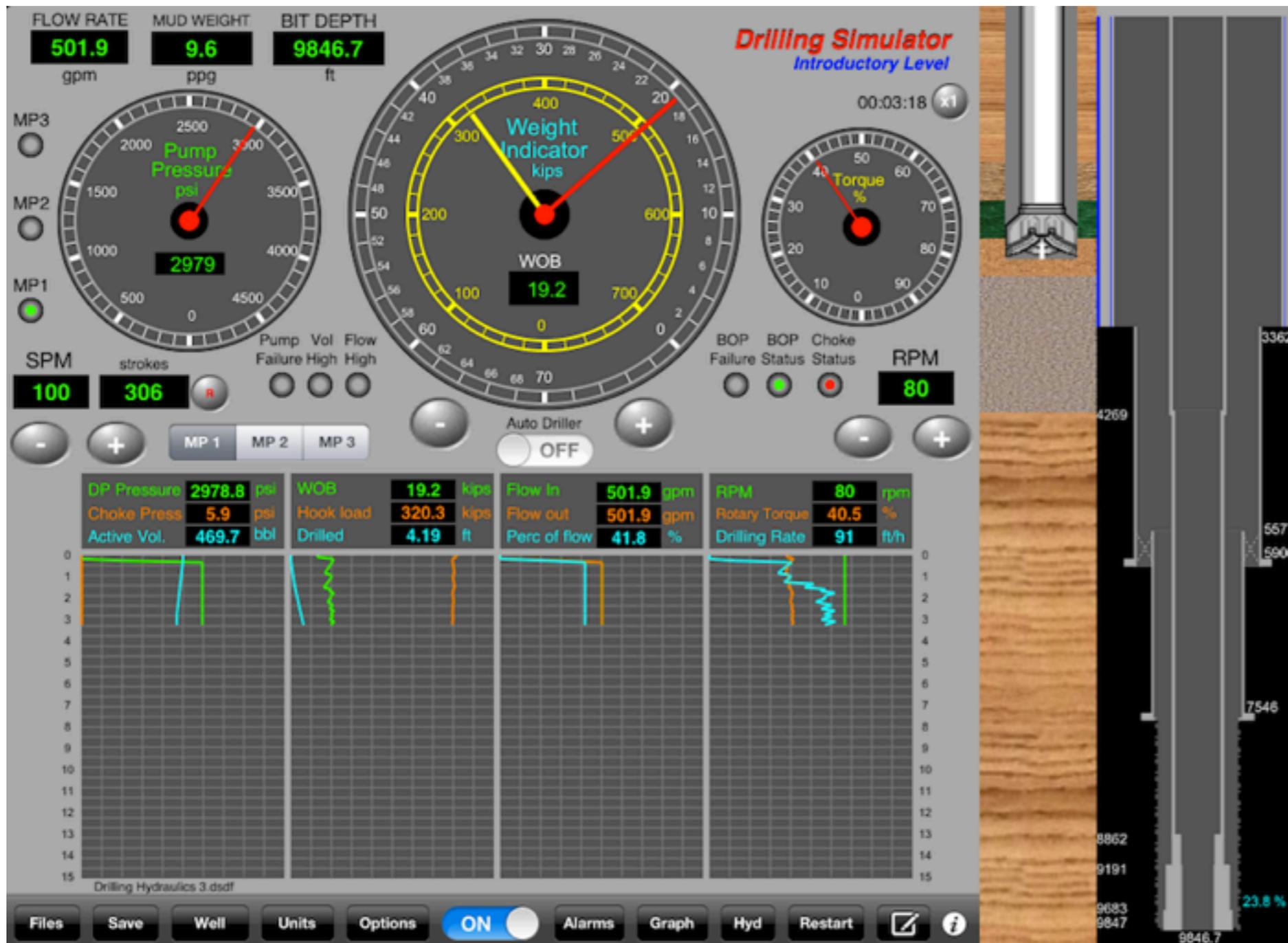
Auto Time +3 minutes

Instruments Scale

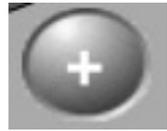
Max Manometer Pressure	1000	2000	3000	5000	10000	psi
Max on Weight Indicator	200	400	800	1200	kips	

Graph

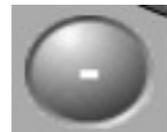




- Moving the Drill String
- Auto Driller
- Hydraulics and Neutral Line
- Kick Detection
- Shut-in the Well
- Stabilization of the Pressures
- Save on iCloud
- Importing by WC Simulator
- The Driller's Method
- The Wait and Weight Method
- Fracture on Shoe Depth
- Underground Blowout
- Blowout

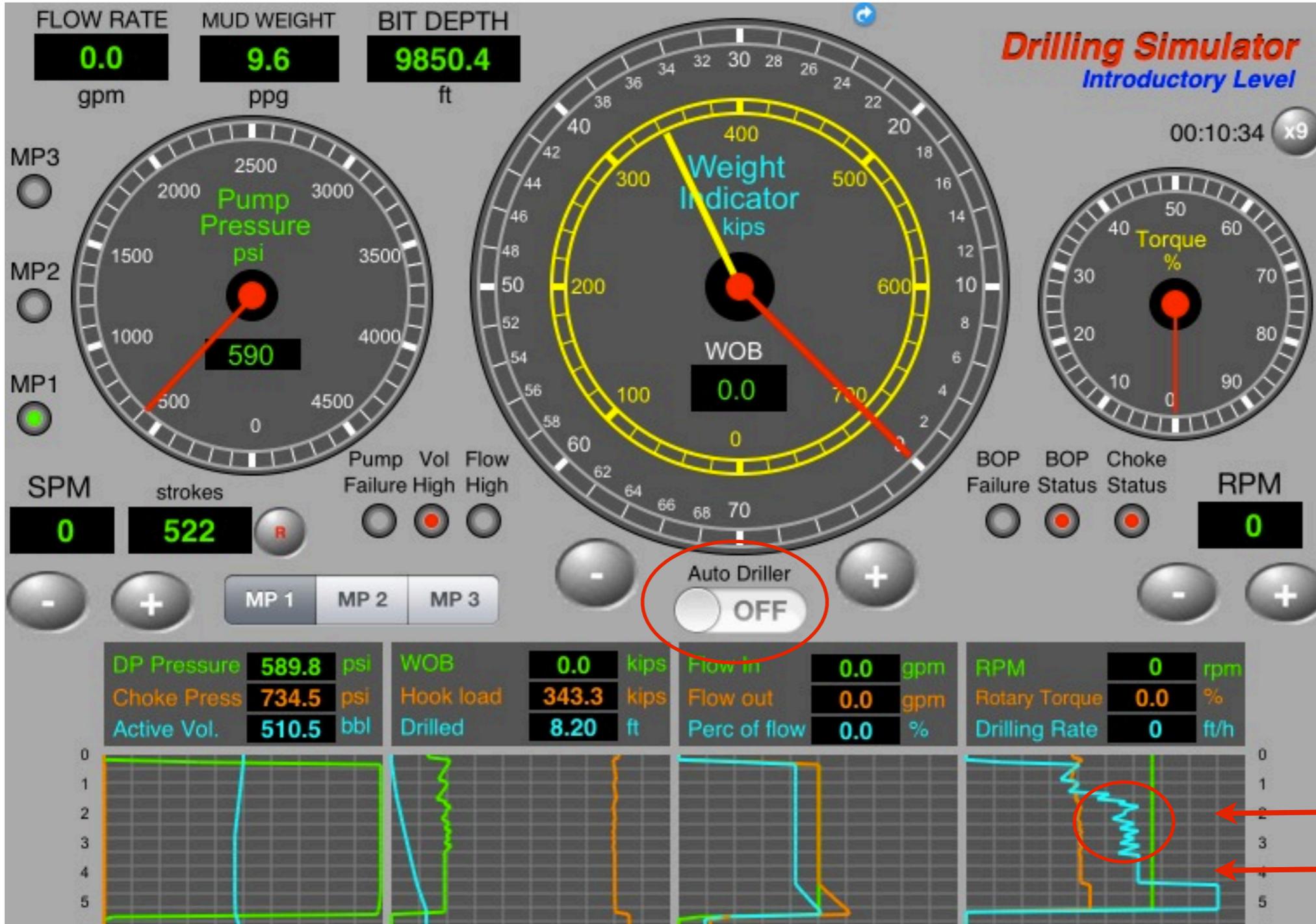


Use the button [+] to move down the drill string. When the drill bit reaches on the bottom hole, the WOB (weight on bit) increases.



Use the button [-] to decrement the WOB. When WOB = 0, the drill string is moved to up (off the bottom)





Auto Driller:

With:



The WOB is constant. Change automatically to Off if to tap on the buttons - / +



Without:



It is necessary to tap on buttons - / + to maintain the WOB.

Without Auto Driller.

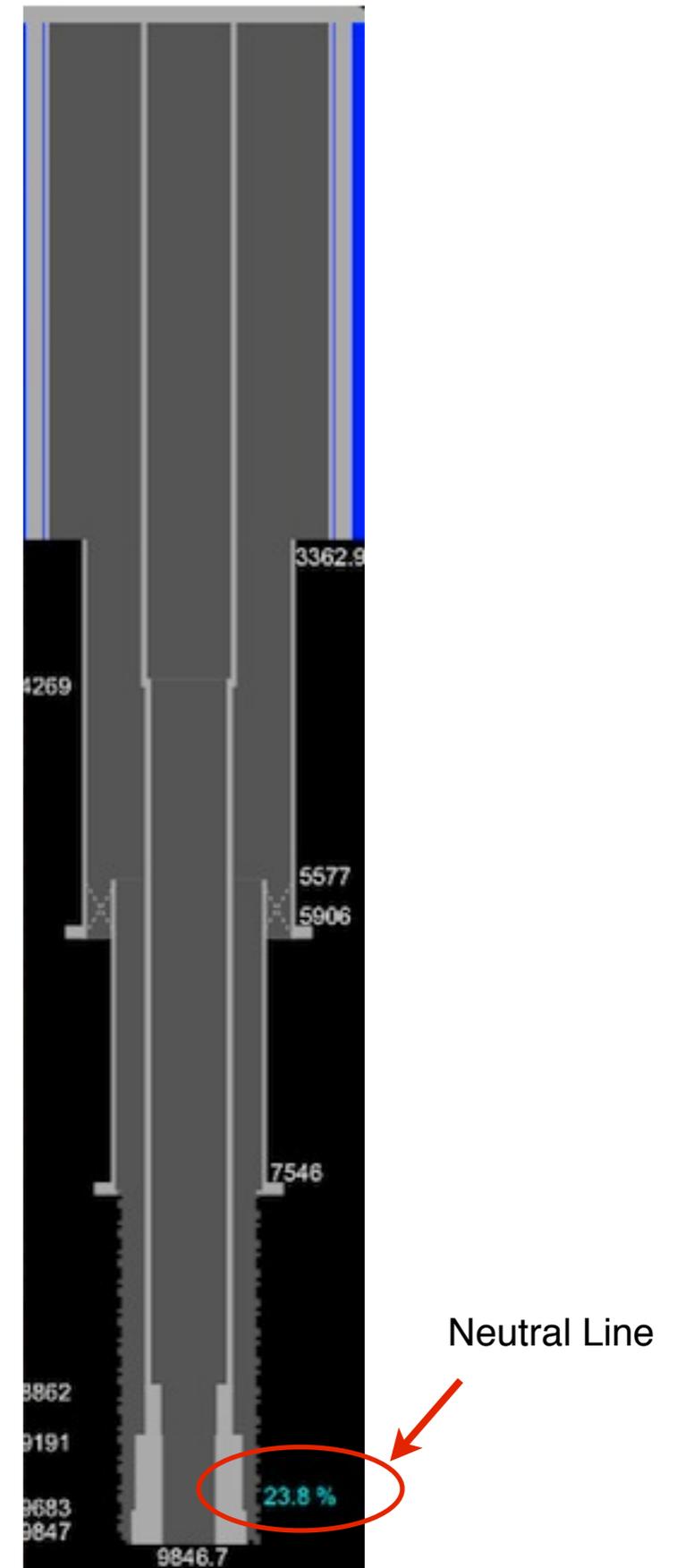
With Auto Driller.

Tap on “Hyd” button to show the Hydraulics View.

- Mud Pumps Informations
- Bottoms-up time
- Drill bit parameters
- System friction losses
- Hydrostatics and Critical Pressure on choke and BOP
- ECD on shoe depth and bottom hole
- Show critical density on shoe (fracture) and the bottom (influx)

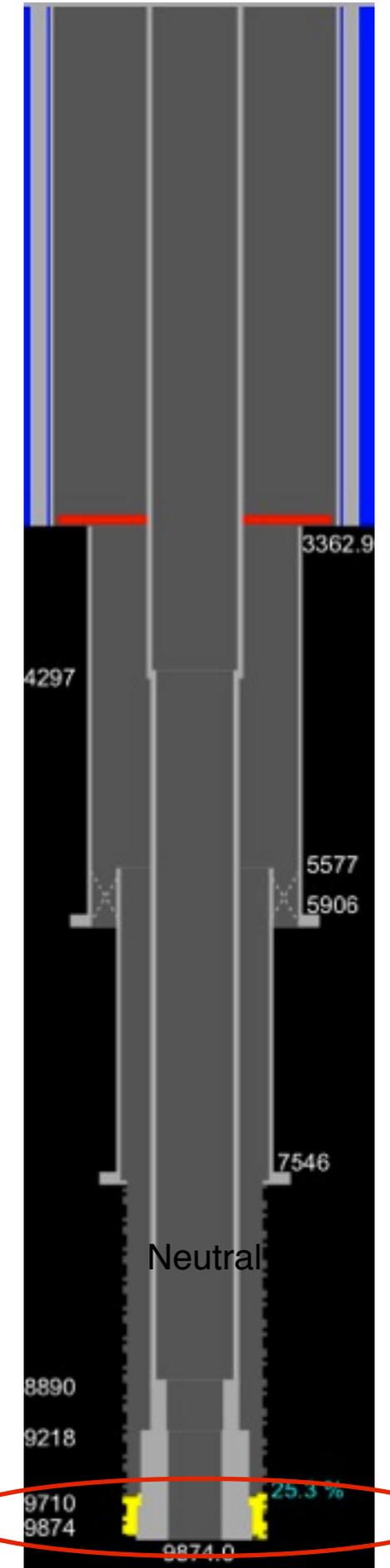
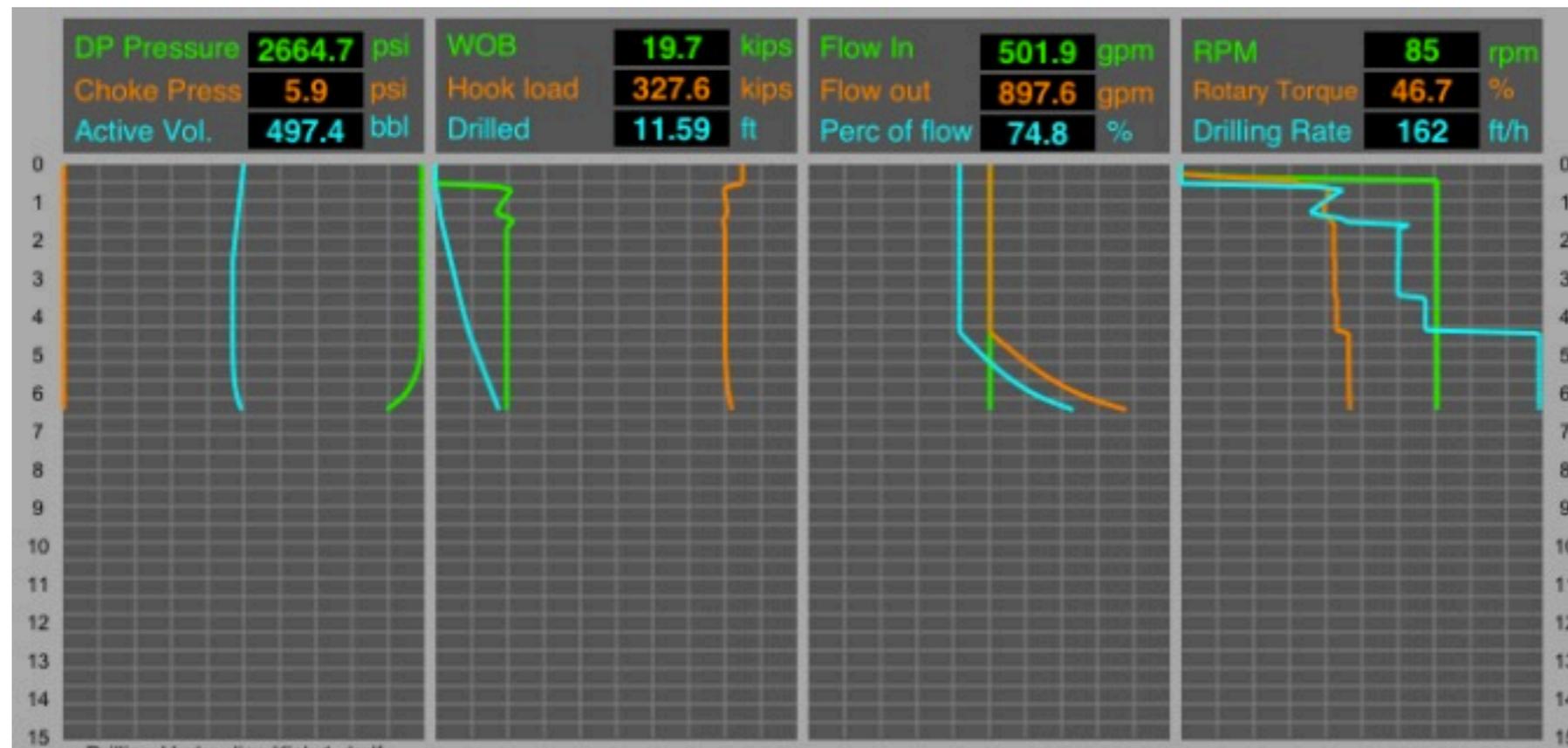
MP 1	100.0	spm	MP 2	0.0	spm	MP 3	0.0	spm
Flow	501.9	gpm	Flow	0.0	gpm	Flow	0.0	gpm
Bottoms-up time		129	min	System Losses				
Drill Bit	Flow Rate	501.9	gpm	Surface	27.4	psi		
Nozzles Loss		2029.1	psi	Drill string	807.8	psi		
HHP / Sq. Inch		10.5	hp/sq.in	Annulus	115.6	psi		
Perc Nozzles Loss		68.1	%	Riser	5.9	psi		
Jet Velocity		486.1	ft/s	TOTAL	950.8	psi		
Force of Impact		1208.6	lbf	Percent	31.9	%		
Drill string Hydrorst		4908.5	psi	Max. Choke Pressure		892.3	psi	
BOP Pressure		1683.0	psi	Max. BOP Pressure		5000.0	psi	
	Depth	Hydrost	Friction	Pressure	ECD	Critical		
	ft	psi	psi	psi	ppg	ppg		
Shoe Depth	7545.9	3763.2	54.5	3817.6	9.74	12.00		
Bottom Hole	9842.5	4908.5	115.6	5024.0	9.83	9.50		

Hyd



The following kick indications can be observed in the graph during the drilling:

- Increase in the pit volume (active tank)
- Decrease in the pump pressure
- Increase in the hook load
- Increase in the flow out
- Increase in the percent of flow
- Increase in the rotary torque
- Increase in the drilling rate



Set RPM=0, SPM=0, WOB=0 and Tap on "Options" button on toolbar and select "Close BOP" button:

The screenshot displays the 'Drilling Simulator Introductory Level' interface. At the top, three gauges show Flow Rate (0.0 gpm), Mud Weight (9.6 ppg), and Bit Depth (9862.0 ft). Below these are three larger gauges: Pump Pressure (0 psi), Weight Indicator (0.0 kips), and Torque (0%). The SPM gauge shows 645 strokes. The 'BOP Status' indicator is highlighted with a red circle and an arrow, indicating it is active. The RPM gauge shows 0. The 'Auto Driller' is set to OFF. A data table at the bottom left provides a summary of key parameters:

Parameter	Value	Unit
DP Pressure	0.0	psi
Choke Press	0.0	psi
Active Vol.	503.3	bbl
WOB	0.0	kips
Hook load	347.7	kips
Drilled	11.59	ft
Flow In	0.0	gpm
Flow out	406.8	gpm
Perc of flow	33.9	%
RPM	0	rpm
Rotary Torque	0.0	%
Drilling Rate	0	ft/h

Below the data table are three line graphs showing the history of these parameters over 15 minutes. On the right, a wellbore diagram shows the bit at 9862.3 ft depth. A red circle highlights the 'Close BOP' button on the wellbore diagram, with an arrow pointing to it.

Check for the behavior of curves of DP pressure and Choke Pressure on graph. On hydraulics view ECD = Critical Density on Bottom:

Drilling Simulator
Introductory Level

00:09:24 x1

Flow Rate: 0.0 gpm
Mud Weight: 9.6 ppg
Bit Depth: 9862.0 ft

Pump Pressure: 587 psi
Weight Indicator: 0.0 kips
Torque: 0%

SPM: 0 strokes
Flow Failure: High

MP 1: 0.0 spm, Flow: 0.0 gpm
MP 2: 0.0 spm, Flow: 0.0 gpm
MP 3: 0.0 spm, Flow: 0.0 gpm

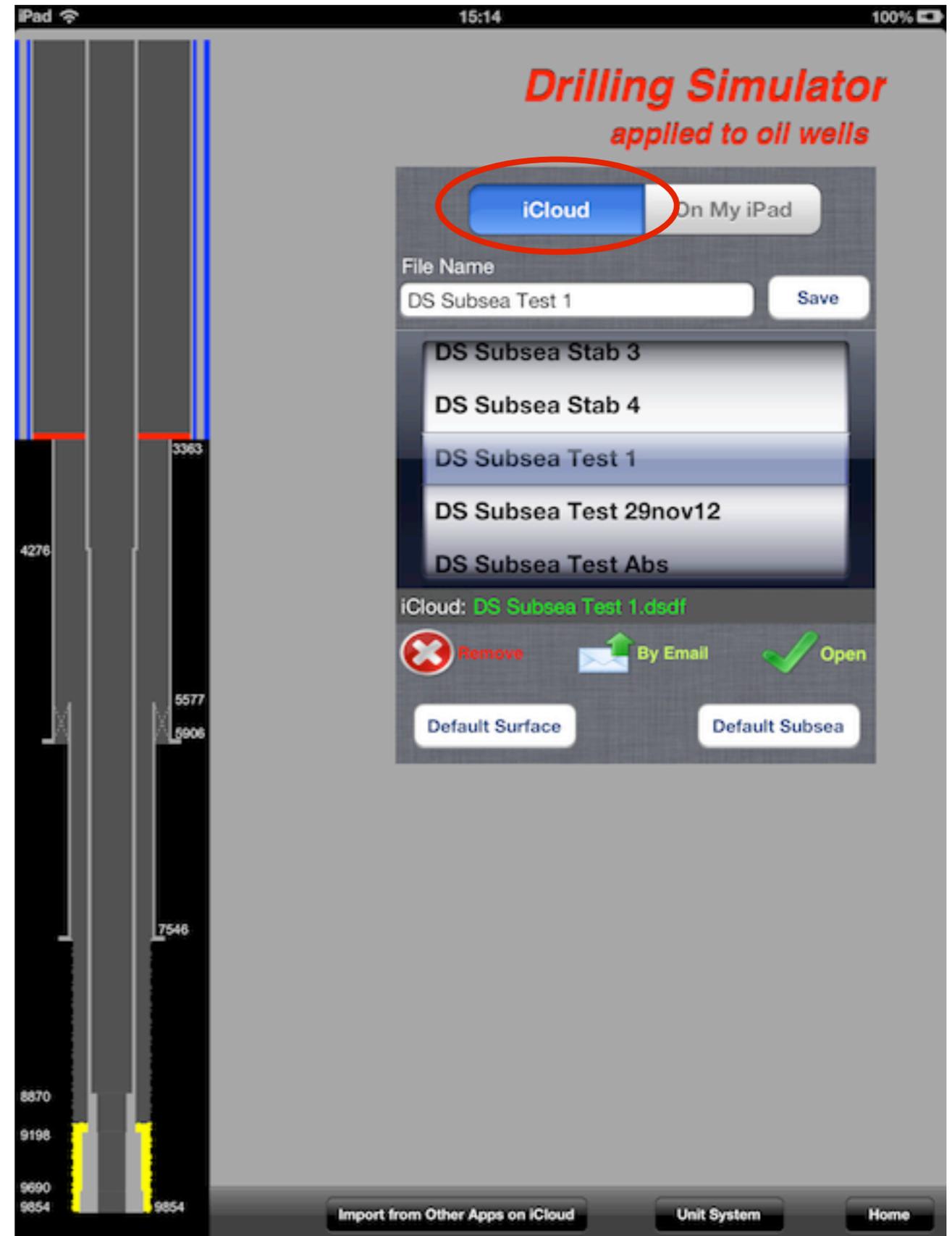
DP Pressure: 587.0 psi
Choke Press: 927.7 psi
Active Vol.: 529.8 bbl

WOB: 0.0 kips
Hook load: 347 kips
Drilled: 11.1 ft

Drill Bit		Flow Rate	0.0	gpm	System Losses		
Nozzles Loss	0.0	psi	Surface				0.0 psi
HHP / Sq. Inch	0.0	hp/sq.in	Drill string				0.0 psi
Perc Nozzles Loss	0.0	%	Annulus				0.0 psi
Jet Velocity	0.0	ft/s	Riser				0.0 psi
Force of Impact	0.0	lbf	TOTAL				0.0 psi
Drill string Hydorst		4908.5	psi	Max. Choke Pressure		940.8 psi	
BOP Pressure		2604.7	psi	Max. BOP Pressure		5000.0 psi	
	Depth ft	Hydorst psi	Friction psi	Pressure psi	ECD ppg	Critical ppg	
Shoe Depth	7545.9	3763.2	0.0	4690.8	11.97	12.00	
Bottom Hole	9842.5	4567.7	0.0	5495.4	10.75	10.75	

Wellbore Diagram: 4285, 5577, 5906, 7546, 8878, 9206, 9698, 9862, 9862.3

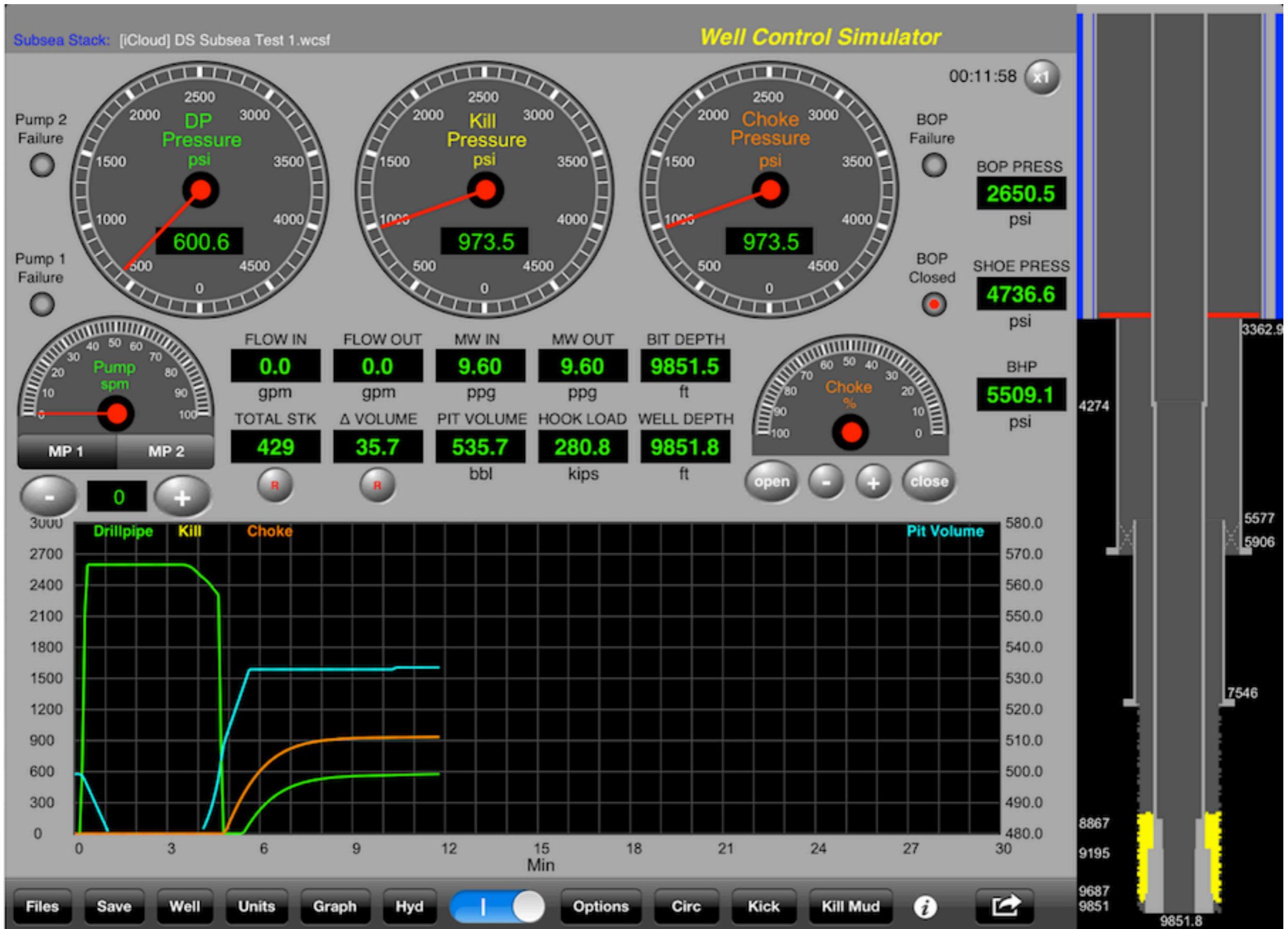
Save after the stabilization of the pressures on iCloud to importing by the app "Well Control Simulation" for control.



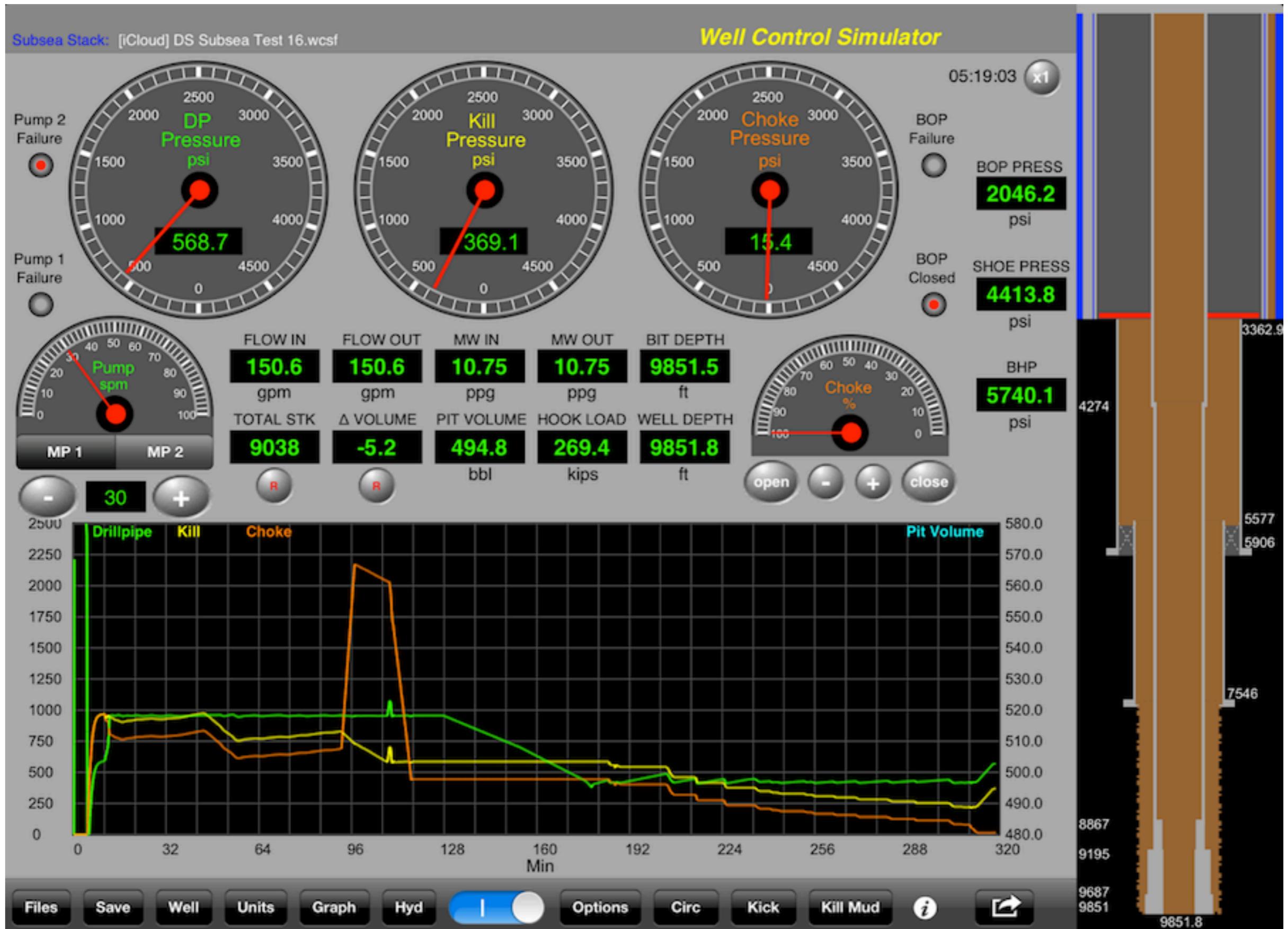
Open the "Well Control Simulator" app to Import from "Drilling Simulator" to apply a Method to control.



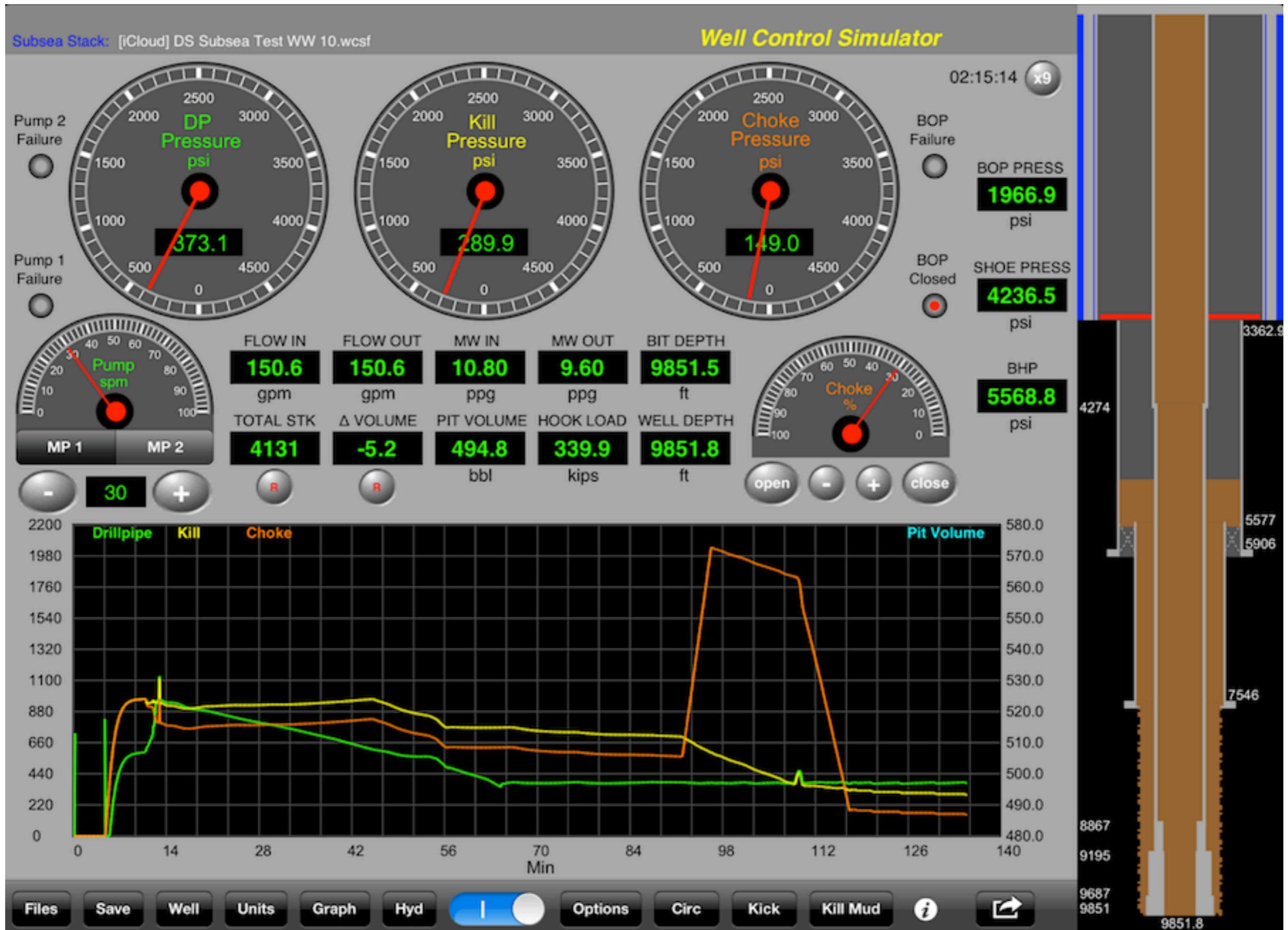
Example after importing from "Drilling Simulator".



Example of the Driller's method on "Well Control Simulator" app. Check "[Well Control Methods](#)" or "[Well Control Worksheets](#)" apps.



The Wait and Weight method on “Well Control Simulator” app. Check “[Well Control Methods](#)” or “[Well Control Worksheets](#)” apps.



Check for the **choke pressure** to reach the **maximum choke pressure**. On hydraulics view, ECD = Critical Density on Shoe Depth:

Drilling Simulator
Introductory Level

00:11:30 x1

FLOW RATE 0.0 gpm
MUD WEIGHT 9.6 ppg
BIT DEPTH 9862.0 ft

Pump Pressure 604 psi
Weight Indicator 0.0 kips
Torque 0%

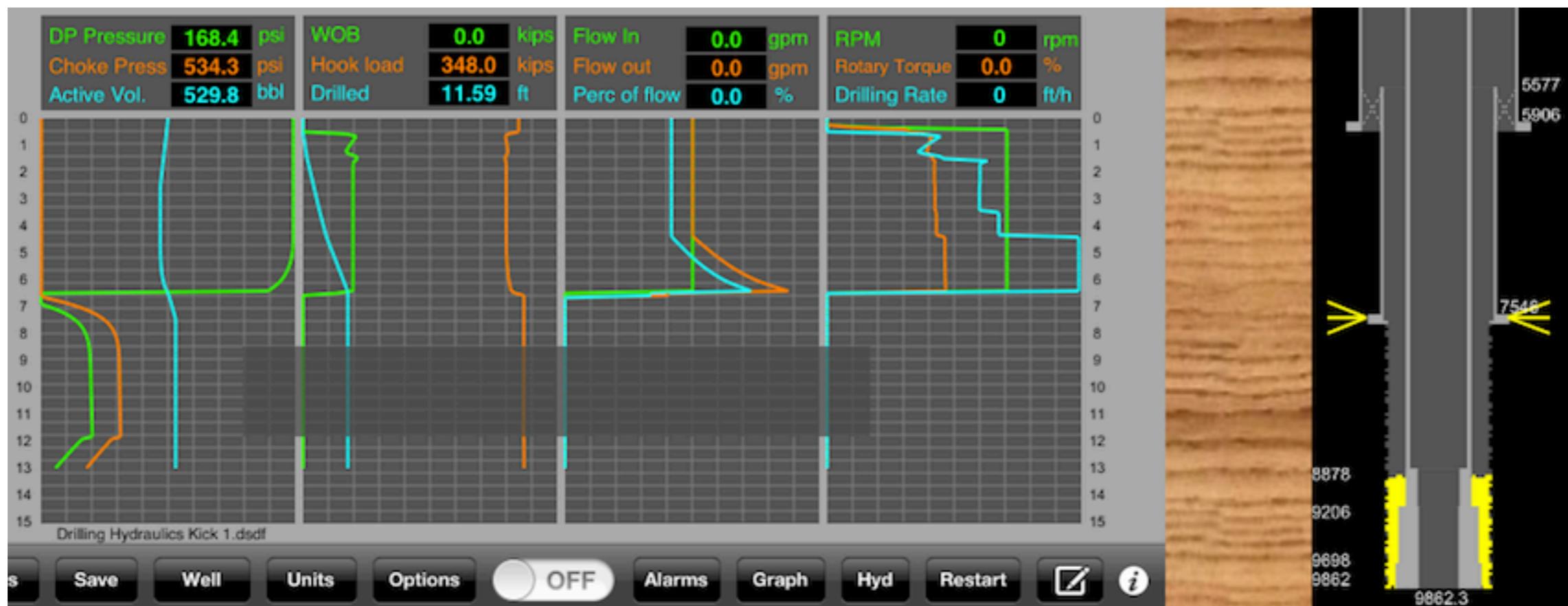
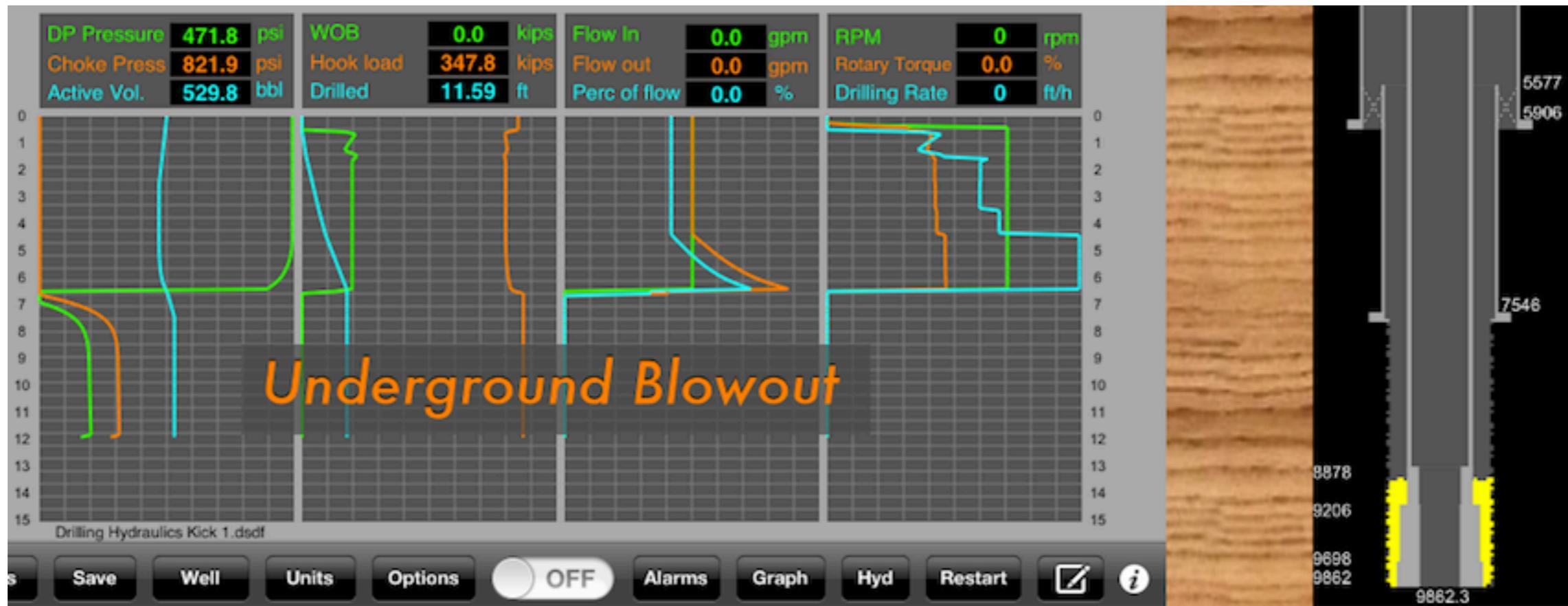
MP3 0.0 spm
MP2 0.0 spm
MP1 0.0 spm

SPM 0 strokes
Flow Failure High 645

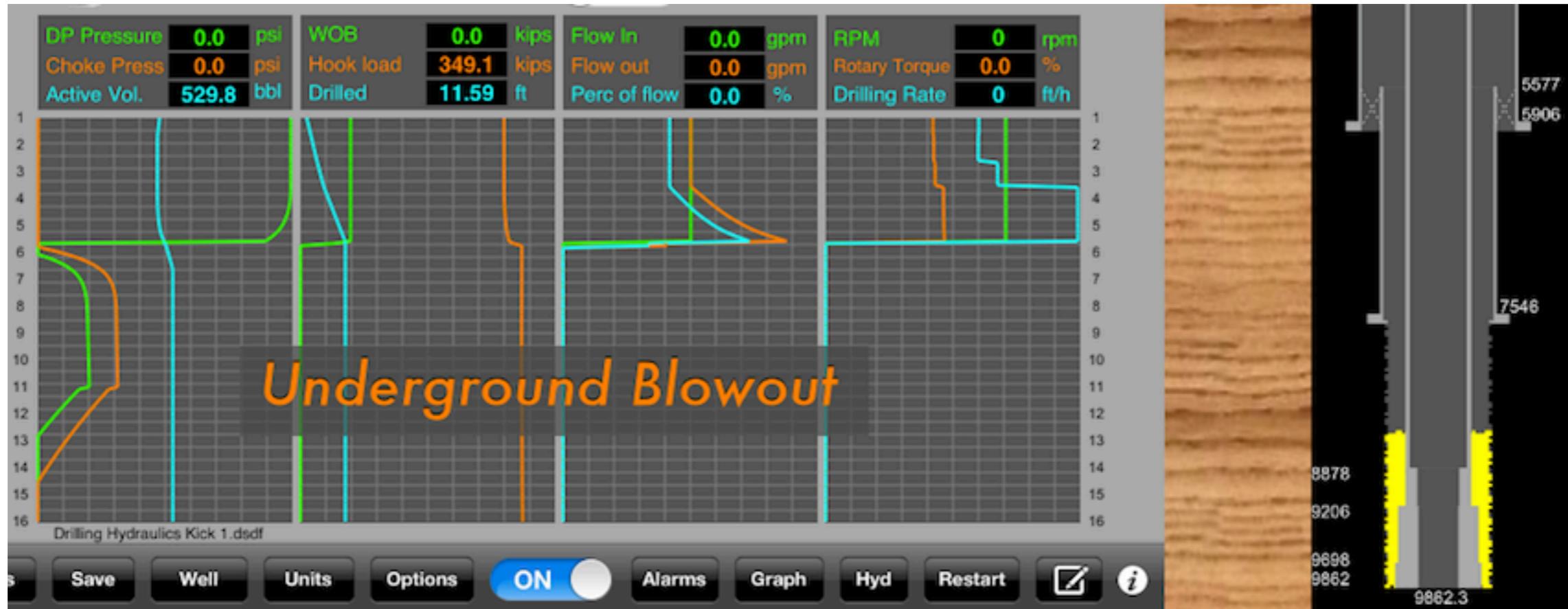
Drilling Hydraulics Kick 1.dsd

MP 1	0.0	spm	MP 2	0.0	spm	MP 3	0.0	spm										
Flow	0.0	gpm	Flow	0.0	gpm	Flow	0.0	gpm										
Bottoms-up time			-	min	System Losses													
Drill Bit	Flow Rate	0.0	gpm	Surface	0.0	psi												
Nozzles Loss	0.0	psi	Drill string	0.0	psi													
HHP / Sq. Inch	0.0	hp/sq.in	Annulus	0.0	psi													
Perc Nozzles Loss	0.0	%	Riser	0.0	psi													
Jet Velocity	0.0	ft/s	TOTAL	0.0	psi													
Force of Impact	0.0	lbf	Percent	0.0	%													
Drill string Hydorst	4908.5	psi	Max. Choke Pressure	940.8	psi													
BOP Pressure	2616.1	psi	Max. BOP Pressure	5000.0	psi													
Shoe Depth		7545.9	ft	Hydorst	3763.2	psi	Friction	0.0	psi	Pressure	4702.2	psi	ECD	12.00	ppg	Critical	12.00	ppg
Bottom Hole		9842.5	ft	Hydorst	4573.7	psi	Friction	0.0	psi	Pressure	5512.7	psi	ECD	10.70	ppg	Critical	10.70	ppg

Shows the expression “Underground Blowout” in the graph. Flashing until gas to reach on the shoe depth.



Shows the expression “Underground Blowout” in the graph. Flashing until gas to reach on the shoe depth.



With Bop closed, set RPM = 5 to occur failure on BOP.

Drilling Simulator
Introductory Level

00:28:24 x9

Flow Rate: 0.0 gpm
Mud Weight: 9.6 ppg
Bit Depth: 9862.0 ft

Pump Pressure: 0 psi
Weight Indicator: 0.0 kips
Torque: 14.1 %

MP3
MP2
MP1

SPM: 0 strokes
Pump Vol Failure High:
Flow High:

BOP Failure Status: **BOP Status:** **Choke Status:**

RPM: 5

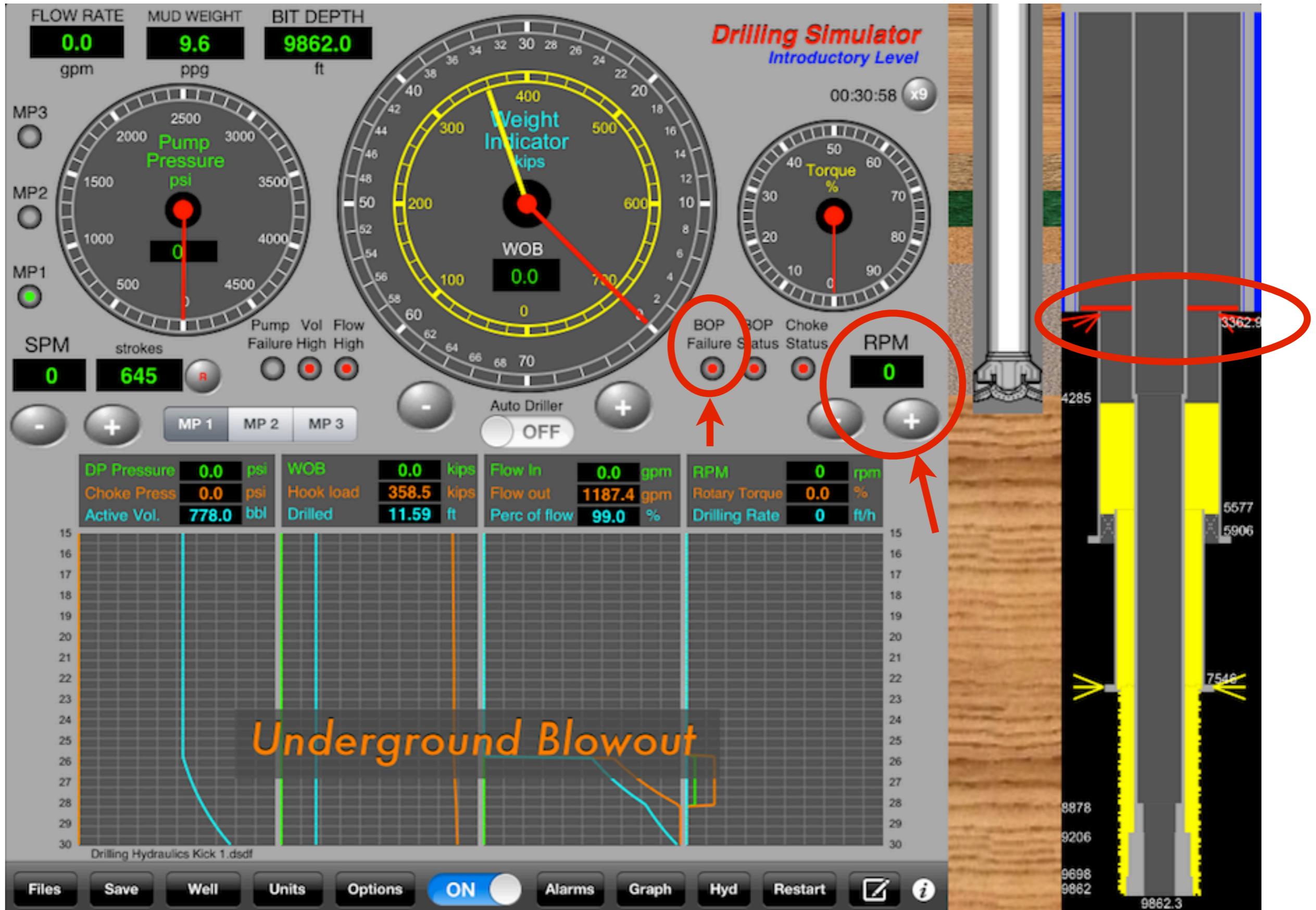
DP Pressure	0.0	psi	WOB	0.0	kips	Flow In	0.0	gpm	RPM	5	rpm
Choke Press	0.0	psi	Hook load	354.4	kips	Flow out	884.0	gpm	Rotary Torque	14.1	%
Active Vol.	598.9	bbl	Drilled	11.59	ft	Perc of flow	73.7	%	Drilling Rate	0	ft/h

Underground Blowout

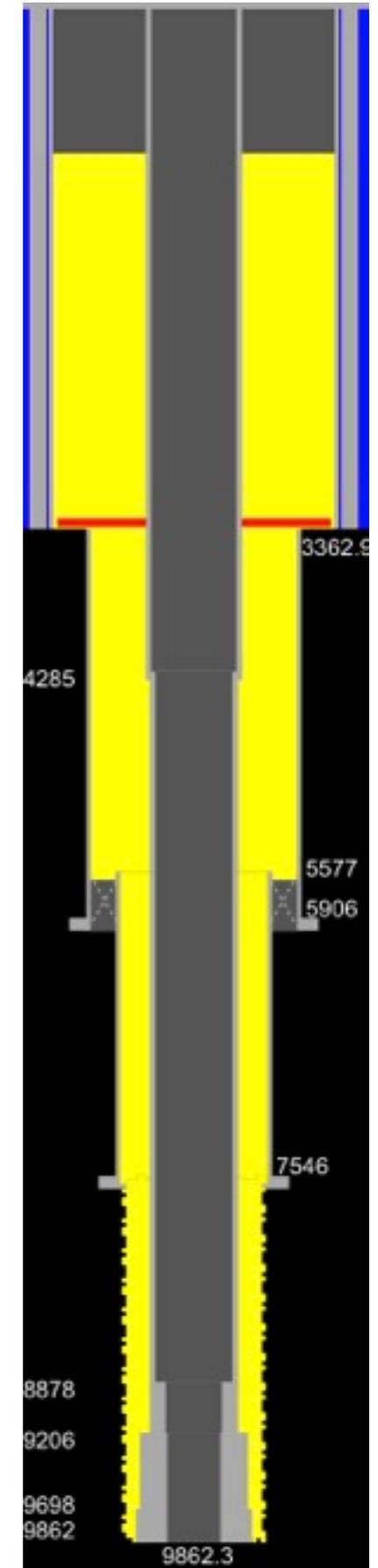
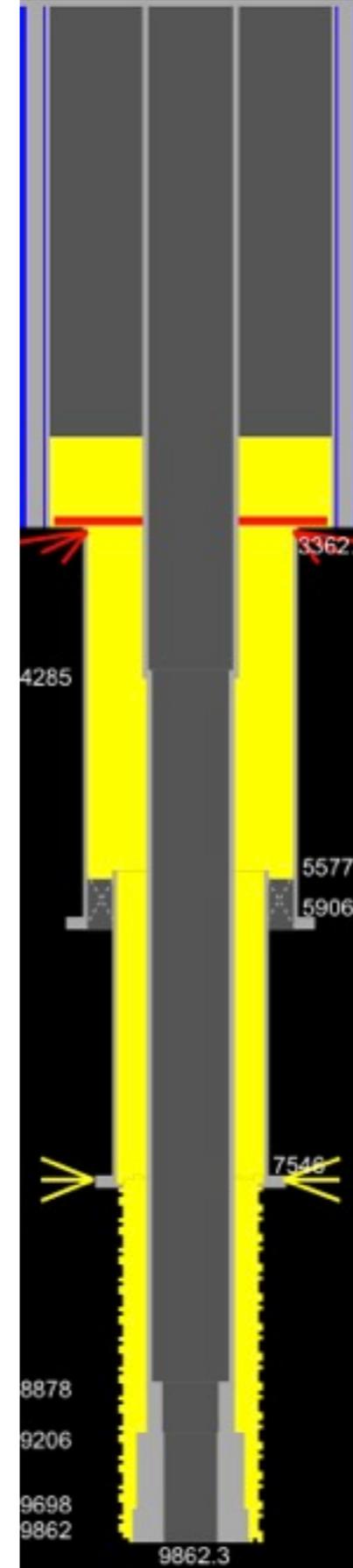
Wellbore Diagram (Right):
- Depth 4285 ft: BOP
- Depth 5362.9 ft: Blowout
- Depth 5577 ft: Casing
- Depth 5906 ft: Casing
- Depth 7548 ft: Blowout
- Depth 8878 ft: Casing
- Depth 9206 ft: Casing
- Depth 9698 ft: Casing
- Depth 9862 ft: Casing
- Depth 9862.3 ft: Bit

Buttons: Files, Save, Well, Units, Options, **ON**, Alarms, Graph, Hyd, Restart, ?

Same if RPM = 0 again, the failure on BOP remains.



When the gas reach to BOP, shows the expression "Blowout" flashing in the graph.



In blowout, when the Gas reach on surface, the simulation end. Tap on "Restart" button or "Hide" to get screenshots or send by email.



Set restart on the end of simulation (blowout) or any time on drilling simulation.





The screenshot shows the Drilling Simulator for iPad interface with an email sharing modal open. The modal title is "Drilling Simulator for iPad - Simulation" and includes a "Send" button. The email fields are filled with the following information:

- To: (empty)
- Cc/Bcc: (empty)
- Subject: Drilling Simulator for iPad - Simulation
- Images: 1.1 MB

The background simulation screen displays various gauges and data:

- FLOW RATE:** 501.9 gpm
- MUD WEIGHT:** 9.6 ppg
- BIT DEPTH:** 9867.0 ft
- Pump Pressure:** 2980 psi
- Weight Indicator:** 17.8 kips
- Torque:** 40.5 %
- SPM:** 100 strokes
- Active Vol.:** 469.7 bbl
- Hook load:** 322.0 kips
- Flow in:** 501.9 gpm
- Flow out:** 501.9 gpm
- Perc of flow:** 41.8 %
- RPM:** 80
- Drilling Rate:** 94 ft/h

The interface also features a vertical wellbore diagram on the right side with depth markers (e.g., 3362.9, 5577, 5006, 7546, 9867.0) and a data table at the bottom with columns for DP Pressure, Choke Press, Active Vol., WOB, Hook load, Drilled, Flow in, Flow out, Perc of flow, RPM, Rotary Torque, and Drilling Rate.

This app was developed based on my experience.

There was no comparison with any other software.

Our goal was to create a low-cost application with the help of experts to share with drilling engineers, technicians, drillers and students.

You can contribute with suggestions for improvements, correcting the translation to english, reporting bugs and spreading it to your friends.

Please visit our support url and see other applications for Oil & Gas for iPhone, iPod Touch, iPad and Mac OS X.

Contact:
contact@wellcontrol.com.br

Support URL:
<http://www.wellcontrol.com.br>

On App Store:
[Oil & Gas Apps for iPhone and iPad](#)

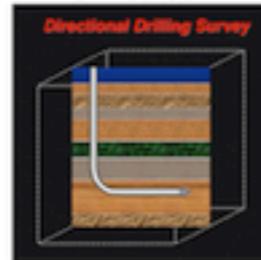


Applications
Well Control Methods
Drilling Hydraulics
Kick Tolerance
Drilling Cost
Directional Survey
Drilling Simulator
Others

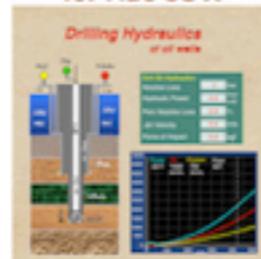
Knowledge
Methods and Concepts

Highlights

Directional Drilling for Mac OS X



Drilling Hydraulics for Mac OS X



Well Control Methods for Mac OS X



A Message to Our Customers

Our app suite sales are impressing us by each day, with satisfied customers buying a product for several devices, trying new ones, recommending to their co-workers and college friends, giving feedback with compliments and suggesting improvements.

We work hard to always bring to you the best experience.

Thank you very much, and welcome!



Enjoy our Apps!

About Us

We are a team of specialists in petroleum engineering with over **24 years of expertise** in oil wells drilling and workover operations. We have in our portfolio **Well Control Simulators** for training and Monitoring Systems for the oil industry.

Our **mission** is to bring petroleum specialists and students **innovative tools** which will provide **safety** and **efficiency** to their work.



News

>> Update for Well Control Methods for iPad 2.4 now available on the App Store

>> Directional Drilling Survey for iPhone, iPod Touch and iPad 2.2 now available on the App Store

>> Directional Drilling Survey for iPad: Single Well Survey (User Guide)

>> Directional Drilling Survey for iPad: Well Planning (User Guide)

>> Directional Drilling Survey for iPad: Load/Save Data File (User Guide)

>> Directional Drilling Survey 2.1 now available on the App Store: Sharing data files with iCloud

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Well Control Apps for iPhone, iPod Touch, iPad and Mac OS X



iPhone Apps Video

