Release Notes
Surface Manager 2.19

Notes Rev. 016 | 25 April 2025

Epiroc

Table of Contents

Supporting Information

New Programs: Submit request via ACIGN. Be sure to specify serial number(s)

Released Version: 2.19 rev. 16

Date Available: 25 April 2025

Requirements

Component	Version		Notes
	Firmware	Hardware	
RRA	3.5 or newer		

* Added to document since last revision.

Compatibility

System	Component	Version		Notes
		Firmware	Hardware	
RCS	Pit Viper Series Models, RCS 4	4.17 or newer		4.19 or newer required for Hazard Layer 4.20 or newer required for TUM
RCS	Pit Viper Series Models, RCS 5	5.3 or newer		5.4 or newer required for TUM
RCS Lite	DM Series: • DM45 • DML • DM30 II • DM-M3 • DM75 PV Series: • PV270 non-RCS	5.0 or newer		
RCS	Smart ROC Series: • D65	4.16 or newer		4.17 or newer for all features
RocRSP	Smart ROC Series: • CL	6.14		

* Added to document since last revision.

Impacted Supporting Documentation

- Surface Manager User Manual
- Surface Manager Server User Manual

Revision Log

Rev. Number	Rev. Date	Change
001	18 Sept 2020	Surface Manager 2.19 Release
002	06 Nov 2020	Feedback Revisions
003	06 Jan 2021	Feedback Revisions
004	02 Feb 2021	Feedback Revisions
005	12 Feb 2021	Feedback Revisions
006	09 Mar 2021	Feedback Revisions – NOT FOR RELEASE
007	08 April 2021	Feedback Revisions – NOT FOR RELEASE
008	14 May 2021	Feedback Revisions
009	20 August 2021	Feedback Revisions
010	23 Sept 2021	Feedback Revisions
011	08 Nov 2021	Feedback Revisions
012	15 May 2023	Rev. 12 update
013	02 August 2023	Rev. 13 update
014	15 Jan 2023	Rev. 14 update
015	16 Aug 2024	Rev. 15 update
015.1	19 Dec 2024	Added known issue regarding database creation
016	25 Apr 2025	Rev. 16 update

System Requirements

Supported Versions

1. **Windows Version** – Surface Manager Releases after Surface Manager 2.19 will no longer support **Windows Vista**.

   Surface Manager 2.19 supports **Windows 10**.

2. **Windows Server Version** – Surface Manger Releases after Surface Manager 2.17 will no longer support **Windows Server 2005**.

   Surface Manager 2.19 supports **Windows Server 2019**.

Client Enhancements

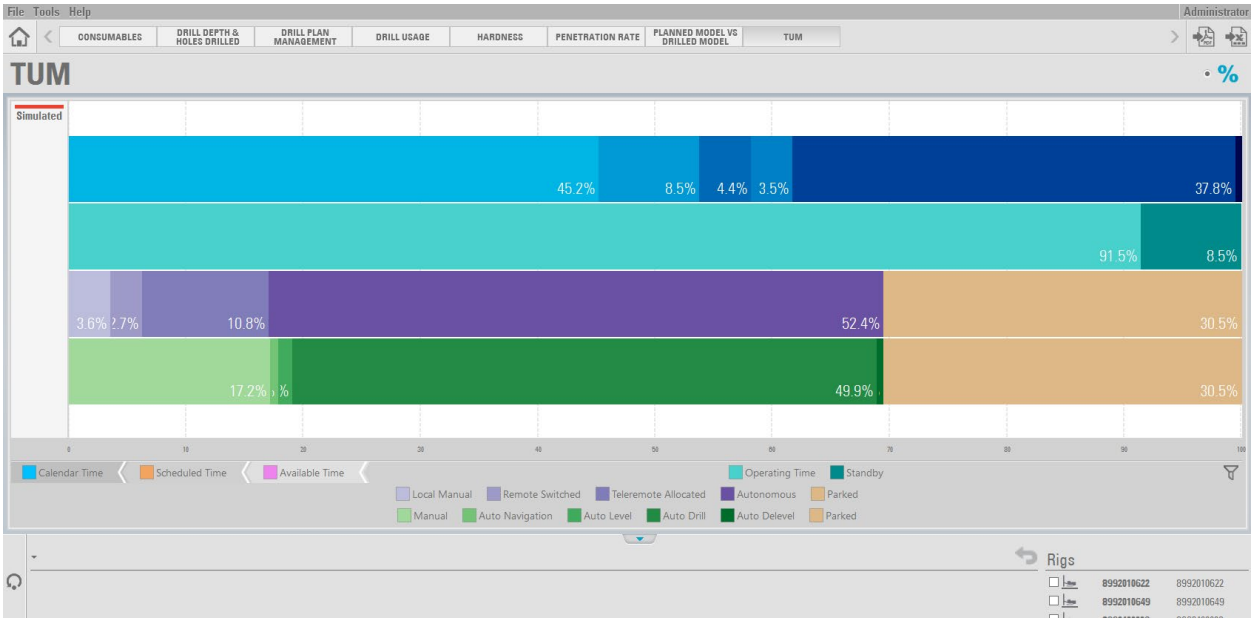
GUI Changes

1. **Time Utilization Model —**

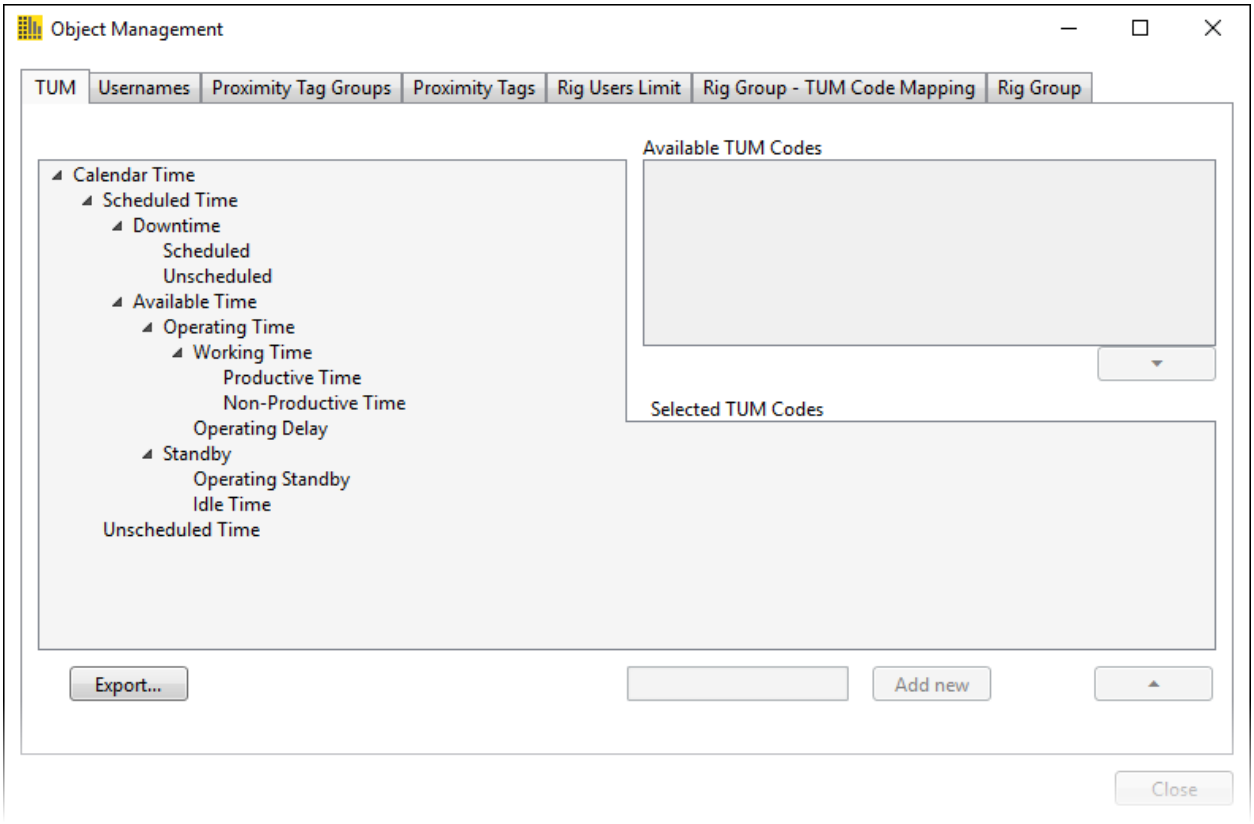
    a. The **Time Utilization Model (TUM)** preview widget has been added.

    b. The **TUM Metrics** preview widget has been added.

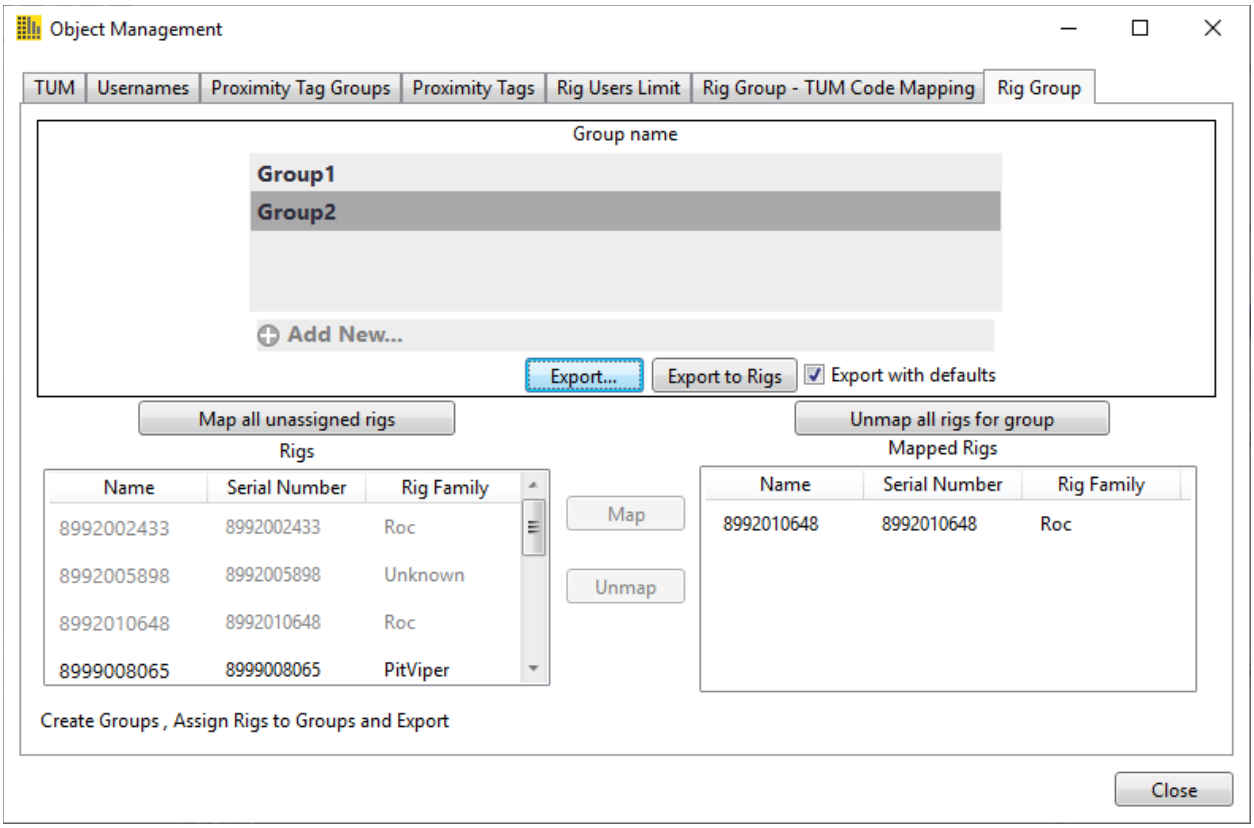
    c. The **TUM** screen has been added.



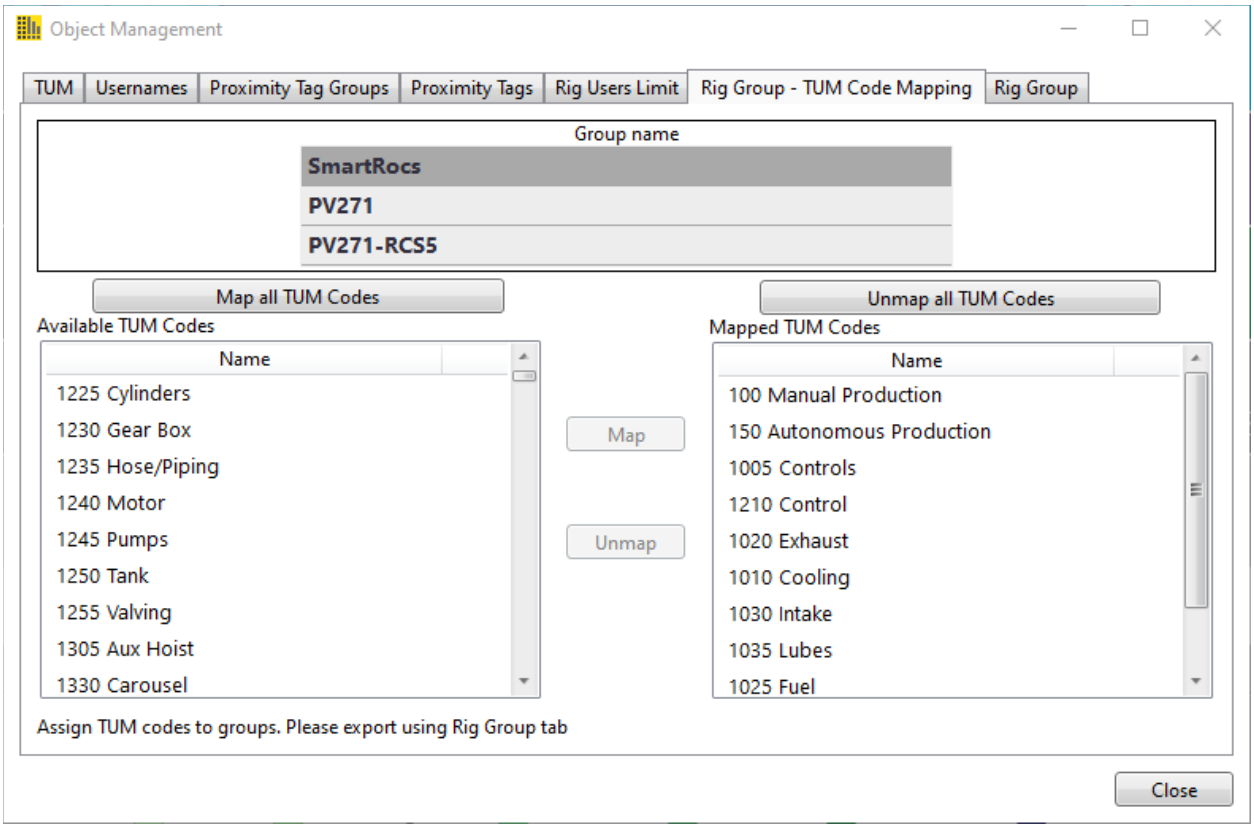
d. The **TUM** tab has been added to the **Object Management** dialog box.



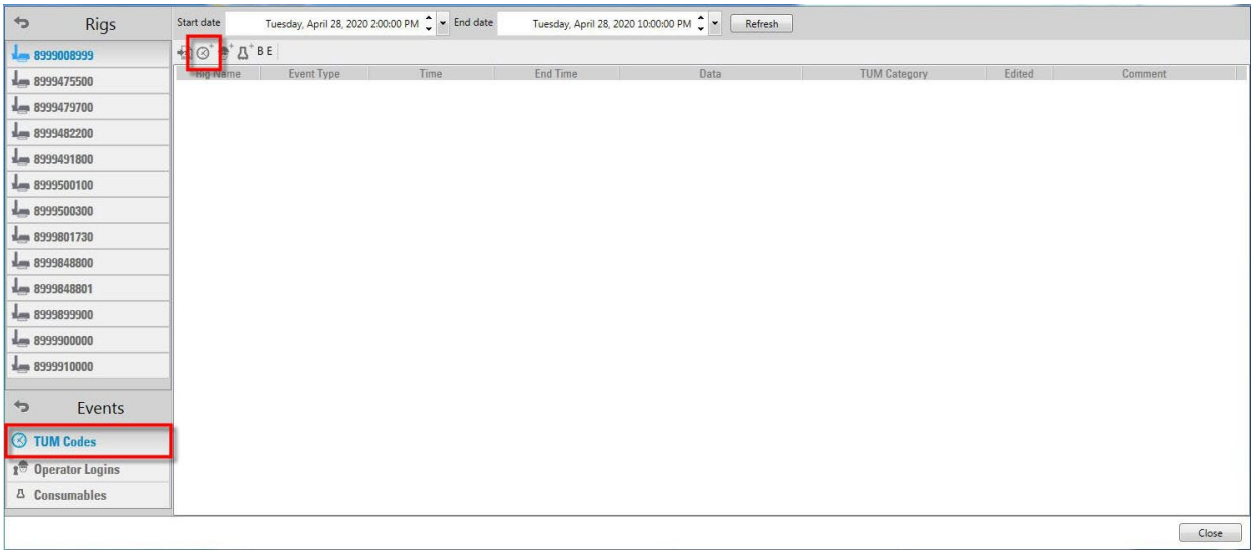
e. The **Rig Group** tab has been added to the **Object Management** dialog box.

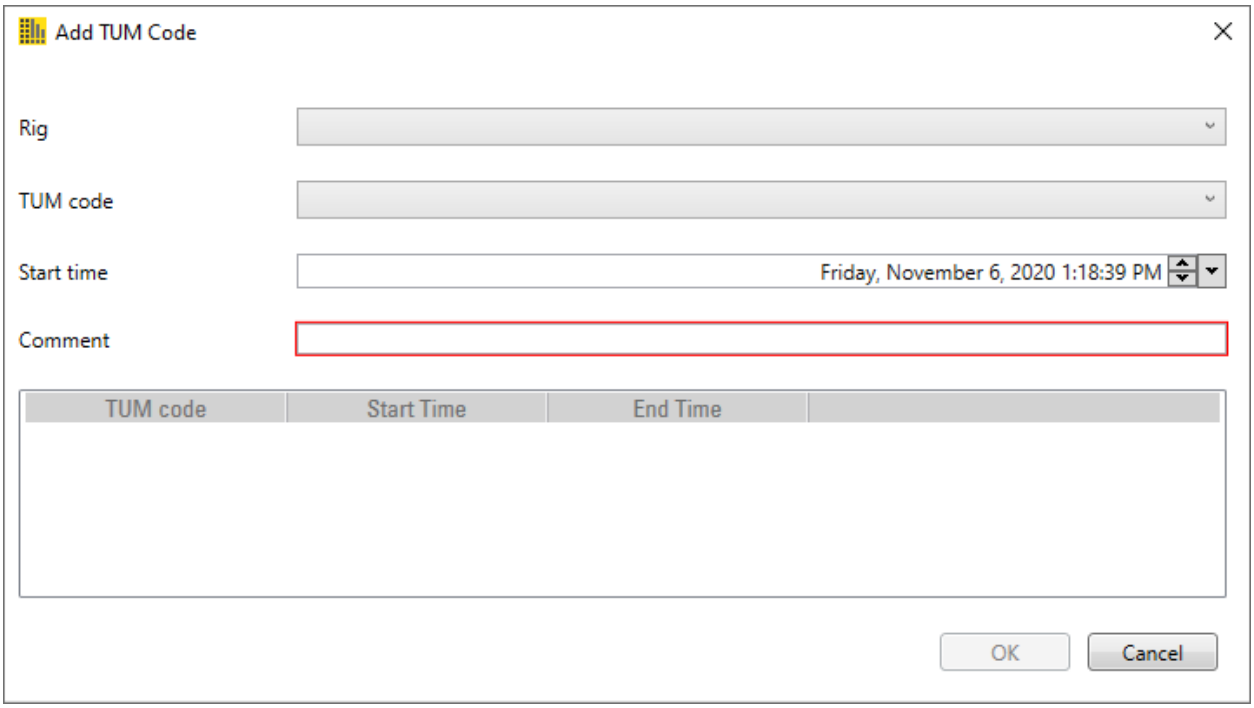


f. The **Rig Group – TUM Code Mapping** tab has been added to the **Object Management** dialog box. Users can map one or more **TUM Codes** at a time.



g. The **Add TUM Code** button, **TUM Codes** view, and **Add TUM Code** dialog box has been added to the **Event Editor**. These have replaced the equivalent delay code functions.

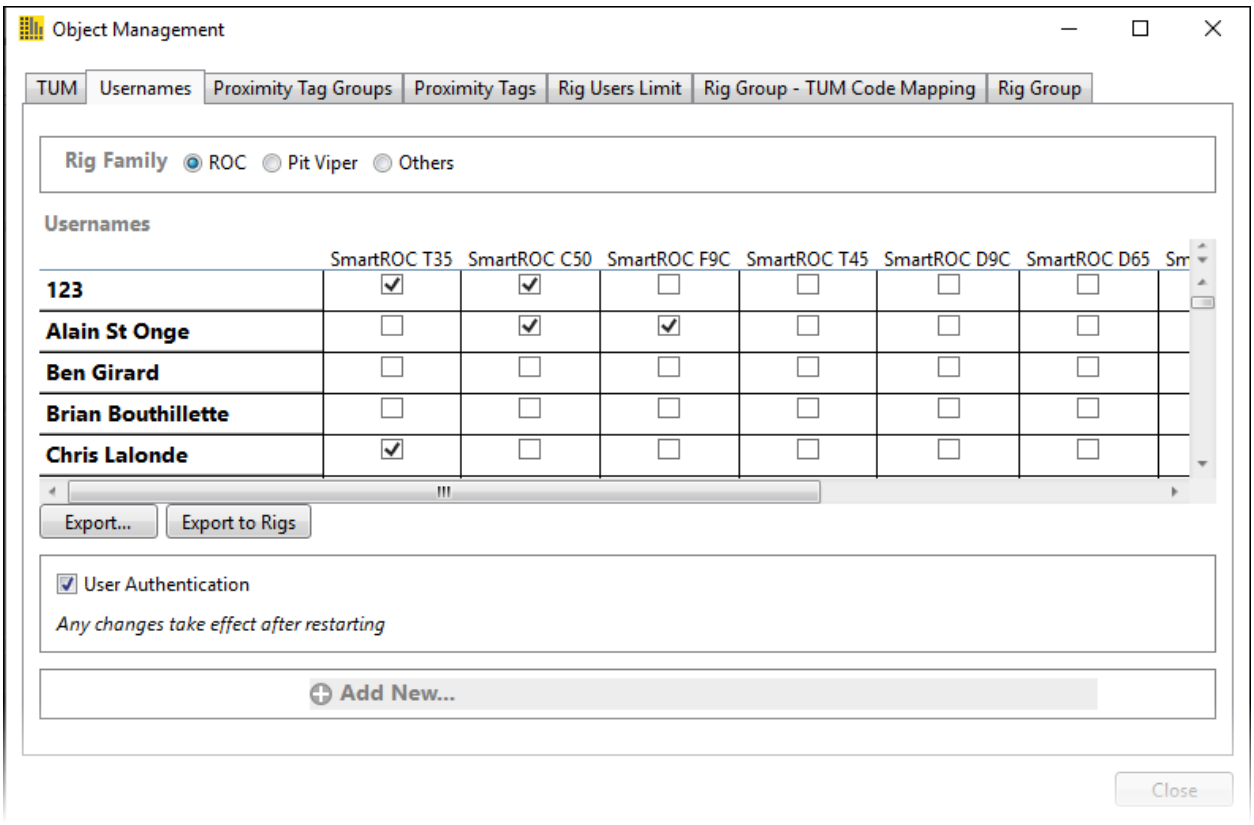




2. **Usernames —**

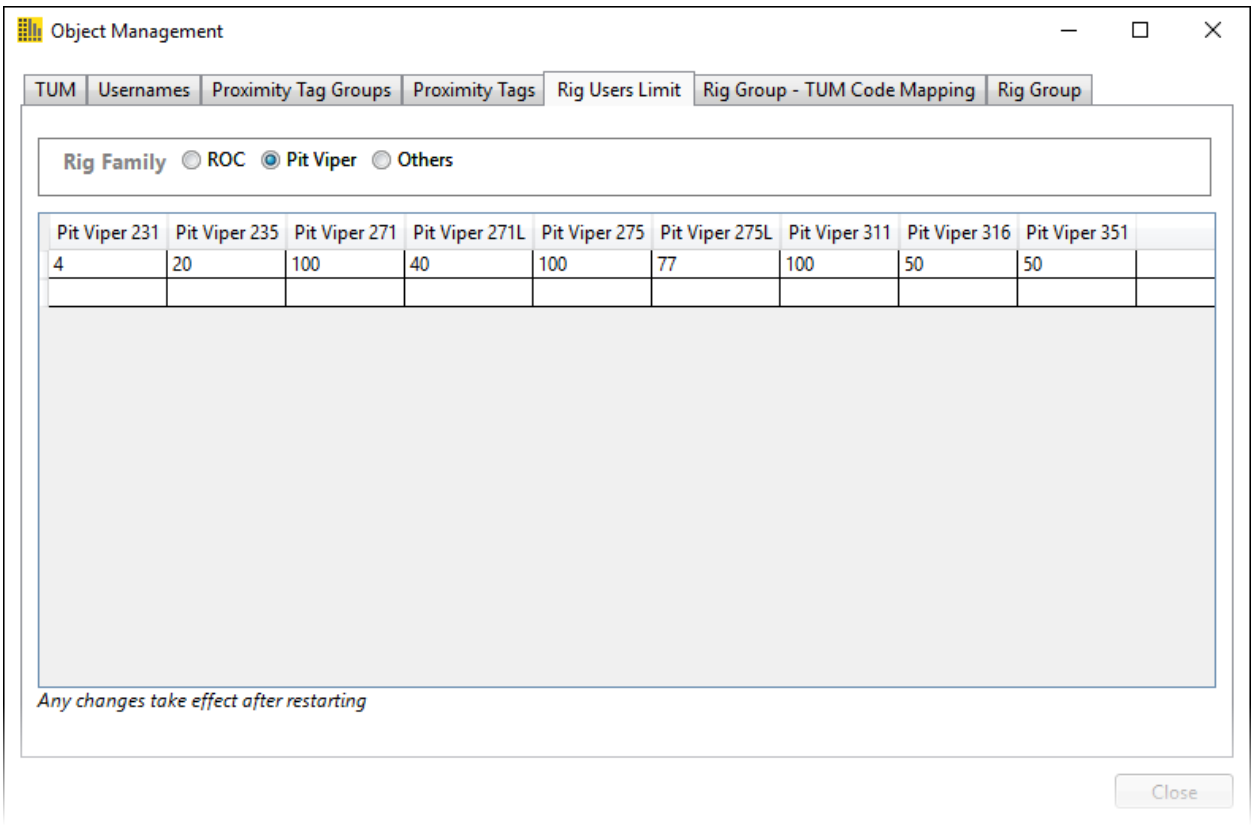
    a. Selection for **Rig Family** and checkboxes for each machine type have been added to the **Usernames** tab in the **Object Management** dialog box.

    b. When a user scrolls down the **Usernames** list, the headers now lock in place for better visibility.



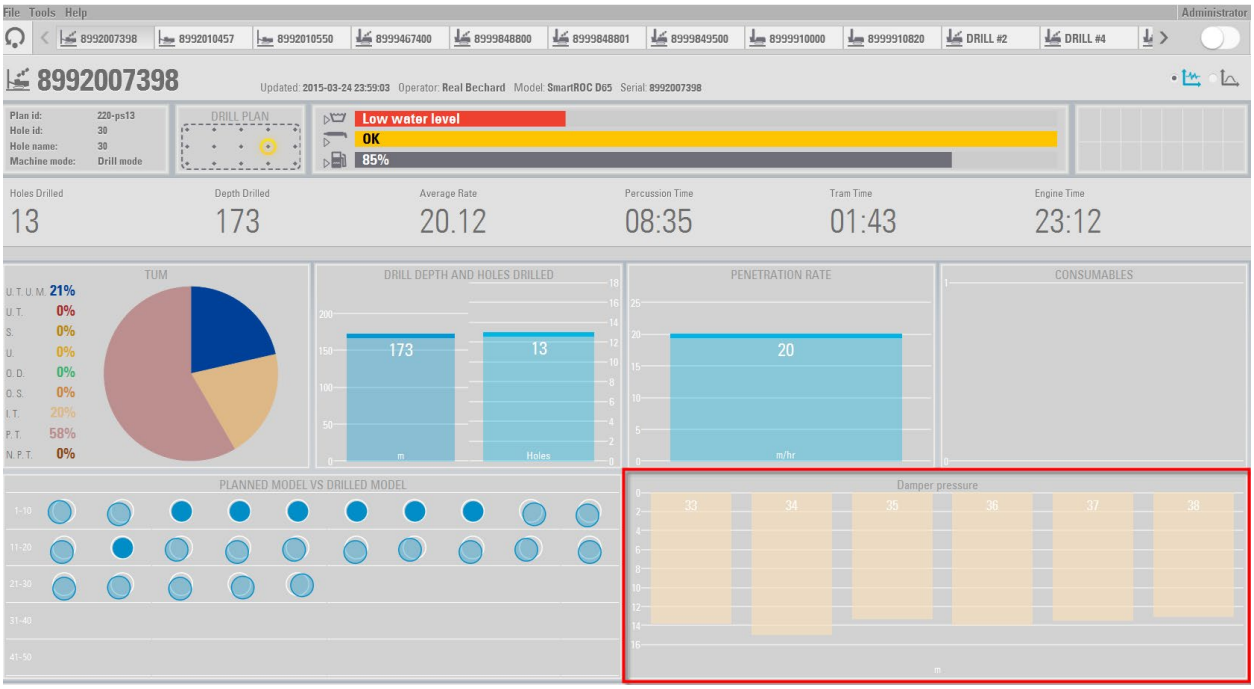
3. **Rig Users Limit —**

    a. The **Rig Users Limit** tab has been added to the **Object Management** dialog box.



4. **Hardness Widget**

    a. The **Hardness** widget can now display criteria for the effort of drilling for non-rotary drill machines other than Hardness. The preview on the main dashboard will reflect this.



5. **Drill Plan Management**

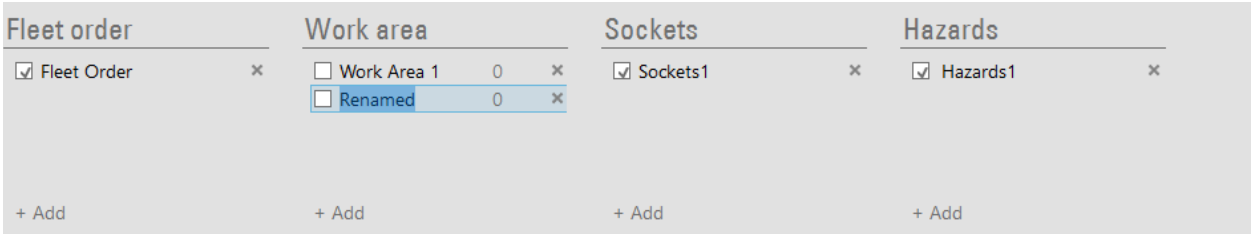
    a. The **Delete Drill Plan** option was added.

6. **Change Database Location**

    a. A **Change Database Location** radio button has been added to the **Login** window.

7. **Rename Drill Plan Attributes**

    a. Geofences, Sockets, Sequences, Hazards, Fleet Orders and Work Areas can now be renamed. Select the name of any drill plan attribute twice to edit the text. Once the text has been edited, changes must be applied to take effect.



System Updates

1. **Time Utilization Model —**

    a. Surface Manager has added TUM. TUM allows users to create codes categorized to a standard TUM model to track calendar time of a machine in reference to TUM categories.

b. **TUM Codes** have replaced references to **Delay Codes** in Surface Manager. Existing delay code names can be assigned to TUM categories in **Object Management** and all historic delay code information can be mapped to TUM categories with Event Editor Bulk Edit

    i. When exporting TUM codes to rigs, each TUM code is also exported as a delay code to rigs that do not yet support TUM codes. The rig operator can continue to start and stop TUM codes as delay codes.

    ii. When delay codes are now imported into Surface Manager, they are assigned a category that the equivalent TUM code is assigned to. Delay codes can continue to be edited as before.

    iii. Any time in a delay code will be reported into the assigned TUM category. Any time not in a delay code will be reported as productive time if the machine engine is on, or idle time if the machine engine is off.

    iv. When a TUM event ends, the next TUM event starts. There is no time gap between one TUM activity and the next. This will be reflected in reports and the **Event Editor**.

    v. When importing TUM codes through Event Logs, the end time is based on the next event's start time.

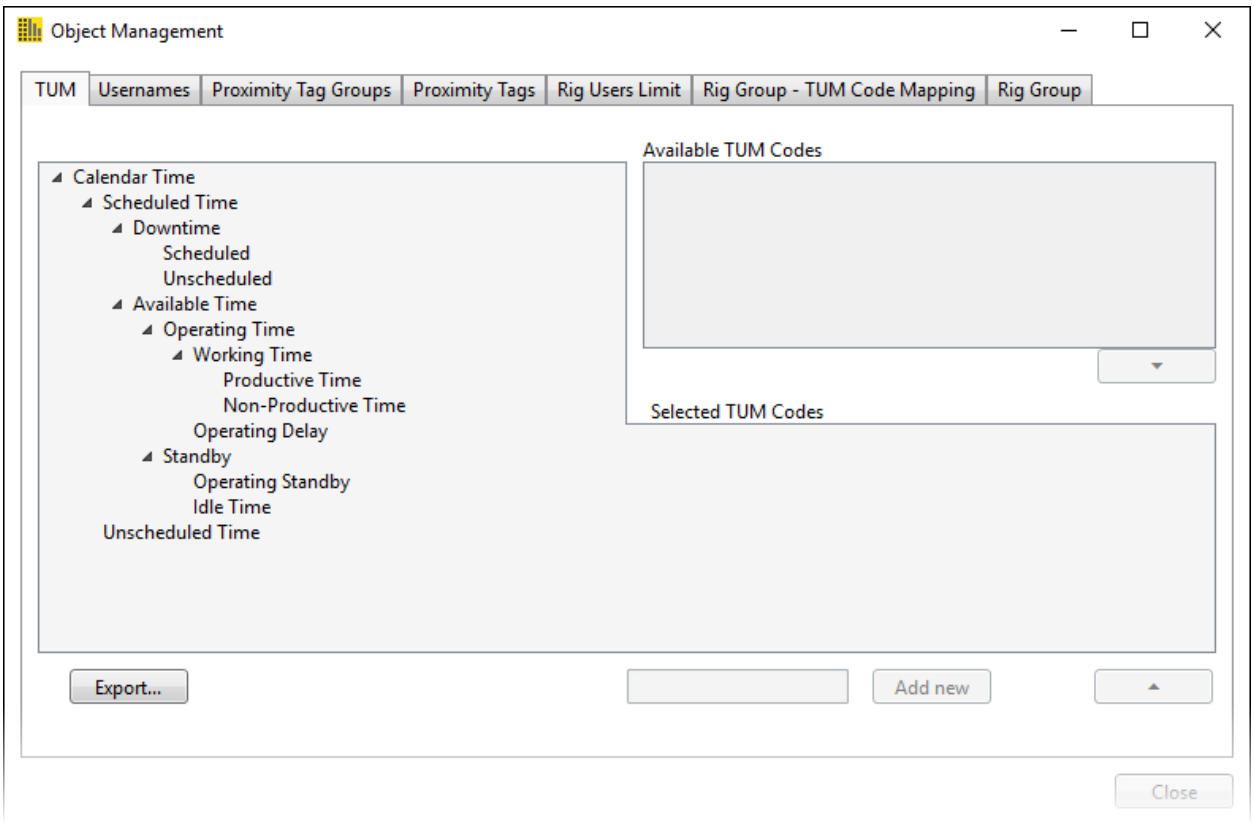
    vi. When editing the start time of a TUM event in **Event Editor**, it will update the previous event's end time.

    vii. TUM code end times can be updated using SQL query.

c. The **TUM** tab has been added to the **Object Management** dialog box. TUM codes can be added, assigned, and exported over the RRA from this tab.

    i. **Available TUM Codes** lists available TUM codes that can be assigned to a TUM category. Existing Delay Codes can be found here.

    ii. **Selected TUM Codes** lists the TUM codes assigned to the currently selected TUM category. Codes can only be added to lowest level TUM categories.



d. The **TUM** tab in the **Object Management** dialog box also displays the hierarchy of TUM categories in descending order.

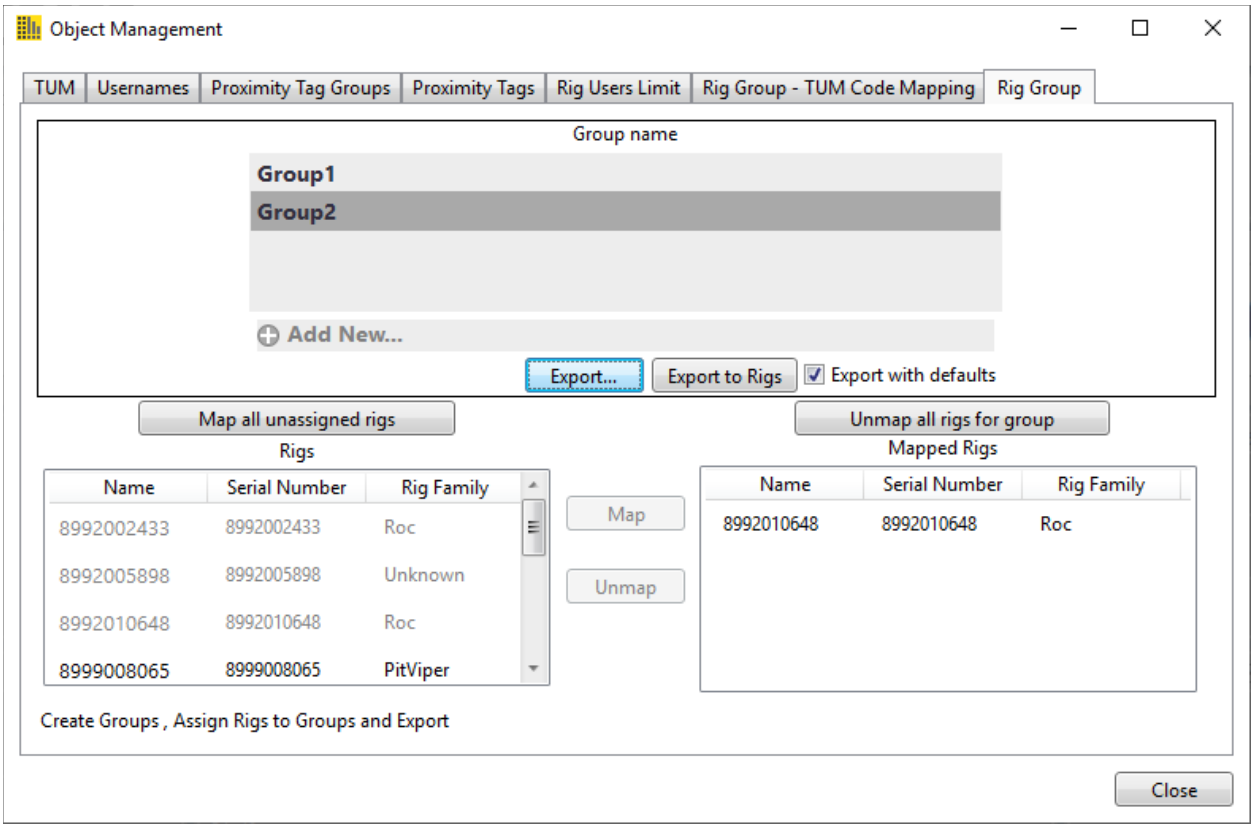
    i. Each TUM category has a default TUM code named after the category. These default codes are not editable and will be exported in the tumcodes.xml file if the option to include them is checked. Default codes are required for RCS5.4 and later versions.

e. The **Rig Group** tab has been added to the **Object Management** dialog box. Users can make rig groups and assign machines to the groups in this tab. This tab is also used to export TUM codes to rig groups.

    i. The **Default Tum Codes** checkbox will enable/disable export of the default tum codes along with the custom codes to the rig group.

    ii. **Export** will allow the user to export TUM codes for the selected rig group to a location on the computer, generating a folder for each rig.

    iii. **Export to Rigs** will allow the user to export TUM codes to the rigs in the group through RRA. This requires each rig in the group to have a defined export folder in Surface Manager Service.



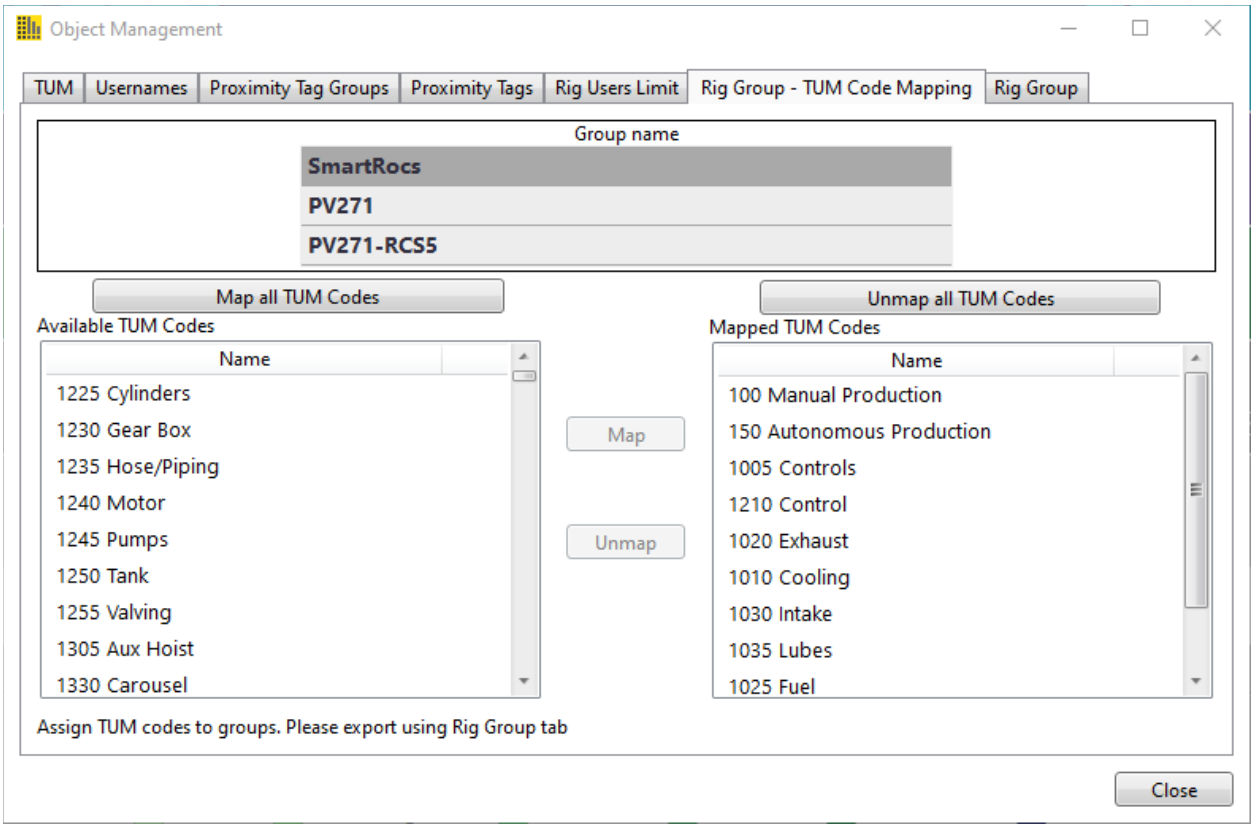
f. The **TumCodeGroup** tab has been added to the **Object Management** dialog box. After a group is made in the **Group** tab, the TUM codes are assigned to the group in this tab. This allows for different sets of TUM codes to be sent to different groups if needed.

   i. **Group Name** lists all Rig Groups that have been created in the Rig Group tab.

   ii. **Available Tum Codes** lists all available TUM codes defined in the TUM tab. Select one or more codes in the list to map them to the selected group.

   iii. **Mapped TUM Codes** lists all TUM codes mapped to the selected group. Select one or more codes in the list to unmap them from the selected group.

   iv. **Map all TUM Codes** and **Unmap all TUM Codes** can be used to bulk map or unmap all tum codes between the available and mapped lists.



g. The TUM preview widget displays the time a machine has spent in each lowest level TUM category. The time is represented as a pie chart and percentages of total calendar time.

h. The TUM metrics preview widget displays calculated metrics based on the total time in each category. The metrics are based off the GMG (Global Mining Guidelines

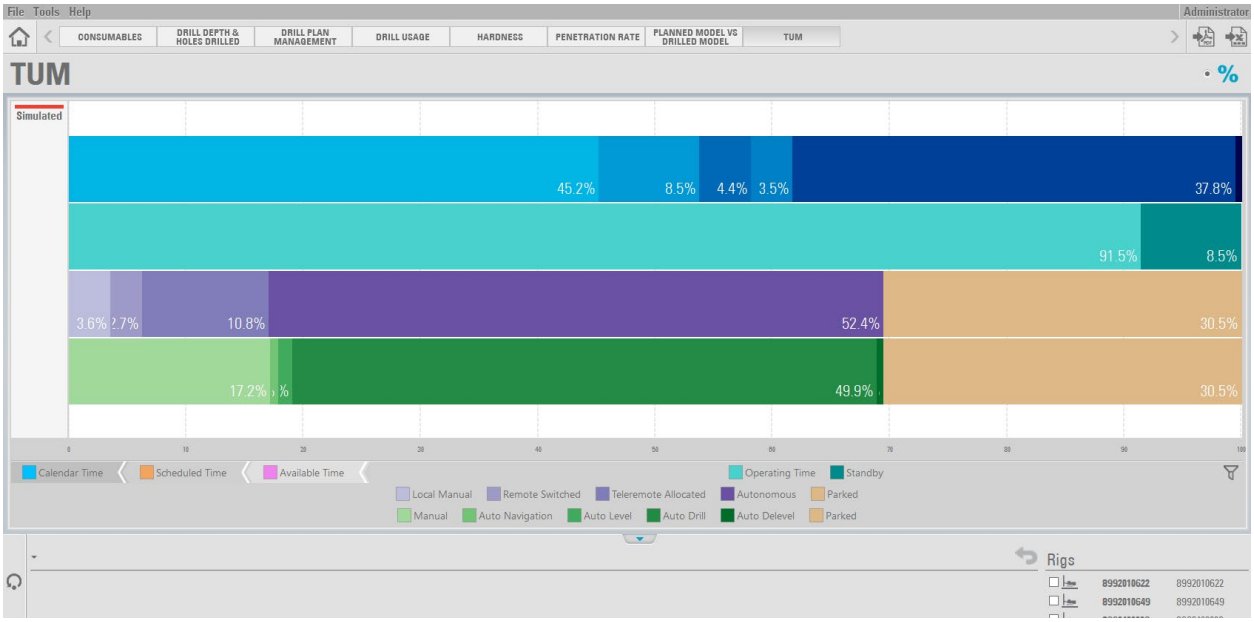
Group) Standard Time Classification Framework. The metrics data is included in TUM reports.

Term	Definition	Formula
	Availability KPIs	
Uptime*	The total time the equipment is capable of operating, whether it is scheduled or not	$\text{Uptime} = \frac{\text{Available Time}}{\text{Calendar Time}}$
Physical Availability	The percentage of time the equipment is available to perform its intended function over a defined period when it is required by the operation	$\text{Physical Availability} = \frac{\text{Available Time}}{\text{Scheduled Time}}$ Or $\text{Physical Availability} = \frac{(\text{Operating Time} + \text{Standby})}{\text{Scheduled Time}}$
Mechanical Availability	The time the equipment is available as a percentage of the time it is required by the operation	$\text{Mechanical Availability} = \frac{\text{Operating Time}}{(\text{Operating Time} + \text{Downtime})}$
	Utilization KPIs	
Use of Availability	The time the equipment is operated as a percentage of the available time	$\text{Use of Availability} = \frac{\text{Operating Time}}{\text{Available Time}}$
Asset Utilization	The time the equipment is being operated as a percentage of the total time available	$\text{Asset Utilization} = \frac{\text{Operating Time}}{\text{Calendar Time}}$
Operating Utilization	The percentage of time the asset is being operated when it is required to operate	$\text{Operating Utilization} = \frac{\text{Operating Time}}{\text{Scheduled Time}}$
Effective Utilization	The time the equipment is used to perform its intended function as a percentage of the time that it is scheduled to work	$\text{Effective Utilization} = \frac{\text{Working Time}}{\text{Scheduled Time}}$
	Effectiveness KPIs	
Operating Efficiency	The time the equipment is performing its intended function as a percentage of the time that it is operating	$\text{Operating Efficiency} = \frac{\text{Working Time}}{\text{Operating Time}}$
Production Effectiveness	The time the equipment is directly contributing to production as a percentage of the time that it is operating	$\text{Production Effectiveness} = \frac{\text{Productive Time}}{\text{Operating Time}}$

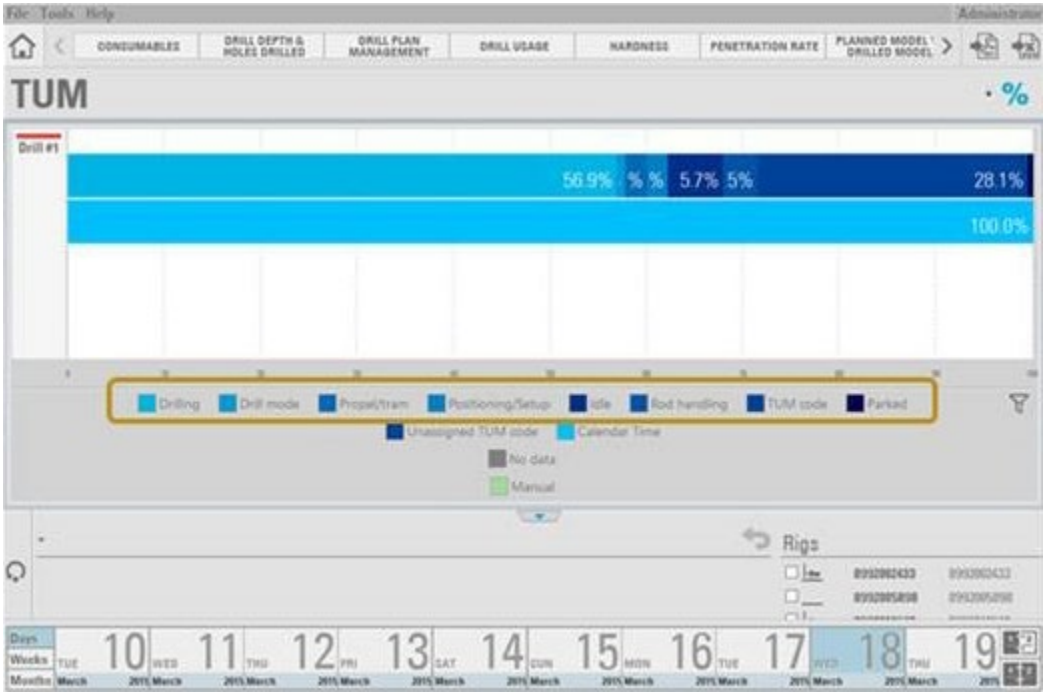
i. The TUM screen displays the time a machine has spent in each TUM code. The time is represented as swim lanes and also displays **Drill Usage** for comparison. The TUM screen is reached by clicking on the TUM preview widget.

    i. By default, the second lane is the TUM lane and initially shows any unassigned TUM time and assigned TUM time (depending if the TUM code is assigned to a category.

    ii. The user can select the TUM icon/name in the legend to drill down into the category. The lane will shift to show the lower categories as a percentage of the parent category all the way to the individual TUM codes.

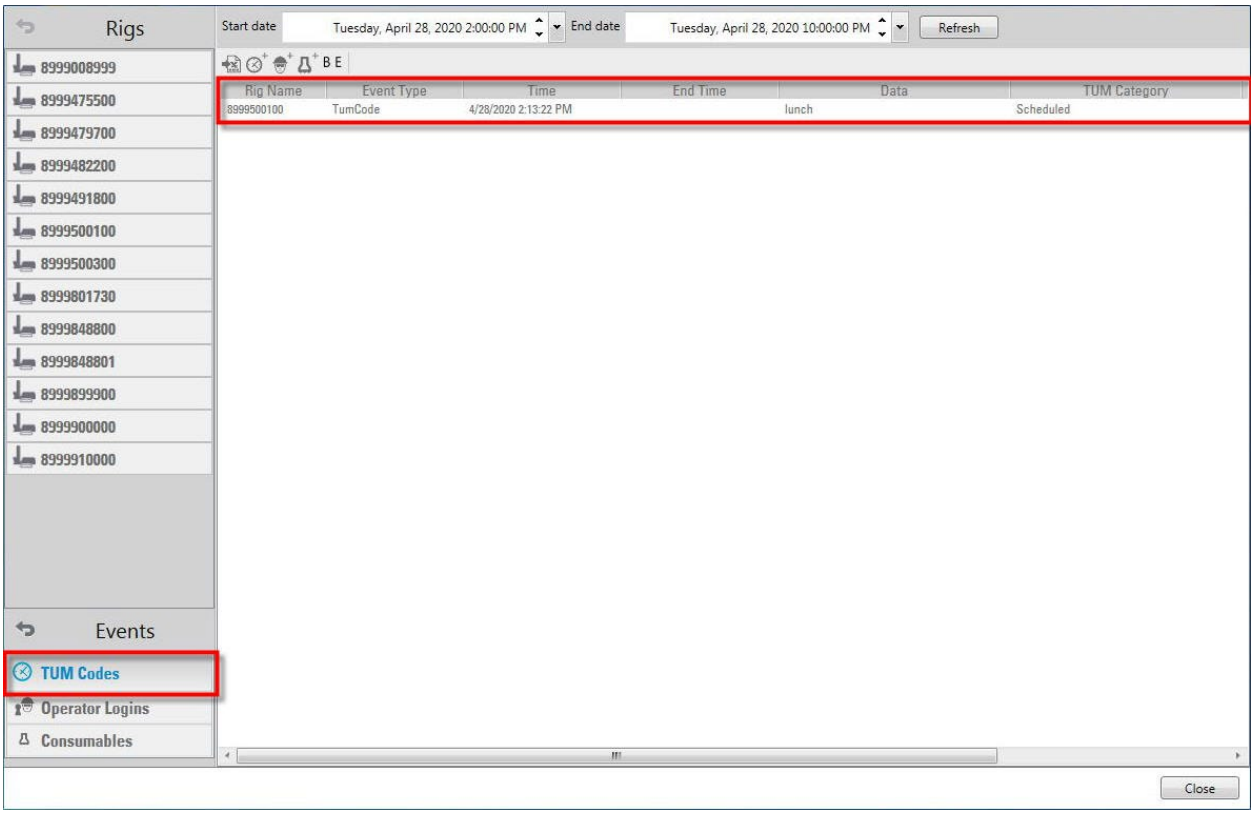


iii. The TUM screen can also display the machine states.

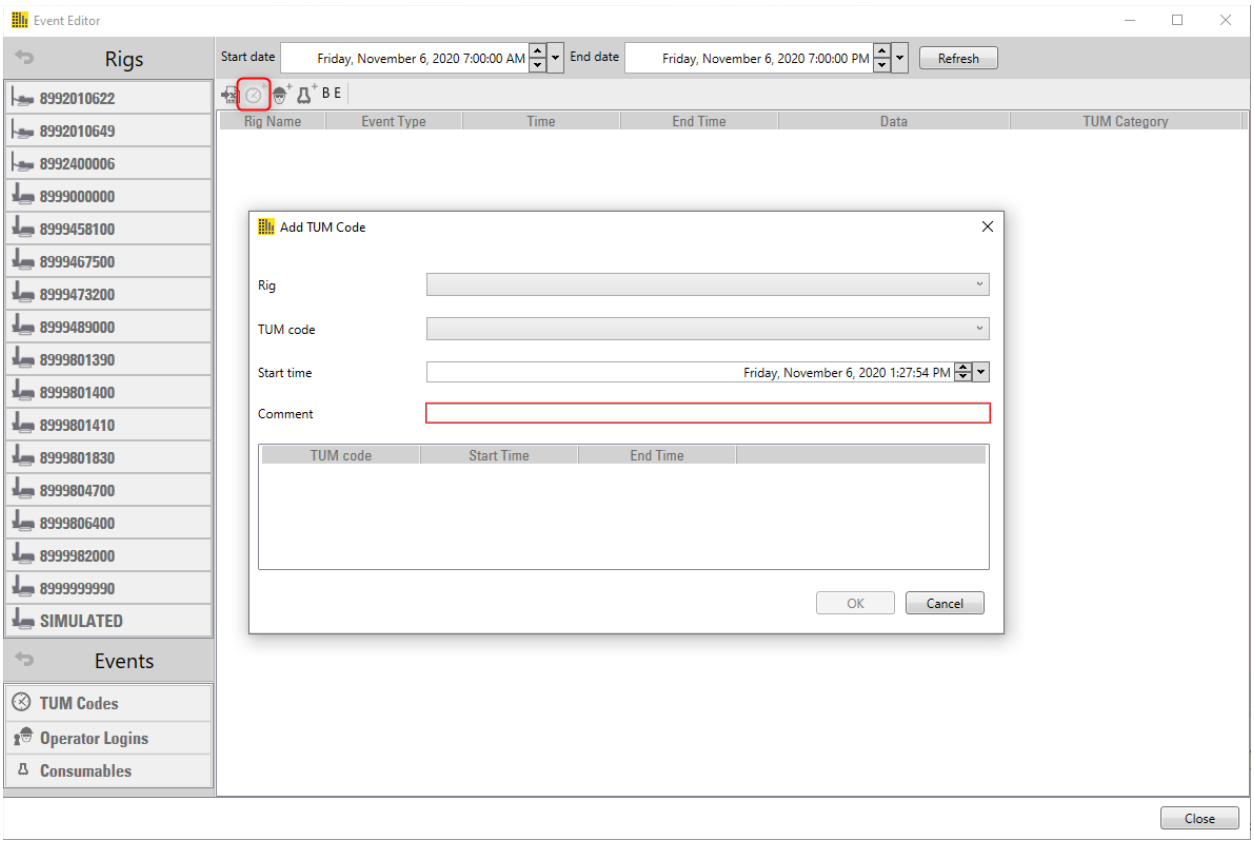


j. TUM code events can now be viewed in the **Event Editor**. Select the TUM Codes button on the left and individual rigs to filter the TUM codes between the start and end date in the list. The end time of one TUM code will also display as the start time of the next TUM code.

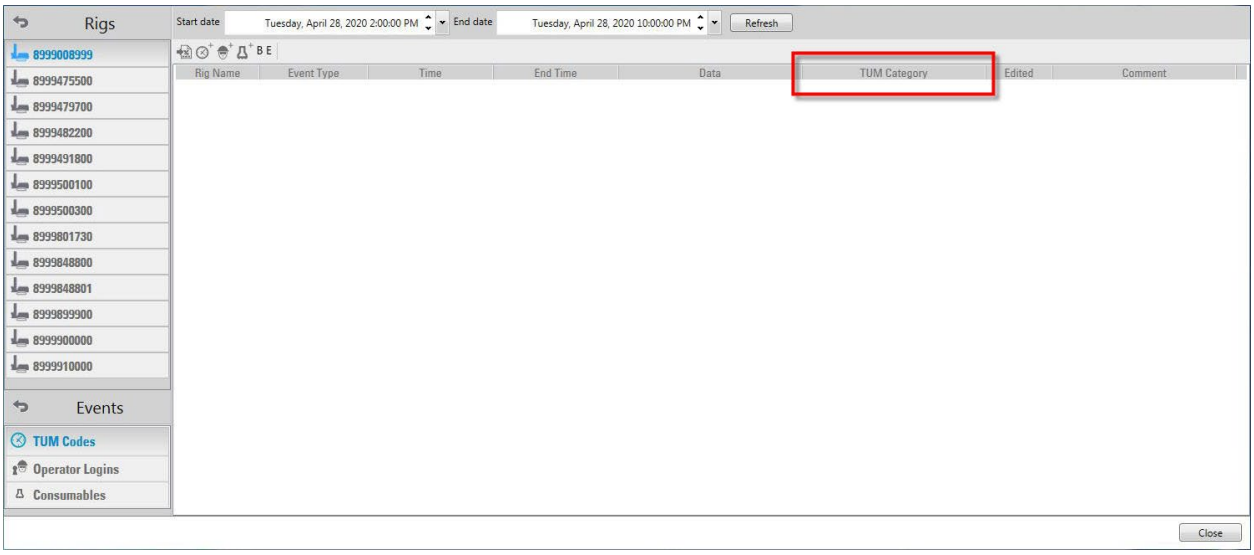
i. Historical delay codes will still be shown in the Event Editor and can also be accessed with the TUM code filter. Delay codes can no longer be added, but can be edited as before.



k. If time spent in a TUM code is not accounted for, TUM codes can now be manually added through the **Event Editor** with the **Add TUM Code** button and dialog box. A TUM code will only have a start time, and will always end on the start time of the subsequent TUM code. A TUM code will automatically be assigned the TUM category defined in object management. TUM codes can also be added to rigs that are not compatible with TUM.



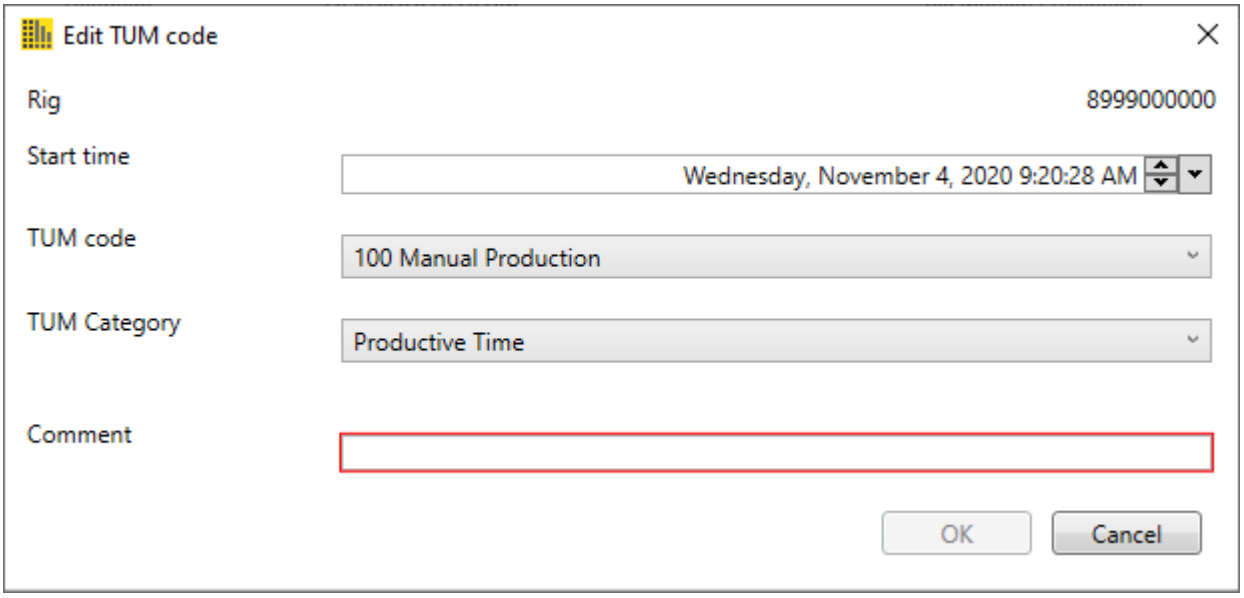
l. The **TUM Category** column has been added in the **Event Editor**. It will list the **TUM Category** for a TUM code.



m. The **Bulk Edit** button has been added so that historical delay codes or tum codes can be assigned new TUM categories. When making changes in the **Bulk Edit** window, Surface Manager checks the **RigDelayCode** for an exact TUM code match. Surface Manager changes the category of that TUM code to what was selected in **Bulk Edit** to avoid mismatching definitions.

n. TUM codes can be edited, by selecting a code and the edit function or double clicking the code. The user can change the start time or TUM code name and category.

    i. If a category is selected that does match the definition of the TUM code in object management, it will warn the user.

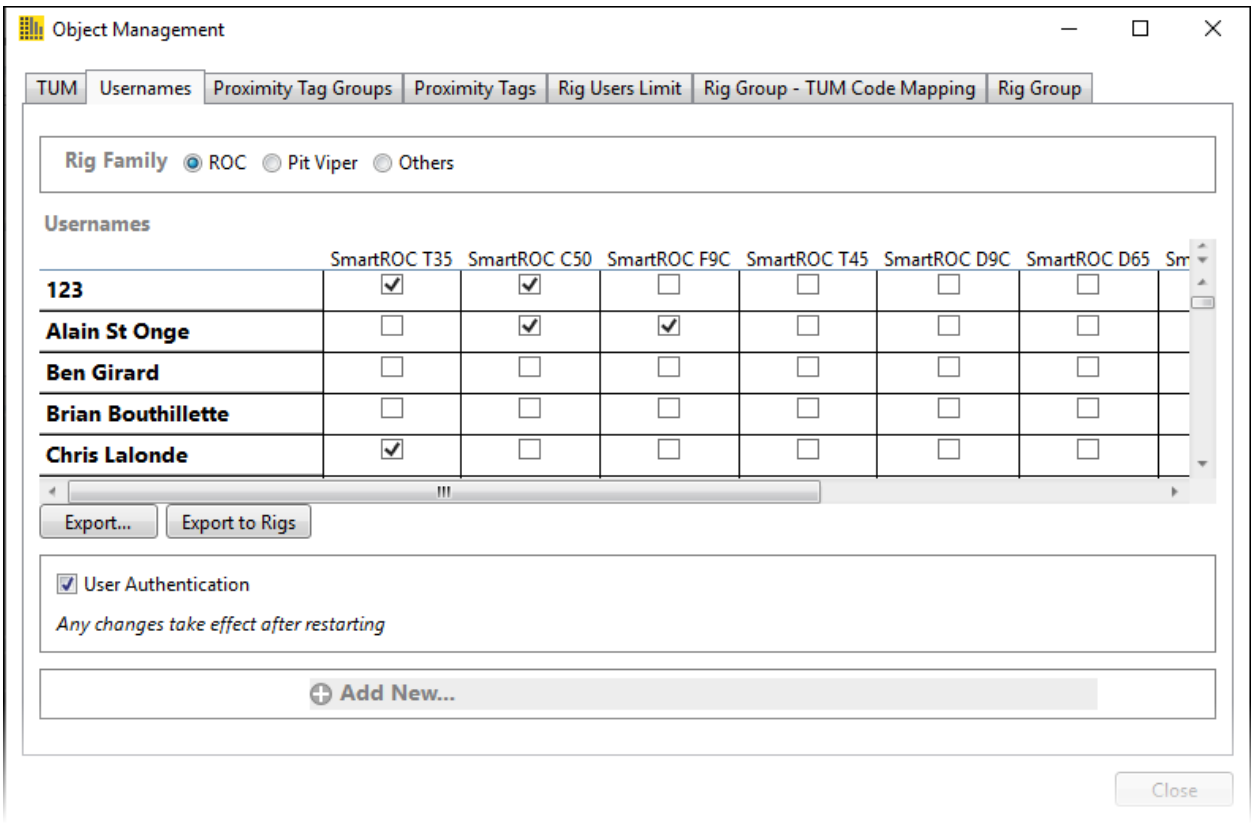


2. **Rig Selection —**

    a. A specific machine type can now be selected when exporting lists of operators, and TUM codes to the machines. This allows the drill supervisor to customize the lists that are sent to each machine type.

    b. The **Usernames** tab in the **Object Management** dialog box lets the drilling supervisor select which usernames are sent to specific machine types.

        i. **Export to Rigs** sends both the **users.txt** and **users.xml** files to the machines based on which users are added to the machine type.



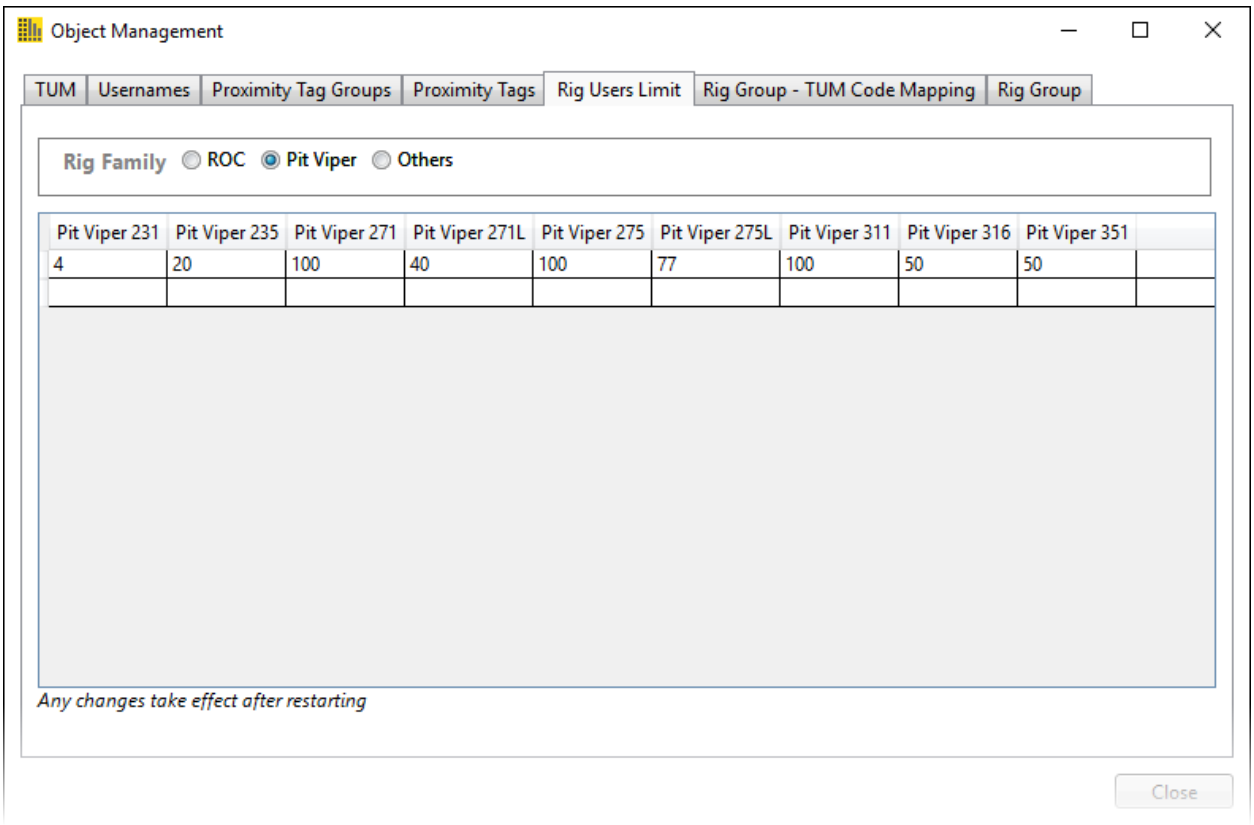
c. The version of RCS running on a machine may have a different limitation on the number of user names that can be exported to the machine. The **Rig Users Limit** tab in the **Object Management** dialog box lets the user view and/or set the limit of operators for each machine type before exporting a list of operator names to a machine. The default limits for different machine types are:

   i. ROC: 50

   ii. Pit Viper: 100

   iii. Others: 100

   Note: If the maximum limit of a category is already greater than the default values, then the script will not update the respective values.



3. **Usernames —**

    a. The **Usernames** tab in the **Object Management** dialog box now refers to all Pit Viper machines as **Pit Viper**.

    b. The radio buttons align more with the **Rig Family** label.

    c. The default user limits for each rig type has been changed.

        i. The default **ROC** user limit is 50.

        ii. The default **Pit Viper** user limit is 100.

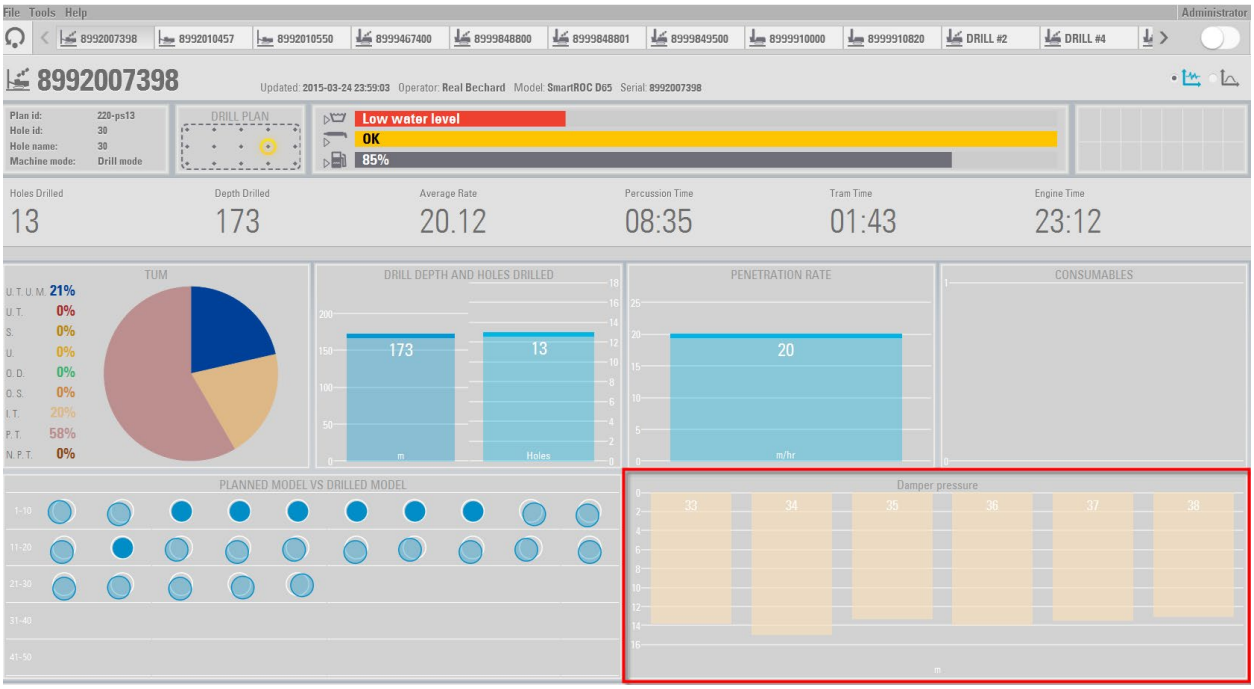
        iii. The **Others** user limit is 100.

4. **Delay Codes —**

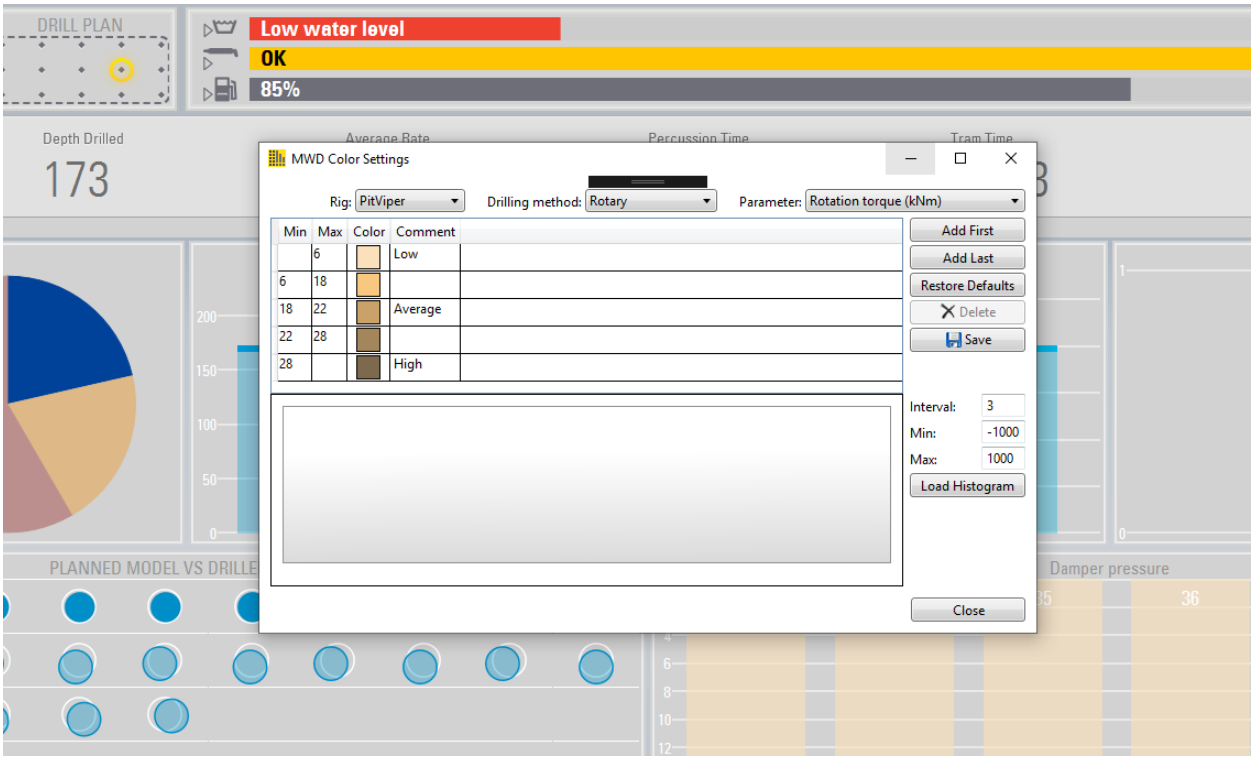
    a. **NA** is no longer an option when selecting a **TUM code** in the **Events Editor**.

5. **MWD Color Settings**

    a. Not all machines use hardness as its parameter for effort of drilling. The **Hardness** widget has been updated to allow different effort of drilling parameters other than hardness to match the appropriate machine and drilling method.



b. Users can change the effort of drilling parameters in the **Tools > MWD Color Settings** according to machine type and drilling method. The currently selected drop down parameter for the Rig family will define the parameter that is shown on the main dashboard.



6. The client will now handle exceptions differently and no longer crash. If an unhandled exception occurs, the client will attempt to continue to operate allowing the user to retry the operator or navigate elsewhere.

7. A number of performance issues have been resolved. Operations on the client should now appear faster and more responsive.

8. When an MWD sample from an SED machine (D65/T45) is included in a **Hole Information** report exported to PDF or Excel, the SED values for the MWD sample will now show up in the report.

9. The TUM code character limit has been changed to 40 characters. RCS 5.4 and RCS 4.20 and later will be able to accept TUM codes between 19 and 40 characters.

10. The number of TUM codes that can be exported to a rig has increased to 1000. RCS 5.4 and RCS 4.20 and later will be able to accept between 100 and 1000 TUM codes.

11. The drill hole limit for D65 machines has been increased from 450 to 2000. RCS 4.16

12. The drill hole limit for T40 machines has been increased to 2000 holes.

13. Drill plans can now be remotely deleted from the machine using Surface Manager when logged in at the Administrative level. This applies only to machines using RRA for file management.

14. TUM category acronyms in the TUM preview widget will now translate with different language settings.

15. **Feeder pressure** on the dashboard will now translate with different language settings.

16. The **Surface Manager Installer** now has a Chinese language option.

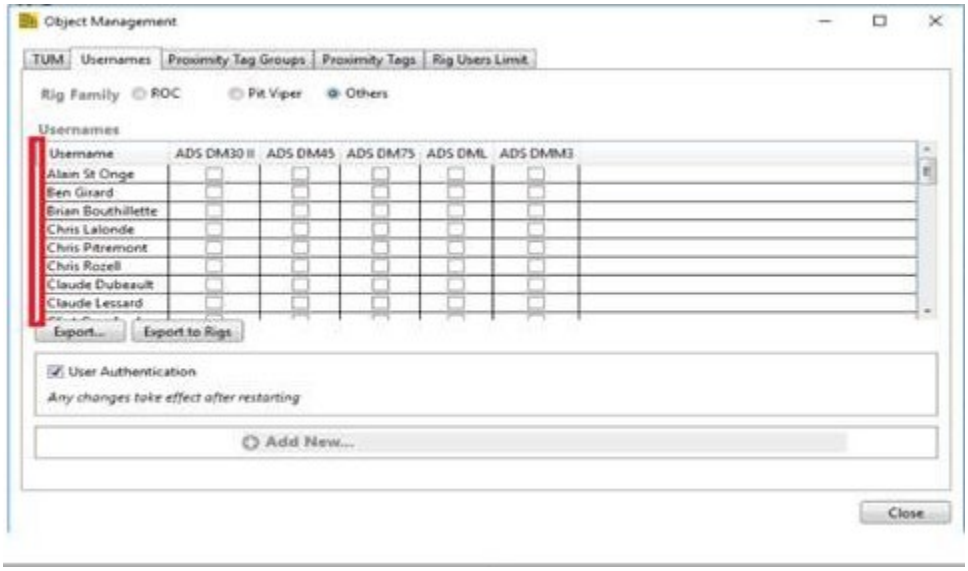
17. The PDF translation now has a Chinese language option.

18. The screens will not flicker when the user is scrolling.

19. Drill plans with multiple work areas that are exported to machines now follow the file naming convention as drill plans with multiple work areas exported to file. The format is **DrillplanName_FleetOrderName_WorkAreaName**. The drill plan ID inside the file still remains only the drill plan name. Note that D65s from RCS versions 4.17 and later do not support special characters in file names.

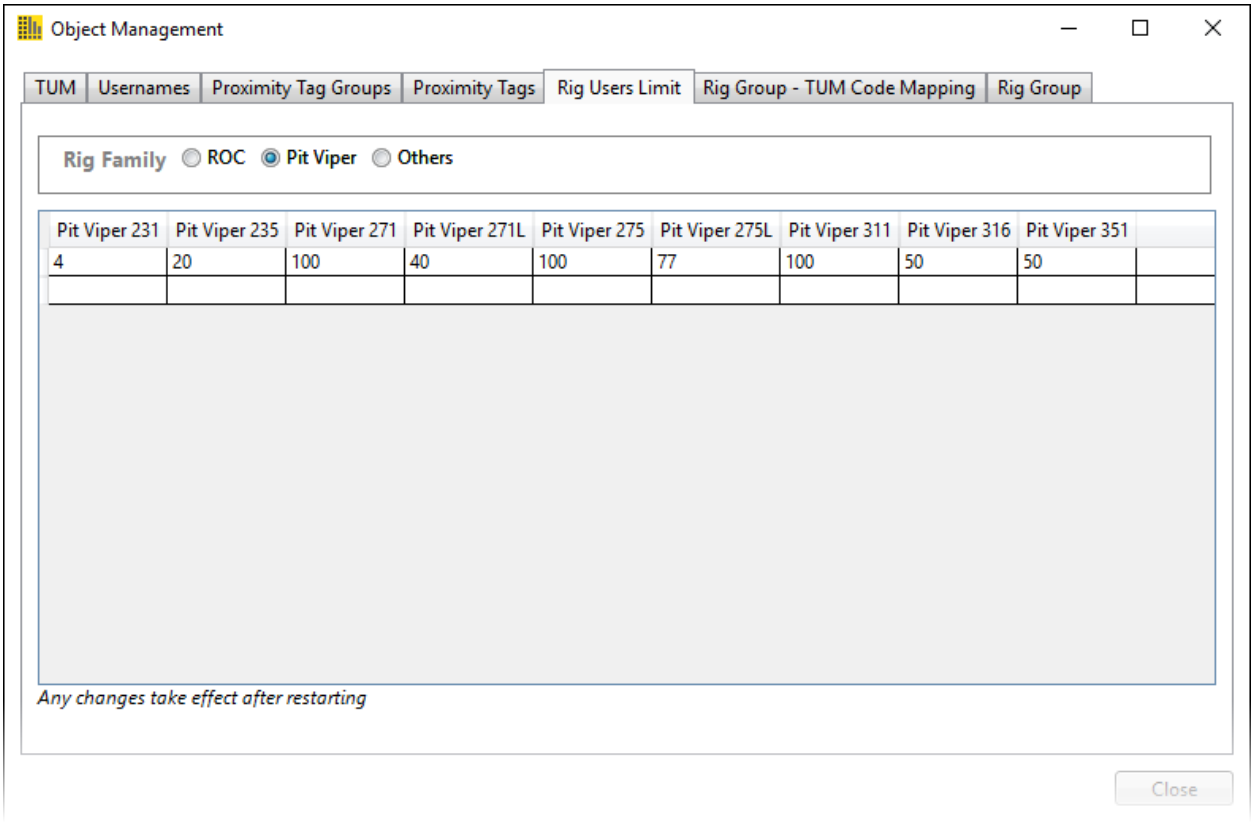
20. In the **Usernames** tab of **Object Management**, the white space of the column before the **Username** column has been reduced.

21. **Remarks** has been added to the **Tools** menu. **Remarks** supports comments from RCS5, RCS Lite, and SED machines.



22. Rig Users Limit

a. The **Rig Users Limit** tab allows users to view the user limits for the individual machine types within a machine family.



23. **Login Window**

a. The **Change Database Location** radio button allows the user to change the location of the database before logging in.

24. Production Editor Changes

a. When making edits to holes in the production editor, the changes will now be reflected in the original database tables as well as the transaction tables. This is the same as the event editor.

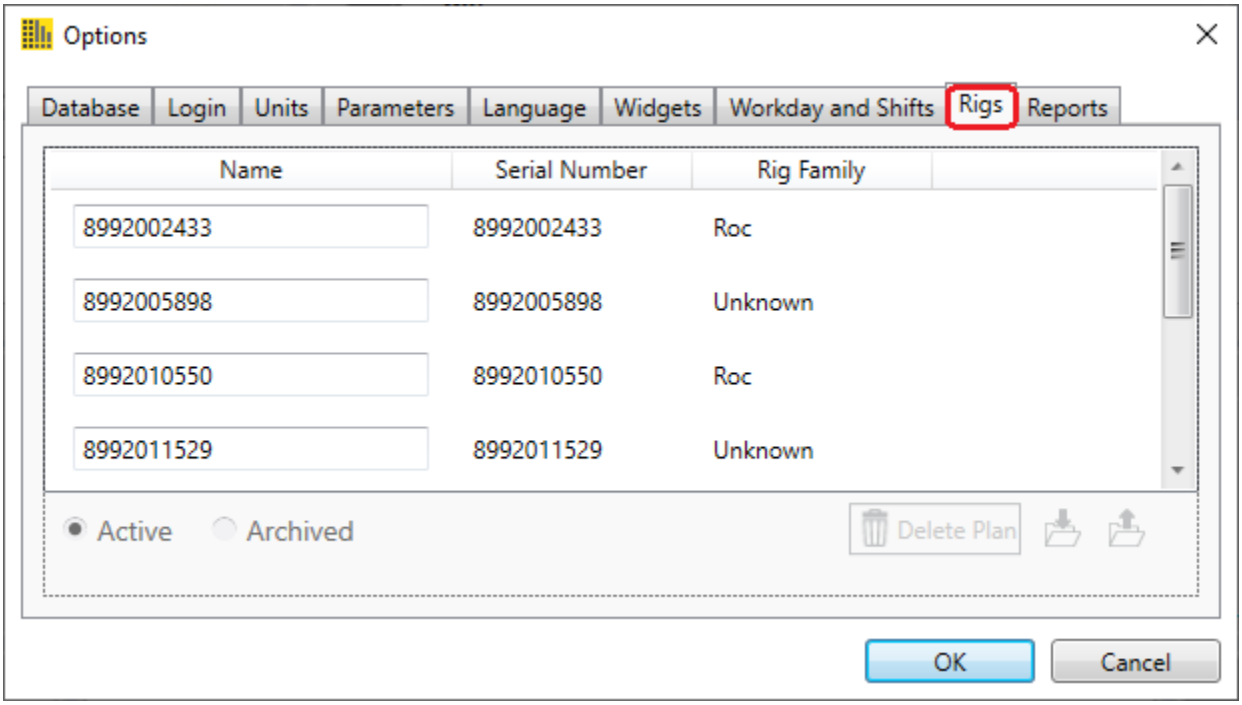
Operation

Drill Plan Management

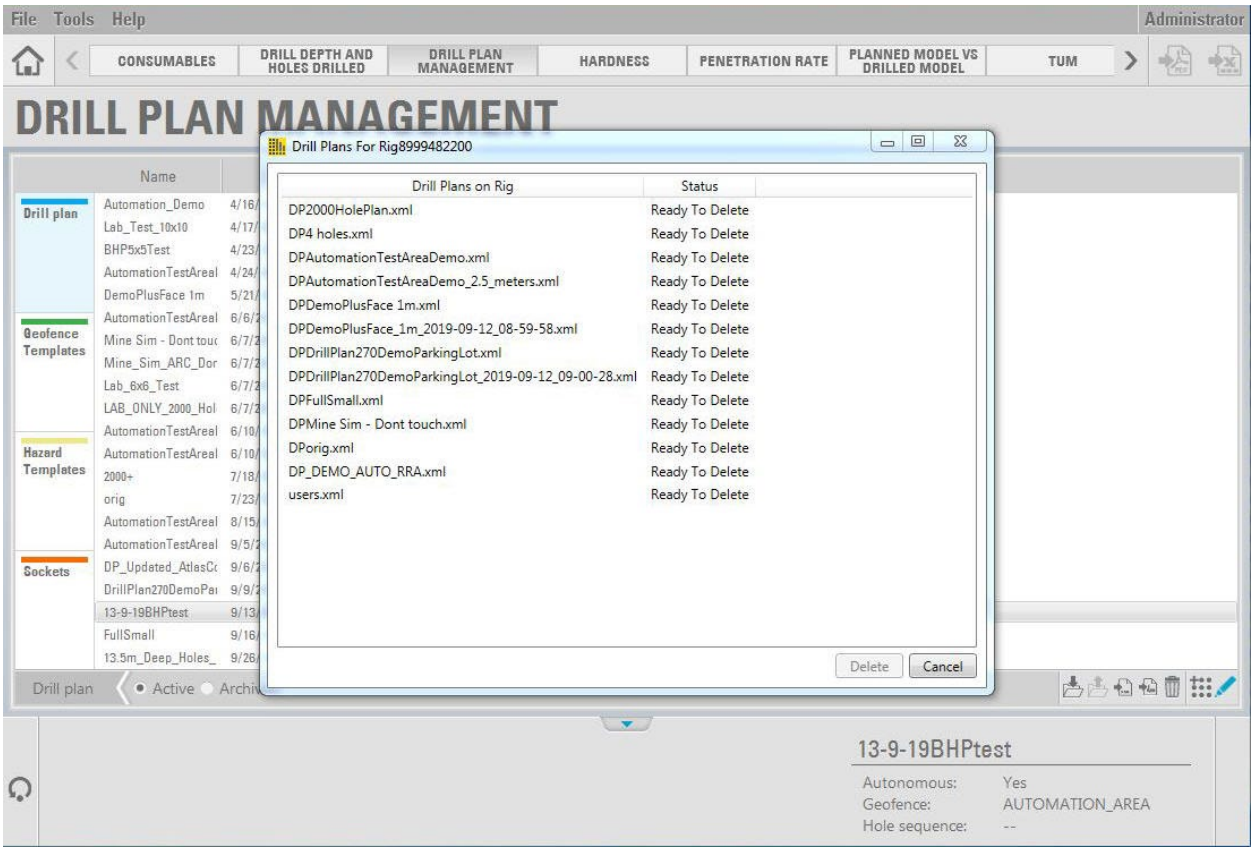
Remote Drill Plan Deletion

The user must be logged in as an Administrator.

1. Open the **Tools > Options > Rig** dialog box.
2. Select the **Rigs** tab.



3. Select the machine with the plan to delete.
4. Select the **Delete Plan** button. The list of drill plans for that machine will display.

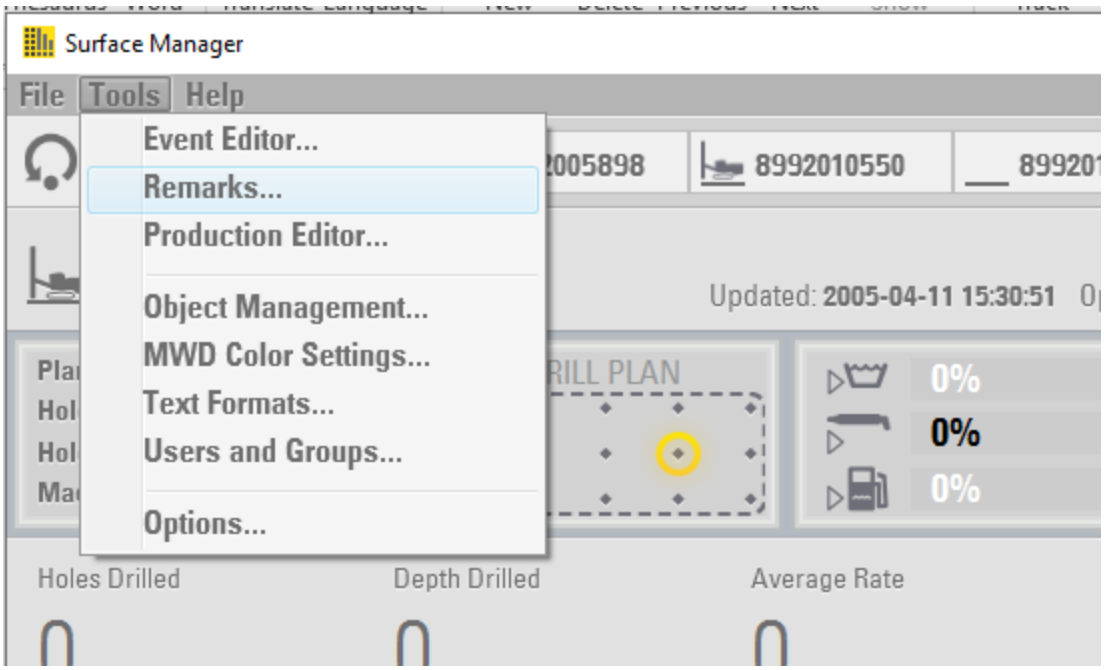


5. Select the drill plan to delete.
6. Select **Delete**.

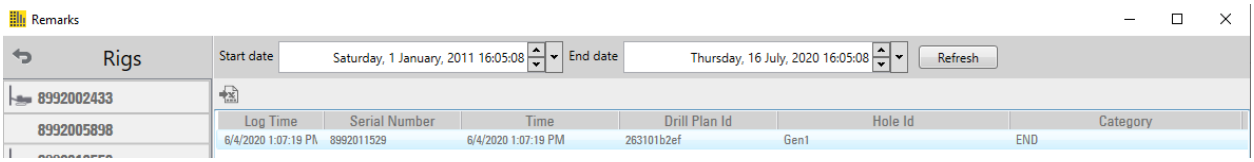
Remarks Option

1. Open the **Tools** menu.

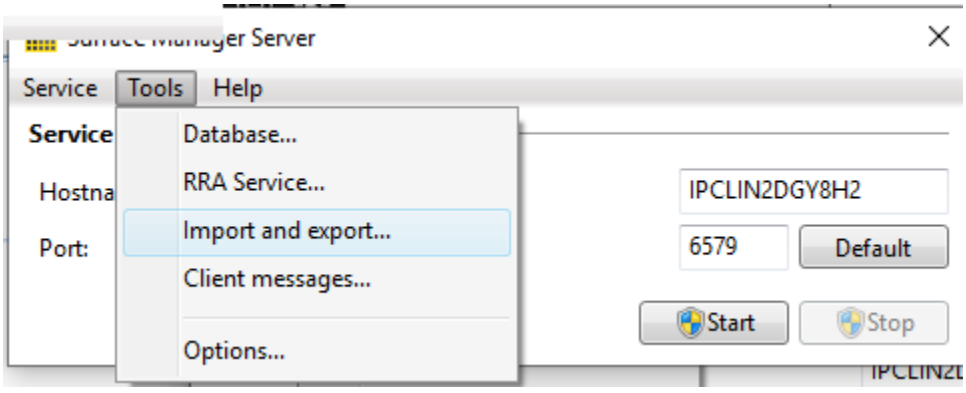
2. Click the **Remarks…** menu item.

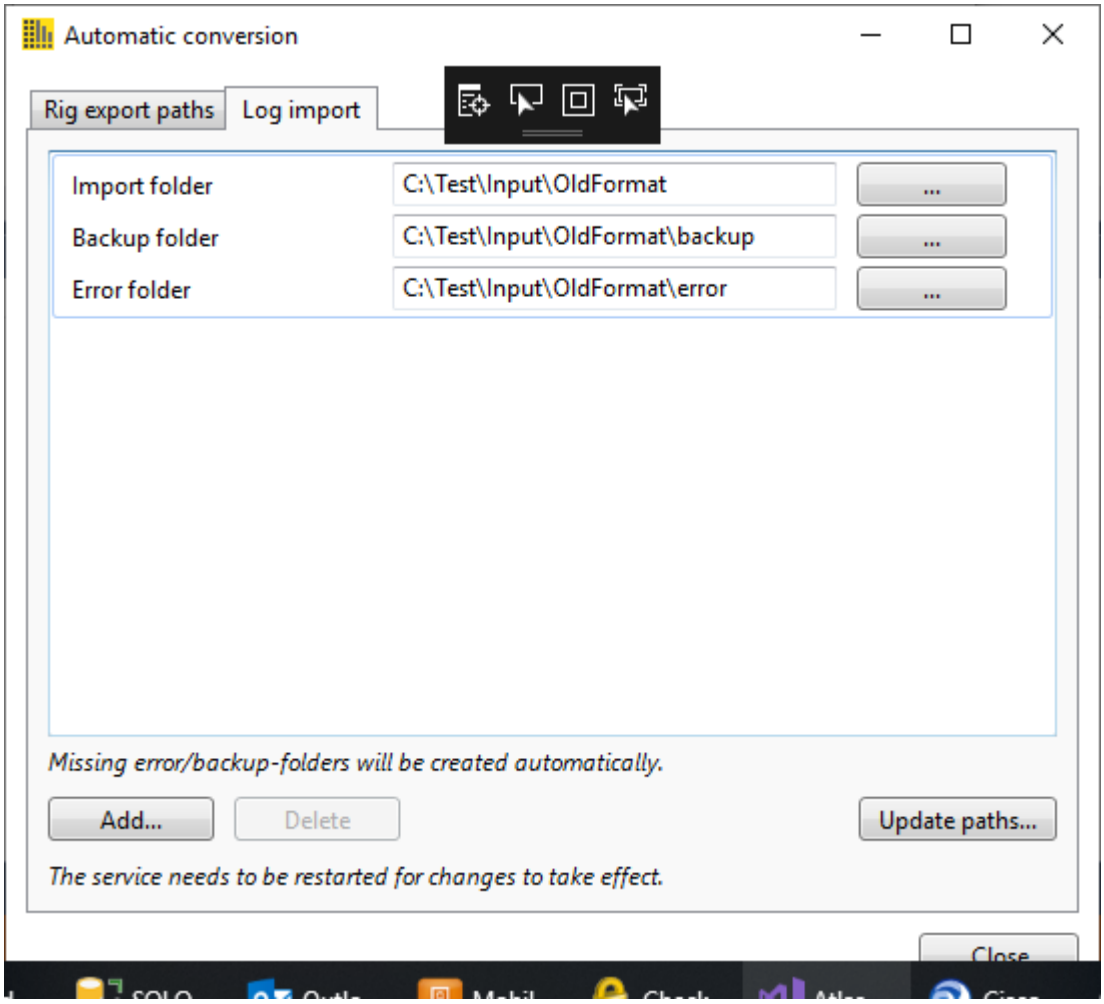


3. This feature currently only lists one remark at a time.



4. Remarks can be imported by placing the remarks file in a folder and giving the path in the Log Import tab.

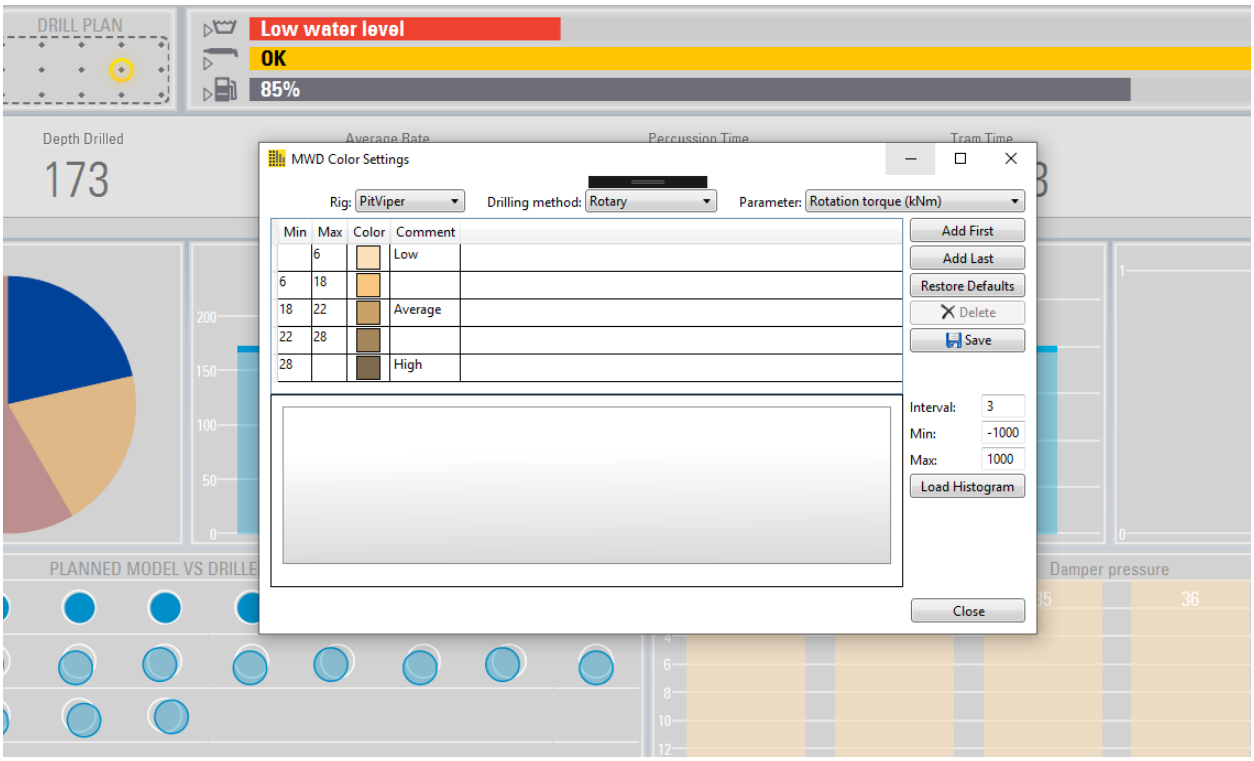




MWD Settings

Change Hardness Widget Parameters

1. Open the **Tools > MWD Settings** dialog box.

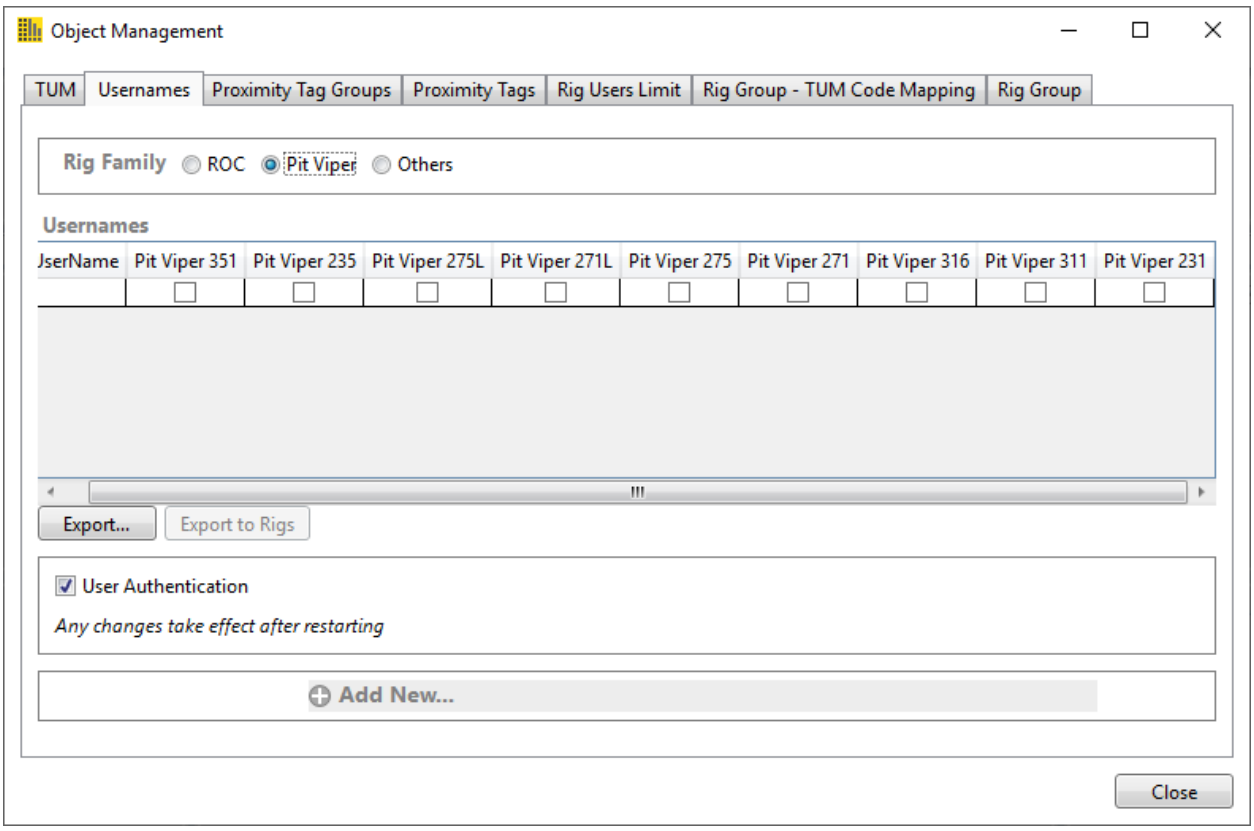


2. Select the **Rig** from the dropdown box.
3. Select the **Drilling method** from the dropdown box.
4. Select the **Parameter** from the dropdown box.
5. Select **Save** to save the changes.
6. Select **Close** to close the dialog box.

Usernames

Rig Selection

1. Open the **Usernames** tab in **Object Management** dialog box.



2. Select the **Rig Family**.
3. Select the checkboxes in the machine column of the **UserName** you want to authorize.
    a. Click **Add New** to add a new **UserName**.
4. Select **Export** to export the list through a USB stick or **Export to Rigs** to export the list to all machines.
5. Select **Close**.

Database Modifications

Database updates have been made to support TUM.

Database updates have been made as per the new GMG structure.

The spelling of **idel** has been corrected to **idle**.

Schema Database Tables

New Table(s)

1. RigTumCategory

Used while listing out TUM Categories in reports.

Maintains the GUIDs mapped to each category.

2. RigFamilies

   Used to display machine families options in **Usernames** and **Rig Users Limit** tabs of **Object Management** dialog box.

3. RigType

   Used to display machine families options in **Usernames** and **Rig Users Limit** tabs of **Object Management** dialog box.

4. OperatorRig

   Used to maintain the mapping between operators and the machine types (used in **Usernames** tab of **Object Management**).

5. Remark

   Surface Manager pulls the remarks from the input folder to populate it in the appropriate **Remark** table column.

6. DefaultMeasurement

   Used to store **Drilling Methods, Default Measures** for each **Rig Family**. The **Drilling Method** can be one of the following:

   - **TopHammer**
   - **DTHD65**
   - **DTH**
   - **Rotary**
   - **Unknown**

7. TumGroup (shows the data in **Group** tab of **Object Management**)

   Used to map the unique identifier and the corresponding **Rig Group** name.

8. TumGroupRig (show the data in **Group** tab of **Object Management**)

   Used to map each machine to corresponding **TumGroup.**

9. TumGroupTumCode

Used to map TUM codes to corresponding **TumGroup**. Used in TUM Code **Groups** tab of **Object Management**, where TUM Codes can be mapped to group of TUM Codes.

Dropped Table(s)

None

Modifications to Table(s)

1. Drill hole edits in the **Production Editor** will now also update the database **DrilledHole** table directly. The transaction table will contain both the original value and the updated **Production Editor** value.
2. Added **DrillUsageFilter_TumChecked** column in **Options** table, to indicate if TUM filter has been checked in TUM Widget (along with existing lanes: **Automation Modes**, **Auto Functions**, **Operator Names**, **Drill Plan**, **Drill States**).
3. Updated **RigDelayCode** table by adding **TumCodeId** column. This column indicates to which TUM Category the existing delay code is mapped.
4. Updated **RigEvent** table by adding **TumCodeId** column. The **TumCodeId** column indicates to which TUM Category the corresponding event belongs to. Mapped as foreign key to code column of **RigTumCategory** table.
5. Added **UseTum** column to **Settings** table, to allow user to toggle between o **Delay Codes** and **TUM** tabs in **Object Management.**
6. Added **IsTumCode** column to **RigEvent** table to indicate if an event was originally received as a TUM code or delay code.
7. Added **IsArchived** column to **Rig** table. Column is used to indicate if a machine is archived.

Bug Fixes

1. Fixed an issue where, after archiving a machine, then selecting that same machine in the **Depth Drilled and Holes Drilled** widget, the **Rig is unavailable. Restart the Surface Manager.** message did not appear.
2. Fixed an issue where an archived machine was still available in the **Drill Depth and Holes Drilled** widget.
3. Fixed an issue where the Refresh button was not working in the **TUM Drill Usage Planned Model vs Drilled Model** screen..
4. Fixed an issue where the **Drill Parameter Change Report** was not accessible after the event logs contained USB security changes.

5. Fixed an issue where an Exception error would occur and the application would crash when the **Refresh** button was selected in the **Hardness** widget.

6. Fixed an issue where **Rig Name** in the **Drill Parameter Change Report** .pdf file was spelled incorrectly.

7. Fixed an issue where an **Exception** error would occur when the custom timeline selector was used in the **Drill Usage** widget.

8. Fixed an issue where the Fuel and Error Code sections in the Surface Manager client were overlapping on the screen.

9. Fixed an issue where the **Drill Depth and Holes Drilled** text and the **Close** icon for the same section were overlapping on the screen.

10. Fixed an issue where the text that identifies the machine title and hardness in the **Hardness** widget preview was cut off on the screen.

11. Fixed an issue where the last value on the x-axis line below the data in the **Drill Usage** widget was overlapping with the frame around the drill usage section on the screen.

12. Fixed an issue where, when a new user was created in Surface Manager without a valid email address and the **Login** type was set to **Active Directory,** Surface Manager would automatically attempt to create a new user when logging in for the first time. An error will display when the user tries to input their login credentials.

13. Fixed an issue where, if no filter selection was made in the **Hardness** widget, no drill holes would appear on the screen. If a filter selection *was* made, all of the drill holes would then appear.

14. Fixed an issue where the Production Editor was not working correctly with the Russian calendar.

15. Fixed an issue where an exception error would occur when more than 256 ANS format characters were in a drill plan name on the **Drill Plan** widget.

16. Fixed an issue where drill plans with sockets would not export through the RRA.

17. Fixed an issue where Surface Manager would export drill plans without socket information.

18. Fixed an issue where Surface Manager crashed when the **Drill Usage Preview** widget was selected when no machine is available.

19. Fixed stability issues with Surface Manager versions 2.16 and 2.18.4.

20. Fixed an issue where a duplicate hole could be imported with a different start or end time due to corrupt data. Duplicate holes will now be ignored.

21. Fixed a bug where the filters on the Hardness screen did not actually filter the results when exporting.
22. Fixed a bug where certain underscore characters where hidden in the drill plan edit screen.
23. Fixed an issue where Surface Manager would export a file named TumCodes.xml while RCS expects the file to be named Tumcode.xml.
24. Fixed an issue where a TUM code file would export without a root tag. This caused RCS to not load the file.
25. Fixed an issue where Surface Manager would make parent IDs and child IDs identical in a TUM code.
26. Fixed an issue where Surface Manager would not load machine event logs with TUM codes in them.
27. Fixed an issue where TUM code files would export IDs with all zeroes.
28. Fixed an issue where the **Rig Family** did not include PV231.
29. Fixed an issue where the **Standby** TUM code was displaying as **Unassigned TUM code** in the **TUM** widget.
30. Fixed an issue where the TUM Widget Preview showed only the most recent TUM code in the pie chart percentage breakdown.
31. Fixed an issue where mechanical delay code **890-** was also displaying in the **Operational** and **Other** delay section.
32. Fixed an issue where the elapsed time in a TUM report is different from its respective PDF report.
33. Fixed an issue where the **Export** button in the **Rig Group** tab of **Object Management** would only export the tumcodes.xml file but not the delays.txt file. Also, only mapped custom codes would export while any mapped default codes would not export. All mapped codes, the tumcodes.xml file, and the delays.txt file will now export.
34. Fixed an issue where TUM and **Remark** permissions could not be added to **Security Groups**.
35. Fixed an issue where **Unscheduled** was misspelled as **Unsheduled** in TUM reports.
36. Fixed an issue where it was difficult to select or delete the last listed **Work area** when six or more work areas are listed.
37. Fixed an issue where the **Save Changes** window when renaming a drill plan did not display.
38. Fixed an issue where multiple productive times were created in between delay codes instead of just one.

39. Fixed an issue where closing Surface Manager without closing a drill plan open in **Drillplan Management** would lock that drill plan. The user wouldn't be able to reopen that same drill plan once Surface Manager was restarted.

40. Fixed an issue where the **Export** button in the **Rig Group** tab of **Object Management** would not export new **Group name** creations to the machines.

41. Fixed an issue where, when hovered over, the **TUM** widget would display times of **00:00:00** hours for all categories except for **Productive Time**.

42. Fixed an issue where using the space key in the text box to add a new TUM in the **TUM** tab of **Object Management** would move the text cursor to the front of the text.

43. Fixed an issue where the TUM preview data did not match with the main TUM widget data when end time was null.

44. Fixed an issue where the autofunction visibility was not working in some scenarios.

45. Fixed an issue where the **Map/Unmap** function in the **Rig Group – TUM Code Mapping** tab of **Object Management** was not translating to Portuguese correctly.

46. Fixed an issue where **Delete Drill Plan** would not work if a serial number was not in the user-provided path. **Delete Drill Plan** will now delete drill plans with any path defined by the user.

47. Fixed an issue where the preview widgets could not be replaced when using the Chinese language.

48. Fixed an issue where, if the user is using imperial units, metric units would still display in the **Planned vs Drilled** widget.

49. Fixed an issue where, if the user is using imperial units, metric units would still display for **Planned vs Drilled** in reports.

50. Fixed an issue where, when changing time in the **TUM** widget, the **Rig** filter would change to the rig selected on the main dashboard and override the current machine selection on the **TUM** widget.

51. Fixed an issue where the **TUM** widget did not reflect changes to the machine selection in the widget.

52. Fixed an issue where it was not possible to view more than one machine at a time in the **TUM** widget.

53. Fixed an issue with the **Drill State** lane of the **Drill Usage** and **TUM** widgets. The entire **Drill State** lane would display as **Delay** when using TUM codes. Since TUM codes are always active, the **Drill State** lane would always display **Delay**. When the TUM code is a **Productive** or **Non-Productive** category, the **Drill State** lane of the **Drill Usage** and **TUM** widgets now display the correct drill state,

54. Fixed an issue where the **Drill Usage** preview widget displayed duplicate parameters.

55. Fixed an issue where the **Rig Group – TUM Code Mapping** tab of **Object Management** did not have a scroll function in its **Group List** section.

56. Fixed an issue where adding a rig group in the **Rig Group** tab of **Object Management** was not reflected in **Rig Group – TUM Code Mapping** unless **Object Management** was closed and reopened.

57. Fixed an issue where the **Drill Usage** and **TUM** showed **Working Time** TUM codes in the top lane as **Delay**, **Reports**.

58. Fixed an issue where duplicate TUM codes could be mapped to **Rig Group** tab of **Object Management** multiple times, resulting in duplicate TUM codes.

59. Fixed an issue where some delay codes without an existing **End Time** were not editable.

60. Fixed an issue where the sum of the **TUM** preview widget was sometimes greater than 100%.

61. Fixed an issue where the **Export to Rigs** users.xml file would display all users instead of the user-selected users.

62. Fixed an issue where the **Export Remarks** excel button in **Remarks** was not working.

63. Fixed an issue where the border line cut at the **TUM** tab of **Object Management**.

64. Fixed an issue where Pit Viper names on the **Dashboard Model** were displayed as **PV** instead of **Pit Viper**.

65. Fixed an issue where users could not edit delay code start times if a TUM code is inserted before the delay code.

66. Fixed an issue where adding TUM codes before a delay code would change that delay code into a TUM code.

67. Fixed an issue that caused Surface Manager to crash when users select a certain time range and then try to load the **Planned Model vs Drilled Model** screen.

68. Fixed an issue where, when Surface Manager loses connection to the server, the following message would display repeatedly:
    Unable to render embedded object: File (A181C1C9-3DBC-4614-9551-109A25C920F9) not found.
    The message now displays only once.

69. Fixed an issue where archiving a machine in the **Tools – Options – Rig** tab did not clear the machine's data from the single-machine Surface Manager dashboard.

70. Fixed an issue where Surface Manager would crash when the user tried to edit dates/times for TUM codes in the **Event Editor** in some scenarios.

71. FDFixed an issue where two TUM codes occurring at the same second would both be ended by the next TUM code by time.
72. Fixed an issue where the key-in lengthy number is not accepted. This caused an alert message saying to enter only numbers to display, even after entering the same to display.
73. Fixed an issue where the **TUM Metrics** x-axis was overlapping with other screen GUIs.
74. Fixed an issue where drilled holes with the same hole ID from different drill plans were not included in queries from the main dashboard and **Production Editor**.
75. Fixed an issue where TUM codes in newly imported event logs would record the end time of the TUM code the same as its start time.
76. Fixed an issue where adding a comment to a TUM code being edited would cause that comment to also be added to the previous TUM in the **Event Editor**. Both TUM codes would also be marked **Yes** in the **Edited** field.
77. Fixed an issue in the **Event Editor** where changing the first TUM code in a filtered list would cause the **End Time** to change to match its **Start Time**.
78. Fixed an issue where **Idle** time was incorrectly calculated in the TUM widget.
79. Fixed an issue where a **Non-working Time** TUM code's duration would be recorded correctly in the **Event Editor** when a setup mode event occurs at the same time, but the **Drill Usage** widget and Excel report would record the TUM code as ending when the setup mode event occurs.
80. Fixed an issue where **Productive Time** was being shown in the **Drill Usage Lane**.
81. Fixed an issue where the machine's current state was not recorded in the **Drill Usage** widget when a TUM code or delay code in **Non-working Time** ended.
82. Fixed an issue where, when a TUM code or delay code ended, the machine's current state was incorrectly recorded as **Non-working Time** instead of the machine's actual current state.
83. Fixed an issue where queries would time out when upgrading Surface Manager to version 2.19 rev. 9.
84. Fixed an issue where the TUM widget would still incorrectly calculate **Idle** time.
85. Fixed an issue where, when exporting a second drill plan to a machine after exporting a first drill plan, the first drill plan would incorrectly be exported again instead of the intended second drill plan.
86. Fixed an issue where TUM categories did not translate when exporting from clients not set to the English language.

87. Fixed an issue where log files were slow to import when using multiple import paths and a large database.

Known Issues

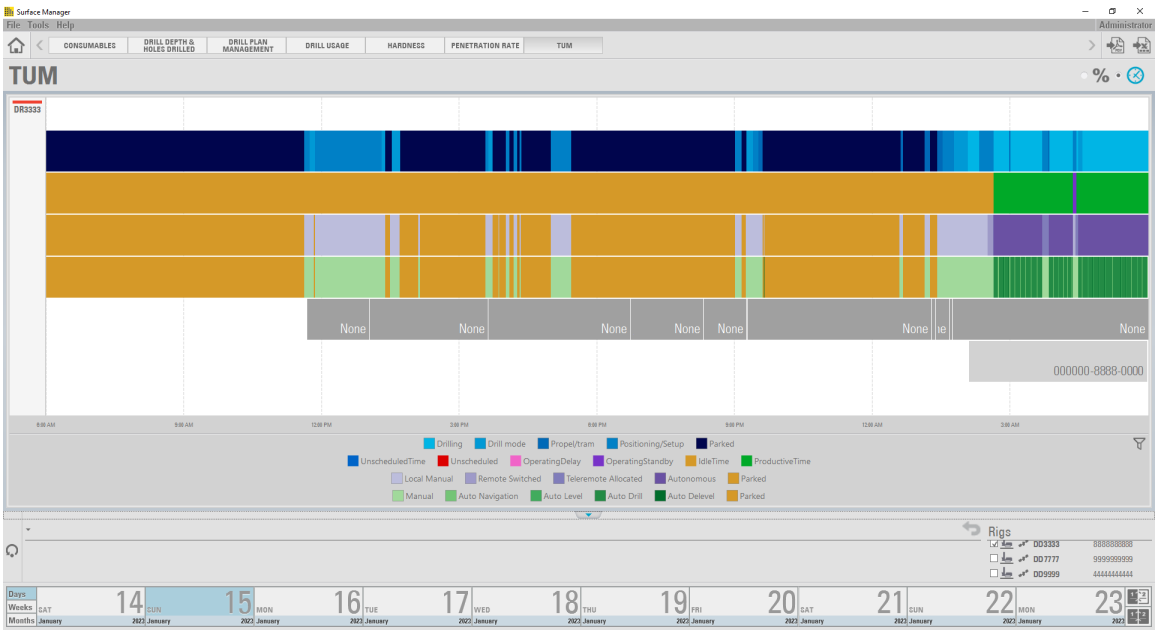
1. **Drill Usage Preview Widget Pie Chart Percentage:** When the drill usage preview pie chart is displayed on the main dashboard, under some scenarios the reported percentage values are incorrect.
2. **Drill Usage Widget Percentage View:** When switching from the timeline view to the percentage view on the drill usage main widget, under some scenarios the reported percentage values are incorrect.
3. **TUM Metrics Preview Widget:** When viewing the TUM metrics preview widget, under some scenarios the reported percentage values are incorrect.
4. **TUM Preview Widget Percentage Values:** When viewing the TUM preview widget pie chart, under some scenarios the reported percentage values are incorrect.
5. **TUM Widget Percentage Values:** When viewing the main TUM widget and navigating through the TUM categories, under some scenarios the reported percentage values are incorrect.
6. When exporting a work area for a drill plan with hazard layers, all hazards are exported and the file cannot load in RCS. A workaround is, when exporting work areas, make sure only hazards contained in the work area are active before exporting.

Surface Manager 2.19 Rev. 12

GUI Changes

1. A comment tool tip has been added to the **Planned Model vs Drilled Model** widget.
2. A new **TUM Timeline** view has been added to the TUM widget. This view shows all active TUM codes as a separate lane between two times. The **TUM Timeline** view shows the following:
    a. Machine states
    b. Safe to Board states
    c. Auto functions
    d. Drill plan
    e. Operator logins

The view also includes an Excel report export function, which exports all the data used to populate the timeline in row and column format.



System Updates

1. Improvements to performance when navigating Surface Manager widgets and filters have been made.

2. Special characters are now allowed in the names of: drill plans, fleet orders, and work areas sent to Pit Viper machines.

   Note: These characters do not apply to SmartROC past version 4.17.

3. Comments can be attached to drill holes as a .csv file. The comments show as a tool tip on the relevant drill hole in the **Planned Model vs Drilled Model** widget. Machines that can attach comments are RCS Lite, Pit Vipers, and SmartROC. The comment file includes the following columns of information:

   a. Log Time

   b. Rig Serial Number

   c. Drill Plan ID

   d. HoleID

   e. Category

   f. KeyWord

4. In the Production Editor, users can now see two drill holes with the same drill hole ID on the same drill plan. This allows users to delete either hole if one is an unnecessary duplicate.

Schema Database Tables

New Table(s)

1. The following new indexes have been added to improve import speed.:

    - **RigStateEvent_RigId_Time**
    - **RigParameterChange_RigId_Time**
    - **RigProximityDetectionEvent_RigId_Time**
    - **DrilledHole_RigSerialNumber_HoleId**
    - **DrilledHole_RigSerialNumber_EndHoleTime**
    - **DrillPlanGeofence_DrillPlanId**
    - **DrillPlanHoleSequence_DrillPlanId**
    - **DrilledHole_RigSerialNumber_DrillPlanId_HoleId**
    - **DrillPlan_PlanId_OriginalPlanId**

    If the database indexes already exist prior to updating, we recommend deleting the indexes prior to updating to Surface Manager 2.19 rev. 12 so they'll be recreated during the installation.

2. RigStbStateTransition

    - **Safe to Board** state transitions from non-Pit Viper machines are now parsed here.

Modifications to Table(s)

1. Added the **EngineTotalFuelUsedJ1939** column in the **RigStatusEntry** table of the database. This shows the fuel used.

    Note: This is compatible with RCS 5.5 and newer.

2. **GpsQuality** events for non-Pit Viper machines are now parsed into the **RigStateEvent** table.

3. **Safe to Board** state transitions from non-Pit Viper machines are now parsed into the **RigStbStateTransition** table.

Bug Fixes

1. Fixed an issue where exporting a drill plan with a hazard layer that is completely outside the geofence would cause an **Incorrect Geofence** error on the machine.
2. Fixed an issue where TUM code percentage values were showing greater than 100% at the leaf level.
3. Fixed an issue where the **Date Range** field's values show on the preview widget but would show as blank in the opened widget.
4. Fixed an issue where, when certain time ranges are selected, Surface Manager crashes when a user opens the **Planned Model vs Drilled Model** screen.
5. Fixed an issue where the **Drill Usage** widget and preview percentage did not match the timeline.
6. Fixed an issue where the **Depth** column of an exported consumables report would randomly reset some cells to have a zero value.
7. Fixed an issue where the TUM code end times would constantly update in the background, causing client performance issues and changes in the event editor would sometimes revert.
8. Fixed an issue where the **Drill Usage Widget** and its preview widget had values that did not match with each other.
9. Fixed an issue where the **Drill Usage Widget** was not refreshing.
10. Fixed an issue where TUM code files with **Unscheduled Time** were exported with the **Unscheduled Time** ID instead of the **Unscheduled** ID.
11. Fixed an issue where editing a historical TUM event would erase the previous Tum event's end time.
12. Fixed an issue where upgrading to Surface Manager version 2.19 revision 1`1 could cause performance in the **Event Editor** to slow down considerably.
13. Fixed an issue where the **Export** button in **TUM Widget** would not work and nothing was exported.
14. Fixed an issue where certain data sets prevents the **Drill Usage Widget** from refreshing.
15. Fixed an issue where comments made in the **Event Editor** would disappear after refreshing.
16. Fixed an issue in the **TUM** widget where clicking on a date range with no data would not refresh the widget.
17. An issue was fixed where Surface Manager sometimes showed "0:00" for engine hours on the **Home** screen.

Known Issues

1. Hazard layers must not intersect the geofence or work area and must be contained entirely within or outside the work area or the **Incorrect Geofence** error message In RCS will activate.
2. Editing a TUM code in the **Event Editor** populates the **Username** fields for the previous and next TUM codes.
3. Editing the **Time** field for a TUM code in the **Event Editor** will set the next TUM code **Edited** field to **True**.
4. The TUM widget can show visual glitches when viewing the last day of data.
5. TUM widget reports exported as Excel or PDF files will duplicate each row of data.

   Note: This known issue is fixed in Surface Manager 2.19 Rev. 13

Surface Manager 2.19 Rev. 13

Schema Database Tables

Modifications to Table(s)

1. The **GpsQuality1** and **GpsQuality2** columns have been added to the **RigGpsQuality** table for Pit Viper machines operating **RCS 5.6 and newer** software **only**. These columns accept what those Pit Viper machines report for the GPS quality of both the CS (**GpsQuality1**) and NCS (**GpsQuality2**) antennas.

   The following table lists the GPS quality indicator definitions for **GpsQuality1** and **GpsQuality2**.

Value	Definition	Status	
0	Fix not available or invalid	Bad	
1	Autonomous GPS fix	Bad	
2	RTK float solution	Other	
3	RTK fix solution	Good	
4	Differential, code phase only solution (DGPS)	Other	
5	SBAS solution – WAAS/EGNOS/MSAS	Other	
6	RTK Float 3D network solution	Other	
7	RTK Fixed 3D network solution	Good	
8	RTK Float 2D network solution	Other	
9	RTK Fixed 2D network solution	Other	
10	OmniSTAR HP/XP solution	Other	
11	OmniSTAR VBS solution	Other	
12	Location RTK	Other	
13	Beacon DGPS	Other	
14	CenterPoint RTX	Good	
15	xFill	Good	

   The **GpsQuality** column for Pit Viper machines operating **RCS 5.5 and older** software still uses the above table.

   The **GpsQuality** column for Pit Viper machines operating **RCS 5.6 and newer** software has been changed to be a summary of **GpsQuality1** and **GpsQuality2**. The following table lists the GPS quality indicator definitions for the changed **GpsQuality** column:

Value	Color	Status
1	Red	Bad
2	Yellow	Other
3	Green	Good

2. The **FuelConsumptionInLiters** and **LastUpdateTime** columns have been added to the **RigProductionEntry** table. **LastUpdateTime** records the date from the most recent Performance Log

Bug Fixes

1. Fixed an issue from rev. 13 where the TUM widget's export to Excel and PDF function will duplicate rows of data in the exported files.
2. Fixed an issue where Surface Manager would only import the first entry of each perflog log from SED machines and ignore both subsequent updates and fuelconsumption data.
3. Fixed an issue Surface Manager misrepresented the fuel levels of some SED machines. Surface Manager now shows the fuel levels of machines correctly, both as a percentage and in the chosen unit of measurement.
4. Fixed an issue in the **Planned vs Drilled Model** PDF export files where the conversion from meters to feet of the **Planned Depth** and **Drilled Depth** columns would produce incorrect results.
5. Fixed an issue in **Object Management** where SmartROC CL was misnamed as SmartROC C70. The change corrected the name to SmartROC CL.

Known Issues

1. The TUM codes end time will not update in the **Event Editor** if a TUM code with an end time outside of the filtered range is added.

   Note: This known issue is fixed in Surface Manager 2.19 Rev. 14.

Surface Manager 2.19 Rev. 14

GUI Changes

1. The **Safe to Board** state of **Approach Mode** has changed in the **Drill Usage** and **TUM** screens. The title of the alt-text
    a. The title of the alt-text has changed from **STB State Approach** to **Approach Mode**.
    b. The color in the graph and legend key has been changed from a gray shade to a purple shade.

System Updates

1. The performance of importing **Drill Quality** logs has been improved.

Schema Database Tables

Modifications to Table(s)

1. The **HoleLength** values from SmartROC Drill Status (DS) logs are now parsed into the **RigStatusEntry** table under the **AccumulatedHoleLength** column.
2. The **AutoAggressiveness** and **JamCount** from **AutoDrillEvents** are now recorded in the **RigStateEvent** table.
3. The following machines were added to the **RigType** table:
    - SmartROC D50 MKII
    - SmartROC D55 MKII
    - SmartROC D60 MKII
    - SmartROC D65 MKI
4. Columns supporting the new timestamp format in RCS 5.7 have been added to the following database tables:
    - DrilledHole
        - StartHoleTime_Timezone
        - EndHoleTime_Timezone
        - StartLogTime_Timezone
    - MwdHole

    - StartLogTime_Timezone
    - EndLogTime_Timezone
- MwdSample
    - Time_Timezone
- RigConsumablesChange
    - Time_Timezone
- RigEvent
    - Time_Timezone
    - EndTime_Timezone
- RigGpsQuality
    - Time_Timezone
- RigOperatorLogin
    - Time_Timezone
- RigParameterChange
    - Time_Timezone
- RigProductionEntry
    - Date_Timezone
    - LastUpdateTime_Timezone
- RigProximityDetectionEvent
    - Time_Timezone
- RigStateEvent
    - Time_Timezone
- RigStatusEntry
    - StartLogTime_Timezone
    - EndLogTime_Timezone
- RigStbStateTransition

- Time_Timezone

Bug Fixes

1. Fixed an issue where Surface Manager would not import event logs that were missing the **GpsEvent** tag.
    a. This issue only affected Surface Manager rev.13, so it is recommended for rev.13 users to update to rev.14.
2. Fixed an issue where D65 Event logs that did not contain GPS quality events would not be imported.
3. Fixed a **Known Issue** from rev.13 where the TUM codes end time will not update in the **Event Editor** if a TUM code with an end time outside of the filtered range is added.
4. Fixed a **Known Issue** from rev.12 where The TUM widget can show visual glitches when viewing the last day of data.
5. Fixed an issue where the **Drill Usage** widget and preview percentage did not match the timeline.
6. Fixed an issue where the **Drill Usage** Excel and PDF export data would not match the **Drill Usage** widget.
7. Fixed an issue where the **Export to PDF** and **Export to Excel** buttons in the **Planned Model vs Drilled Model** widget would be grayed out and inactive when the widget is launched for the first time.
8. Fixed an issue where the **Event Editor** filter would exclude events with start/end times that fell in that filtered range.
9. Fixed an issue where **Event Editor** would not allow TUM codes to be moved after calculated end times.
10. Fixed an issue where the **Drill Usage** preview would not load unless at least 2 TUM codes within a filtered range.
11. Fixed an issue where the **Drill Usage** information in an exported PDF did not match the Surface Manager widget.
12. Fixed an issue the **Event Editor** where editing any event would also give an edit flag to the following, even if they weren't the events edited:
    a. The last TUM code in the editor.
    b. The TUM code after the edited event.

13. Fixed an issue in the **Event Editor** where the **End Time** would be calculated incorrectly if the TUM code order changed.

14. Fixed an issue in the **Event Editor** where TUM codes would not update to a blank **End Time** if moved to the end of the event list.

15. Fixed a known issue from rev. 12 where visual glitches could occur in the **TUM** widget when viewing the last day of data.

16. Fixed an issue in the **Event Editor** where, when a filter range is active, deleting a TUM code would not update the previous TUM code's end time if that previous TUM code was outside of the filtered range.

17. Fixed an issue in the **Event Editor** where editing a TUM code would set the end time as the start time of the next TUM code for that machine.

Known Issues

1. When in **Local** mode, the **Import log files...** in the **File** menu is not available.

2. The **Event Editor** screen does not refresh automatically when a TUM code is deleted. Users should manually refresh the screen after deleting a TUM code.

3. The **Drill Usage** PDF report does not report non-working time, causing the percentages between the report and the **Drill Usage** screen to not match.

Surface Manager 2.19 Rev. 15

System Updates

1. Drilled Hole validation filters have been added to the main dashboard.
2. The Portuguese translation for **Auto DeLevel** is now correctly translated as **Denivelamento automático**.
3. Spanish Portuguese translation for **Auto DeLevel** is now correctly translated as **Desnivel automático**.
4. Surface Manager no long allows users to import drill plans that have duplicate drill hole IDs.
5. When the database is upgraded, the following occurs:
    a. When starting the Surface Manager Service, the user is notified that a database update is in progress.
    b. When the database update is complete, the **Database updated successfully. Service will now restart.** message shows on the Surface Manager Service startup window.
6. The **Event Editor Change Log** is now exported in chronological order.
7. The **EqpManufact** header in exported files has been changed from **Atlas Copco** to **Epiroc**.
8. If a hazard extends beyond a geofence's/work area's boundary, only the part of the hazard within the boundary shall be exported.
9. The time to import **Drill Quality** logs has been decreased.
10. Delay codes have been removed from the **TUM** widget's **Drill States** lane.

Schema Database Tables

Modifications to Table(s)

1. The database can now record multiple **AutoDrillEvents** that occur at the same time.
2. To be compatible with future RCS production log changes, milliseconds are now stored in certain time columns. The following columns have had their types converted to SQL Datetime2(7):

    NOTE: Due to updates to the data type of some of the following columns, updating the SQL database can take up to 20 minutes.

    - DrilledHole

    - StartHoleTime
    - EndHoleTime
    - StartLogTime
- MwdHole
    - StartLogTime
    - EndLogTime
- MwdSample
    - Time
- Remark
    - LogTime
    - Time
- RigConsumablesChange
    - Time
- RigEvent
    - Time
    - EndTime
- RigGpsQuality
    - Time
- RigOperatorLogin
    - Time
- RigParameterChange
    - Time
- RigProductionEntry
    - Date
    - LastUpdateTime
- RigProximityDetectionEvent

    - Time
- RigStateEvent
    - Time
- RigStatusEntry
    - StartLogTime
    - EndLogTime
- RigStbStateTransition
    - Time

Bug Fixes

1. Fixed an issue where the **Import log files…** option is not available when the database is set to **Local** mode.
2. Fixed an issue where the TUM widget's export to Excel and PDF function will duplicate rows of data in the exported files.
3. Fixed an issue where the Surface Manager Client would crash if a machine was deleted from Surface Manager Server while the multi-rig view is enabled.
4. Fixed an issue where the Surface Manager Client would crash if a machine was deleted from Surface Manager Server.
5. Fixed an issue where the **Event Editor** change log does not export the **Data** column correctly.
6. Fixed an issue where the **Drill Usage** PDF report would not record **Non-Working Time**, resulting in incorrect percentages in the report.
7. Fixed an issue where the last day on the **Drill Usage** widget could be missing data.
8. Fixed a known issue from Surface Manager 2.19 Rev. 14 where the **Event Editor** would not automatically refresh after deleting a TUM code.
9. Fixed an issue where TUM codes were not exported to machines if a **Drill Plans** folder did not exist.
10. Fixed an issue where the **Event Editor** start time would swap the minutes and seconds of the shift start time.
11. Fixed an issue where Surface Manager crashes when the **Planned Model vs Drilled Model** widget is viewed in Local database mode.
12. Fixed an issue where the **Import and export…** option in the **Tools** menu would be inactive.

13. Fixed an issue where, when creating a database, Surface Manager Service would not use the set **Username** and **Password** values for their equivalent fields in the database.

14. Fixed an issue where the **Drill Usage** PDF report would not record **Non-Working Time**. This created a mismatch between the PDF reports and the Surface Manager **Home** screen.

15. Fixed an issue in the **Event Editor** where editing a delay code would set the **End Time** to the **Start Time** of the next TUM code for that machine.

16. Fixed an issue where, if a hazard is on a drill plan, trying to export a work area's drill holes would result in ALL of that drill plan's drill holes being exported.

17. Fixed an issue where attempting to edit or delete a TUM code that another user has already edited or deleted would crash Surface Manager.

18. Fixed an issue where, when editing a drill plan, deleting a hazard template that drill plan uses would crash Surface Manager

19. Fixed an issue where duplicate TUM and delay codes would export to machines in delays.

20. Fixed the following issues with drill plans that have >500 hazard points:

    a. Deleting said drill plan would crash Surface Manager.

    b. The hazard's name would not show in warning messages if a warning occurred.

    c. When exporting said drill plan, the hazard's name would not show in an error message if an error occurred.

21. Fixed an issue where the **Total** lane in PDF reports did not show percentages or times.

22. Fixed an issue where the **Home** screen would not load preview widgets when Surface Manager launches.

23. Fixed an issue where, on last day imports where the TUM codes does not have an end time, the last event time was not recorded as the TUM code end time.

24. Fixed an issue where the **State Transition** did not have data in some of its rows in Excel export.

25. Fixed an issue were the **Last Working Day** percentage was missing when a new log with data after the **Last Working Day** is imported.

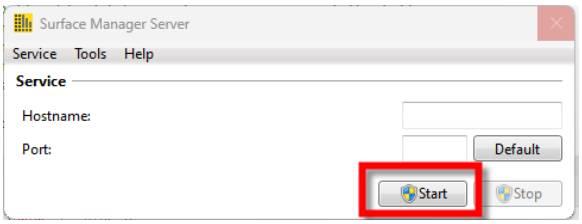
26. Fixed an issue where Surface Manager can crash when trying to view the **Planned Model vs Drilled Model**

27. Fixed an issue where it was possible in the **Event Editor** to set a delay code's **Start** and **End** time to overlap with another delay code.

28. Fixed an issue where the **TUM** and **Drill Usage** data was mismatched in the Excel and PDF exports.
29. Fixed an issue in the **Event Editor** where **TUM** code-calculated **End** times would skip delay code **Start** times.
30. Fixed an issue in the **Event Editor** where editing a **TUM** code's **End** time could change it into being its **Start** time instead.
31. Fixed an issue in the **Event Editor** where editing a delay code would not update the previous **TUM** code's **End** time.
32. Fixed an issue in the **Event Editor** where transactions were being made to **TUM** codes that did not need updating.
33. Fixed an issue in the **Event Editor** where deleting a delay code could would not update the previous **TUM** code's **End** time.
34. Fixed an issue in the **Event Editor** where editing a delay code's **End** time would make it the **Start** time of the next **TUM** code.
35. Fixed an issue where the **Average Penetration Rate** on the **Home** screen was miscalculated.
36. Fixed an issue where the **TUM** and **Drill Usage** Excel reports would not accurately report the data in the database.

Known Issues

1. When a new version of Surface Manager is installed, Surface Manager updates the SQL database. Users MUST use the Surface Manager Server GUI to **Start** the service after the SQL database update.



2. The **Drill Usage** and **TUM** widgets do not automatically refresh the visuals when navigating away from the **Home** screen.

3. In the **TUM** widget, the **Safe to Board** and **Auto Functions** tooltips do not show the correct time spent in each state.

   NOTE: This issue is fixed in SM 2.19 Rev. 16.

4. In the **Drill Usage** and **TUM** widgets, the **Park State** is sometimes replaced by **Positioning and Setup**.

   NOTE: This issue is fixed in SM 2.19 Rev. 16.

5. New databases cannot be created. To work around the issue:

   a. Install Surface Manager 2.19 rev.14.

   b. Create a database using the Surface Manager Service GUI.

   c. Start the Surface Manager 2.19 rev.14 Service to make sure the database has been created successfully.

   d. Uninstall the Surface Manager 2.19 rev.14 Service.

   e. Install Surface Manager 2.19 rev.15 Service.

   f. Start the Surface Manager 2.19 rev.15 Service.

      NOTE: This issue is fixed in SM 2.19 Rev. 16.

Surface Manager 2.19 Rev. 16

GUI Changes

1. **Hole Name** and **Hole ID** can now be hidden by using a filter in the **Planned Model vs Drilled Model** widget.

System Updates

1. Surface Manager no longer uses drilled holes with invalid start and end times to validate other drilled holes.
2. Loading times for the **Planned Model vs Drilled Model** widget have been decreased.
3. The **Drill Usage** and **TUM** widgets now automatically update when selecting/deselecting a machine.
4. **Non-productive time** TUM codes will override all other drill usage categories in the **Drill Usage** pie chart on the Home screen and in the **Drill Usage** widget.

   NOTE: **Non-productive time** TUM codes are NOT included in the **Drill Usage** categories in the **TUM** widget.
5. **Non-productive time** TUM codes are now included in the **Drill Usage** PDF and Excel exports.

Schema Database Tables

1. Reliability when updating the Surface Manager Database has improved.

Modifications to Table(s)

1. Consumable change events from SmartROC event logs now parse into the **RigConsumableChange** table.
2. Parameter change events from SmartROC event logs now parse into the **RigParameterChange** table.
3. The analog oil level from SmartROC status logs are now parsed into the **OilLevel** column in the **RigStatusEntry** table.
4. The analog water level from SmartROC status logs are now parsed into the **WaterLevel** column in the **RigStatusEntry** table.
5. The following tags are now parsed into the **RigStateEvent** table:
   a. **Reason**
   b. **ObstacleTypes**

    c. **ObstacleDirections**

6. The following columns have been added **RigStateEvent** table:
    a. **Reason**
    b. **Obstacle Types**
    c. **ObstacleDirections**
7. The following columns in the **RigStatusEntry** table are now nullable:
    a. **WaterLevel**
    b. **OilLevel**
    c. **WaterMistTankLevelLow**
    d. **HECLOilTankLevelLow**

Bug Fixes

1. Fixed an issue where creating a new database would fail if the username given for login credentials already existed on the SQL Server.
2. Fixed an issue where sockets were not included in drill plans exported to SmartROC machines.
3. Fixed an issue where sequences were not included in drill plans exported to SmartROC machines.
4. Fixed an issue in the **Home** screen where some drill usage states on the **Drill Usage** widget would not show at all if their value was 0%.
5. Fixed a known issue from SM 2.19 rev.15 where the Surface Manager Server could not create new databases.
6. Fixed an issue where TUM code end times were miscalculated if either of the following occurred:
    a. An imported event log had duplicate TUM code events.
    b. Event logs were imported out of order.
7. Fixed an issue where the **Drill Usage** and **TUM** widgets would not include events that started before the selected time range.
8. Fixed an issue where, in the **Drill Usage** and **TUM** widgets, the **Park** state would sometimes be replaced by **Positioning and Setup**.

9. Fixed an issue where, in the **TUM** widget, the **Safe to Board** and **Auto Functions** tooltips would not show the correct time spent in each machine state.

10. Fixed some graphical issues that occur when selecting multiple machines in the **Drill Usage** and **TUM** widgets.

Known Issues

1. The **Planned Model Vs Drilled Model** preview widget will sometimes not load. The workaround is to refresh the home screen or select the desired date again.

2. When viewing the **TUM** widget in the percentage view, the TUM code colors in the TUM lane do not match the color in the legend. The workaround is to hover the mouse over the desired TUM lane. The tooltip will reveal the TUM code.

3. In the **Drill Usage** and **TUM** widgets, the machines can sometimes be out of order when selecting multiple machines.

4. In the **Drill Usage** and **TUM** widgets, selecting a time range where there is no data for a selected machine will cause the last known event to be shown for the entire selected time range.

5. When switching between rigs and dates on the Home screen, the loading icon will not show.

6. In the **TUM** widget, TUM lanes will sometimes be drawn incorrectly and will end before the actual end of their selected time period.