Drilling Operations to Analysis Workflows

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Drilling Operations To Analysis Workflows

The Drilling Operations to Analysis Workflows all begin in the OpenWells® application and end using the WELLPLAN™ application. In all of these workflows, the drilling operation report data is input into OpenWells software, and then the data is analyzed using WELLPLAN software.

Symbols Used in the Workflows

This symbol indicates data input in one application is shared with another application.

This symbol indicates important steps in the integration process.

Workflow A: Kick Operations Analysis

Software Needed

- OpenWells®
- WELLPLAN™

Overview

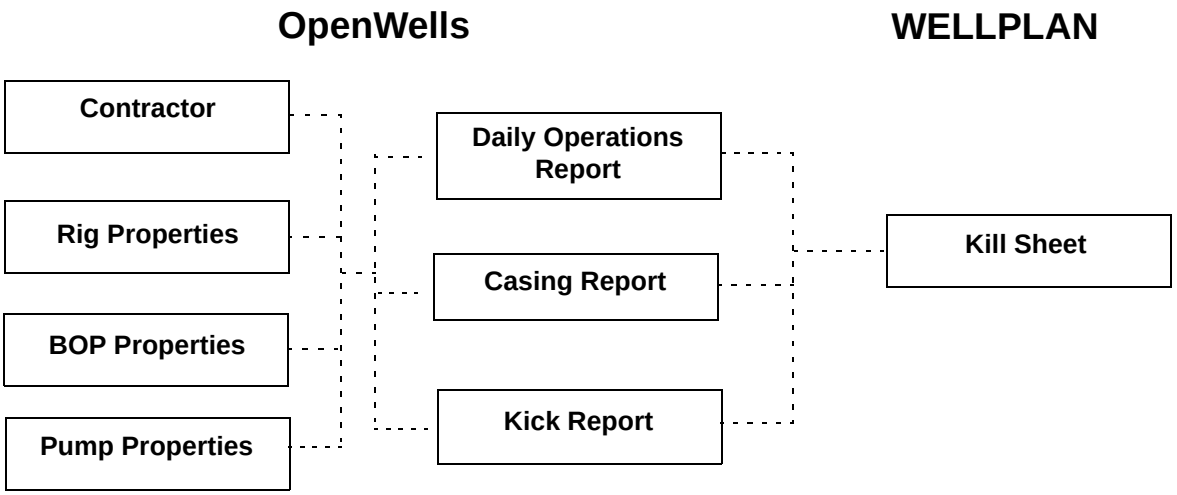
The Kick Operations Analysis Workflow can be used for performing well control analysis using WELLPLAN software based on data entered using OpenWells software.

This example workflow used in this section includes using OpenWells and WELLPLAN software.

1. OpenWells software: This workflow begins in OpenWells software by defining the rig contractor, the rig, and the rig operations. Next, a drilling event prior to the kick is created including Daily Operations, and Casing reports. In the final step, a Kick report is created. Data from all reports are shared with the WELLPLAN application and used in the Well Control analysis.

2. WELLPLAN software: WELLPLAN software is used to perform well control analysis using the kill sheet. Within the WELLPLAN application, a new case is created that is based on an OpenWells Kick report. This workflow includes only well control analysis.

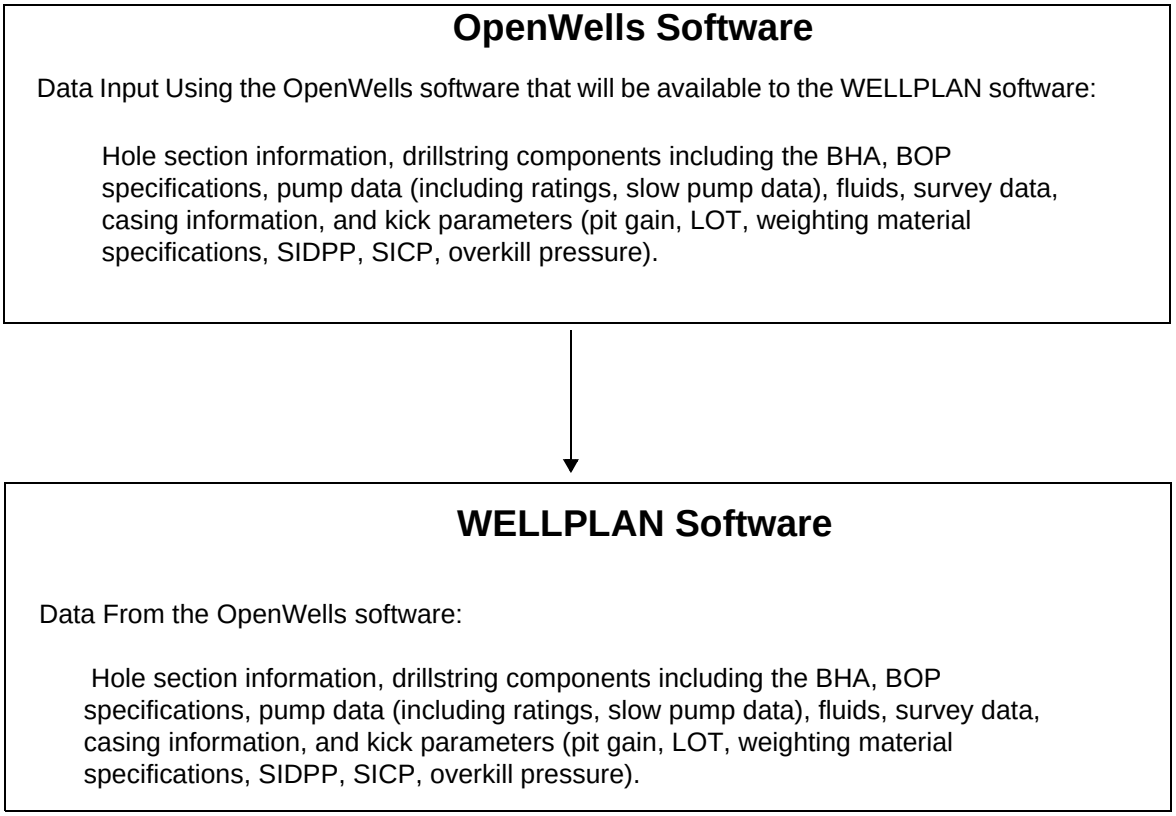
The following diagram describes where the data required for this workflow is input into the OpenWells application in order to be available to the WELLPLAN Kill Sheet.



This workflow does not demonstrate all the functionality of the software.

The intent of this workflow is to demonstrate integration between the applications and does not include all of the software's functionality. There are other possible ways the applications could be used together, as well as separately. Refer to the individual product's online help for more information.

Data Flow



Workflow Steps

Use OpenWells Software to Input Operational Data

1. Launch OpenWells if it is not already active. (**Start** > **Programs** > **Landmark's Engineer's Desktop 5000.1** > **OpenWells**)

2. If the login screen appears, enter the appropriate User ID and Password.

3. Create a company, project, site, well, and wellbore if they do not already exist.

Define a Rig Contractor and Rig

4. Define a rig contractor using the **Contractors Tab** located at the bottom of the **Well Explorer**. (Right-click on the database icon at the top of the **Well Explorer Contractor** tab and select **New**

Contractor from the menu. Use the **Contractor Properties** dialog to specify information about the contractor.

5. Click **Yes** when asked if you want to create a new rig.

6. Specify the rig properties using the **Rig Properties** > **General** tab.

7. Specify the derrick properties using the **Rig Properties** > **Derrick** tab.

8. Specify the BOP pressure rating using the **Rig Properties** > **Other** tab.

Create a Rig Operation

9. Create a rig operation when prompted using the **Rig Operation Properties** > **General** tab.

Specify BOP Properties

10. Specify the BOP properties using the **BOP Properties** > **General** tab. You may need to create a BOP first by right-clicking on **BOPs** in the **Well Explorer Contractor** tab and selecting **New BOP** from the right-click menu.

Note: Be sure to specify proper installation and removal dates. If not, the data will not be available to the WELLPLAN application as expected.

11. Specify the BOP choke and kill line properties using the **BOP Properties** > **Choke/Kill Line** tab.

    Note: For subsea wells, be sure the choke and kill line length is equal to the mudline depth.

Specify Pump Properties

12. Using the **Pump Properties** > **General** tab, specify the pump properties. You may need to create a pump first by right-clicking on **Pumps** in the **Well Explorer Contractor** tab and selecting **New Pump** from the right-click menu.

Note: Be sure to specify proper installation and removal dates.If not, the data will not be available to the WELLPLAN application as expected.

Create a Company, Project, Site, Well, Wellbore, and Event

13. Using the **Well Explorer** > **Wells** tab, create a company by right-clicking on the database icon at the top of the **Wells** tab and selecting **New Company** from the menu.

    a) Specify the company name and the reporting standard description using the **Company Properties** > **General** tab.

    b) Define a default survey tool using the **Company Properties** > **Survey Tools** tab.

14. Create a project when prompted.

    a) Using the **Project Properties** > **General** tab, name the project and specify general project information.

    b) Specify the geographic reference system using the **Project Properties** > **Map Info** tab.

15. Create a site when prompted.

    a) Define general site information using the **Site Properties** > **General** tab.

    b) Define the site location using the **Site Properties** > **Location** tab.

16. Create a well when prompted.

    a) Specify general well information using the **Well Properties** > **General** tab.

    b) Specify depth reference information using the **Well Properties** > **Depth Reference** tab.

    c) Specify the well location using the **Well Properties** > **Location** tab.

17. Create a new wellbore when prompted. Specify general wellbore information using the **Wellbore Properties** > **General** tab.

18. Create an event when prompted.

    a) Specify the start and end date of the event, and other event information using the **Event Properties** > **General** tab.

    b) Define associated rig operations using the **Event Properties** > **Associated Rig Operations** tab. You must have already defined a rig as described previously in this workflow.

Define Drilling Event of Hole Section Prior to Kick Open Hole Section

19. Create a Daily Operations Report. (Right-click on the event in the Well Explorer and select Report from the menu.) Select **Daily Operations** from the **Create New Report Wizard** and input information as required.)

    
    a) Specify general information using the **General** section.

    
    b) Specify hole section information using the **Hole Section** section.

    
    c) Specify drillstring information using the **Drillstrings** section.

    
    d) Specify the fluids information using the **Fluids** section.

    
    e) Specify the survey information using the **Survey** section.

    f) Save and close the report.

Create a Casing Report Prior to the Daily Drilling Report with the Kick

20. Create a Casing Report. (Right-click on the event in the Well Explorer and select Report from the menu.) Select **Casing** from the **Create New Report Wizard** and input information as required.)

    a) Specify general information using the **General** section.

    b) Specify status information using the **Status** section.

    
    c) Specify casing components using the **Components** section.

    d) Save and close the report.

Create a Daily Operations Report for the Open Hole Section with the Kick

21. Create a Daily Operations Report. (Right-click on the event in the Well Explorer and select Report from the menu.) Select **Daily Operations** from the **Create New Report Wizard** and input information as required.)

Note: Carefully define the date and time of the activities because if incorrect input of dates and/or times are made, some data in the kick report will not be displayed.

a) Specify general information using the **General** section.

b) Specify hole section information using the **Hole Section** section.

c) Specify drillstring information using the **Drillstrings** section.

d) Specify the fluids information using the **Fluids** section.

e) Specify the survey information using the **Survey** section.

f) Specify the time summary using the **Time Summary** section.

g) Specify slow pump information using the **Pump Operations** section.

h) Specify the leak off test information using the **Leak Off Test** section.

i) Save and close the report.

Create a Kick Report for the Open Hole Section with the Kick

22. Create a Kick Report. (Right-click on the event in the Well Explorer and select Report from the menu.) Select **Kick** from the **Create New Report Wizard** and input information as required.)

a) Specify the kick parameters using the **General** section. You should enter all the data into the report. The following items are data entry tips.

- The **Activity/Op Date/Time** drop-down list is only populated if you specified the time summary in the previous step.

- If the **Hole Size** or **Casing Size** drop-down lists are empty, the time input on the **Daily Operations Report** is probably incorrect.

- The **SCR** data drop-down list will not be populated unless slow pump information has been input on the **Daily Operations Report**.

23. Save and close the Kick Report.

24. Close the OpenWells application.

Using WELLPLAN Software to Analyze Kick Information

Access the WELLPLAN Software

25. Launch the WELLPLAN software if it is not already active. (**Start > Programs > Landmark's Engineer's Desktop 5000.1 > WELLPLAN**)

Creating a Case Using OpenWells Report Data

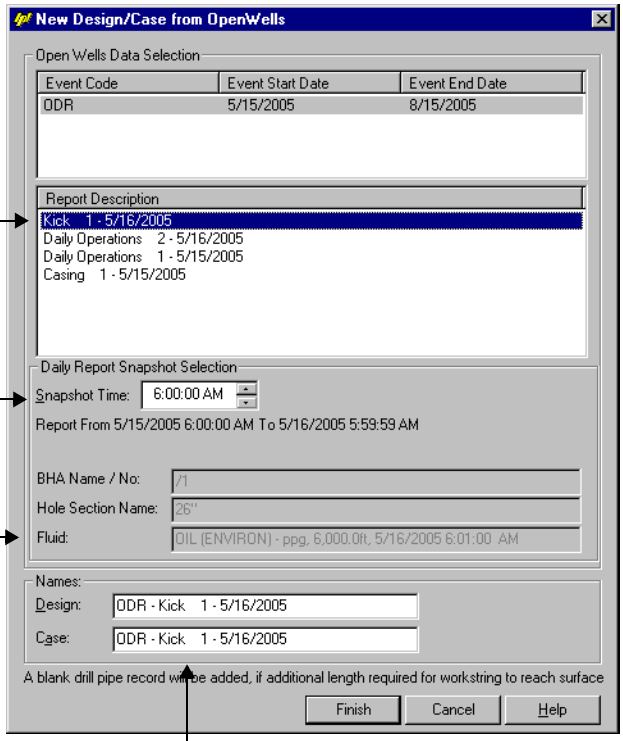
26. Create a case using the drillstring entered on the last report.

a) Right-click on the wellbore you want to associate the new case with and select **New Design/Case from OpenWells** from the right-click menu.

Use the **Report Description** list to select the OpenWells report that has the data you want to use to create the report.

Use the **Snapshot Time** field to select the time (during the report period) that has the BHA, Hole Section Name, and Fluid you want to use.

The BHA, Hole Section, and Fluid in use during the selected time will be displayed in the **BHA Name/No**, **Hole Section Name**, and **Fluid** fields.



Default design and case names are provided. You can change the names as needed.

b) Select the desired OpenWells report from the list and click **Finish**.

27. Review the data from the OpenWells software in the Case menu options, including: pore pressure, fracture gradient, hole section, wellpath, drillstring, and fluid.

28. Access the **Well Control** module and activate the **Kill Sheet** analysis mode.

29. Review all three tabs (**Choke/Kill Line**, **Operational**, **Slow Pumps**) of the **Case > Well Control Setup** dialog. This data was input using OpenWells.

30. Access the **Kill Sheet** using the **Wizard.**

31. On the **Kill Sheet**, click the **Default from Editors** button and notice the input fields are correctly defined based on data input in the OpenWells application.

32. Use the **View > Plot > Kill Graph** to review the stand pipe pressure versus the number of strokes to kill the well.

If the input data is inconsistent, the plot will not be displayed. Review the messages in the Status Messages to assist you with determining what is wrong with the data. It is very important to pay very close attention to the report date and times when inputting data into the OpenWells application.

Workflow B: Drillstring Operations Workflow

Software Needed

- OpenWells®
- WELLPLAN™

Overview

The Drillstring Operations Workflow can be used for performing engineering analysis using WELLPLAN software on a drillstring entered using OpenWells software.

This example workflow used in this section includes using the OpenWells and WELLPLAN software.

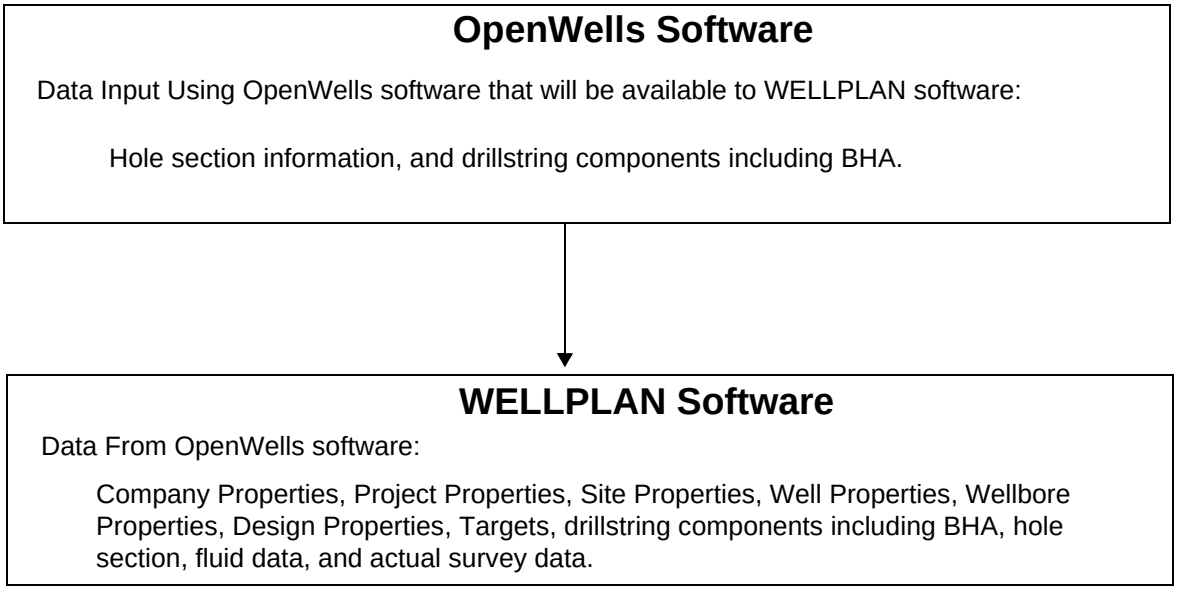
1. OpenWells software: This workflow begins in the OpenWells application. Hole section and drillstring information is entered on Daily Operations reports and casing information is input on the Casing report.

2. WELLPLAN software: Using the WELLPLAN application, a new case is created that is based on an OpenWells Daily Operations report. Torque and Drag analysis can then be performed using WELLPLAN software. Note that this workflow includes only torque drag analysis, although you could perform additional analysis with the data.

This workflow does not demonstrate all the functionality of the software.

The intent of this workflow is to demonstrate integration between the applications and does not include all of the software's functionality. There are other possible ways the applications could be used together, as well as separately. Refer to the individual product's online help for more information.

Data Flow



Workflow Steps

Use OpenWells Software to Input Operational Data

1. Launch the OpenWells application if it is not already active. (**Start > Programs > Landmark's Engineer's Desktop 5000.1 > OpenWells**)

2. If the login screen appears, enter the appropriate User ID and Password.

3. Create a company, project, site, well, and wellbore if they do not already exist.

Create OpenWells Daily Operations Report

4. Create an event if one is not already created. (Click the **New** button in the top-left corner of the OpenWells application and select Event. Enter the event information.)

5. Create a Daily Operations Report. (Right-click on the event in the Well Explorer and select Report from the menu.) Select **Daily Operations** from the **Create New Report Wizard** and input information as required.)

Add Hole Section to Daily Operations Report

6. Input hole section data using the **Hole Sections** section of the Daily Operations Report. (Create a new report, if necessary. If you create a new report, use the General section of the report to specify the measured depth.)

Add Drillstring to Daily Operations Report.

7. Access the **Drillstrings** section of the report. In the **BHA Run Summary**, click the **Add Row** button and on the **Summary** tab, specify the hole size, BHA name and number, MD in, MD out, and the date and time which the BHA was run. On the **Components** tab, specify the components. Use the **Select From Catalog** button to access the catalog for input.

Add Survey Data to Daily Operations Report.

8. Access the **Survey** section of the report and add survey data as necessary.

9. Save and close the report.

Create OpenWells Casing Report

10. Create a Casing Report.

    a) Right-click on the event you want to create the casing report for in the Well Explorer, and select **New Report**.

    b) Select **Casing** from the list of report types. Click **Next**.

    c) Specify the date and click **Finish**.

    d) In the **General** section, specify the name of the casing, casing size, hole size, measured depth of the casing top, date and time the casing was run and landed.

    e) In the **Status** section, specify the casing length, measured depth top, measured depth base, and the measured depth the casing was landed at.

    f) In the **Components** section, specify the number of casing joints, the casing length, and other casing properties.

g) Save and close the report.

11. Close the OpenWells application.

Use WELLPLAN Software to Analyze Data

12. Open the WELLPLAN application. (**Start > Programs > Landmark's Engineer's Desktop 5000.1 > WELLPLAN**)

Creating a Case Using OpenWells Report Data

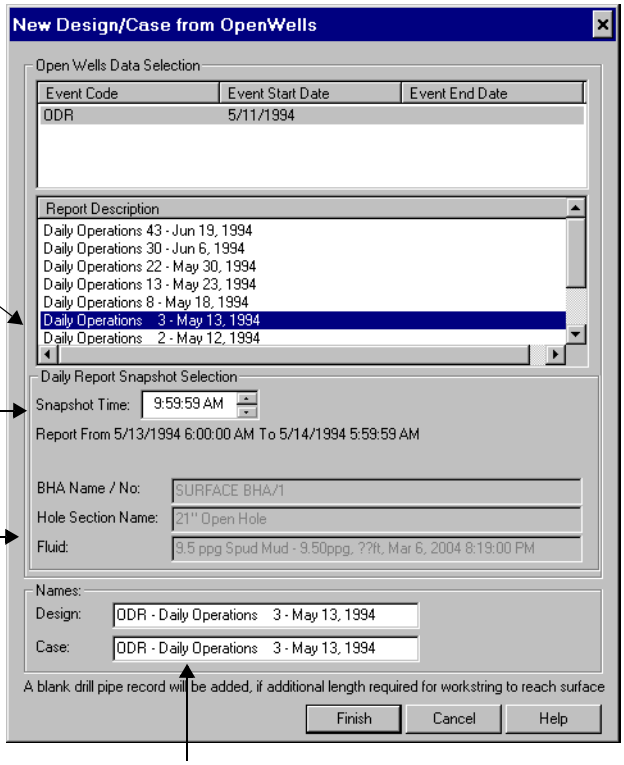
13. Create a case using the drillstring entered on the last report.

a) Right-click on the wellbore you want to associate the new case with and select **New Design/Case from OpenWells** from the right-click menu.

Use the **Report Description** list to select the OpenWells report that has the data you want to use to create the report.

Use the **Snapshot Time** field to select the time (during the report period) that has the BHA, Hole Section Name, and Fluid you want to use.

The BHA, Hole Section, and Fluid in use during the selected time will be displayed in the **BHA Name/No**, **Hole Section Name**, and **Fluid** fields.



Default design and case names are provided. You can change the names if you want to.

b) Select the desired OpenWells report from the list and click **Finish**.

c) Review the data from the OpenWells application in the Case menu options, including: hole section, wellpath, drillstring, and fluid.

Performing Torque Drag Analysis

14. Perform a drag chart analysis using this data.

    a) Access the Torque Drag module using the toolbar button or the Module menu. Select **Drag Chart** from the **Mode** drop-down list.

    b) Using **Case > Torque Drag Setup**, specify the traveling assembly weight and analysis options you want to use.

    c) Use **Parameter > Run Parameters** to specify the analysis parameters and to indicate the operations you want to analyze.

    d) View results using **View > Plot > Tension Point Chart**.

15. Close the WELLPLAN application.

Workflow C: Casing Operations

Software Needed

- OpenWells®
- WELLPLAN™

Overview

The Casing Operations Workflow is a workflow can be used to perform engineering analysis using WELLPLAN software on casing information entered using OpenWells software.

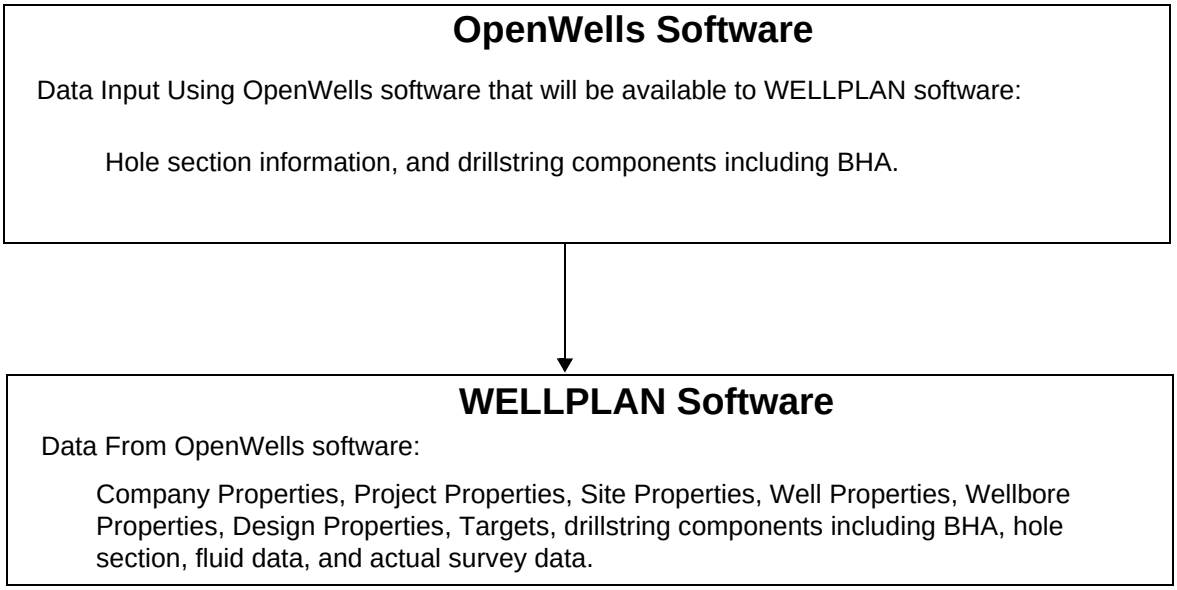
1. OpenWells: This workflow begins in OpenWells. Hole section information is entered on a Daily Operations report. Casing information is entered on a Casing report.

2. WELLPLAN software: Using WELLPLAN software, a new case is created that is based on an OpenWells Casing report. Engineering analysis can then be performed using the WELLPLAN software. Note that this workflow includes only torque drag analysis of running the casing.

This workflow does not demonstrate all the functionality of the software.

The intent of this workflow is to demonstrate integration between the applications and does not include all of the software's functionality. There are other possible ways the applications could be used together, as well as separately. Refer to the individual product's online help for more information.

Data Flow



Workflow Steps

Use OpenWells Software to Input Operational Data

1. Launch the OpenWells application if it is not already active. **Start > Programs > Landmark's Engineer's Desktop 5000.1 > OpenWells**)

2. If the login screen appears, enter the appropriate User ID and Password.

Use OpenWells Software to Create Casing Report

3. Create a **Casing Report**.

   a) Right-click on the event in the Well Explorer and select **New Report**.

   b) Select **Casing** from the list of report types. Click **Next**.

   c) Specify the date and click **Finish**.

   d) In the **General** section, specify the casing name, type, size, and what (if any) casing it is installed inside.

e) In the **Status** section, specify the length, measured depth, and top depth of the casing.

f) In the **Components** section, specify the length, grade, and connection of your choice.

g) Save and close the report

Analyze Data Using WELLPLAN Software

4. Open the WELLPLAN application. **Start > Programs > Landmark's Engineer's Desktop 5000.1 > WELLPLAN**)

Create a Case With Data Input Using OpenWells Software

5. Create a case using the casing entered on the OpenWells casing report. To do so:

a) Right-click on the wellbore you want to associate the new case with and select **New Design/Case from OpenWells** from the menu.

b) Use the **New Design/Case from OpenWells** dialog to select the OpenWells report that you want to use to create the design and case. You can specify the design and case names, or you can use the default names. Click **Finish** after you have selected the correct report and time.

c) Review the data from OpenWells software in the Case menu options, including: hole section, wellpath, drillstring, and fluid. Notice the casing input using OpenWells software is now the workstring in WELLPLAN software.

Perform Torque Drag Analysis

6. Perform a torque drag analysis using this data.

a) Access the Torque Drag module using the toolbar button or the Module menu. Select **Drag Chart** as the analysis mode.

b) Using **Case > Torque Drag Setup**, specify the traveling assembly weight and select the analysis options you want to use.

c) Using **Parameter > Run Parameters** to specify the analysis parameters you want to use. Since you are running casing, you will want to use the *tripping in* operation mode.

d) View results using **View > Plot > Tension Point Chart**.