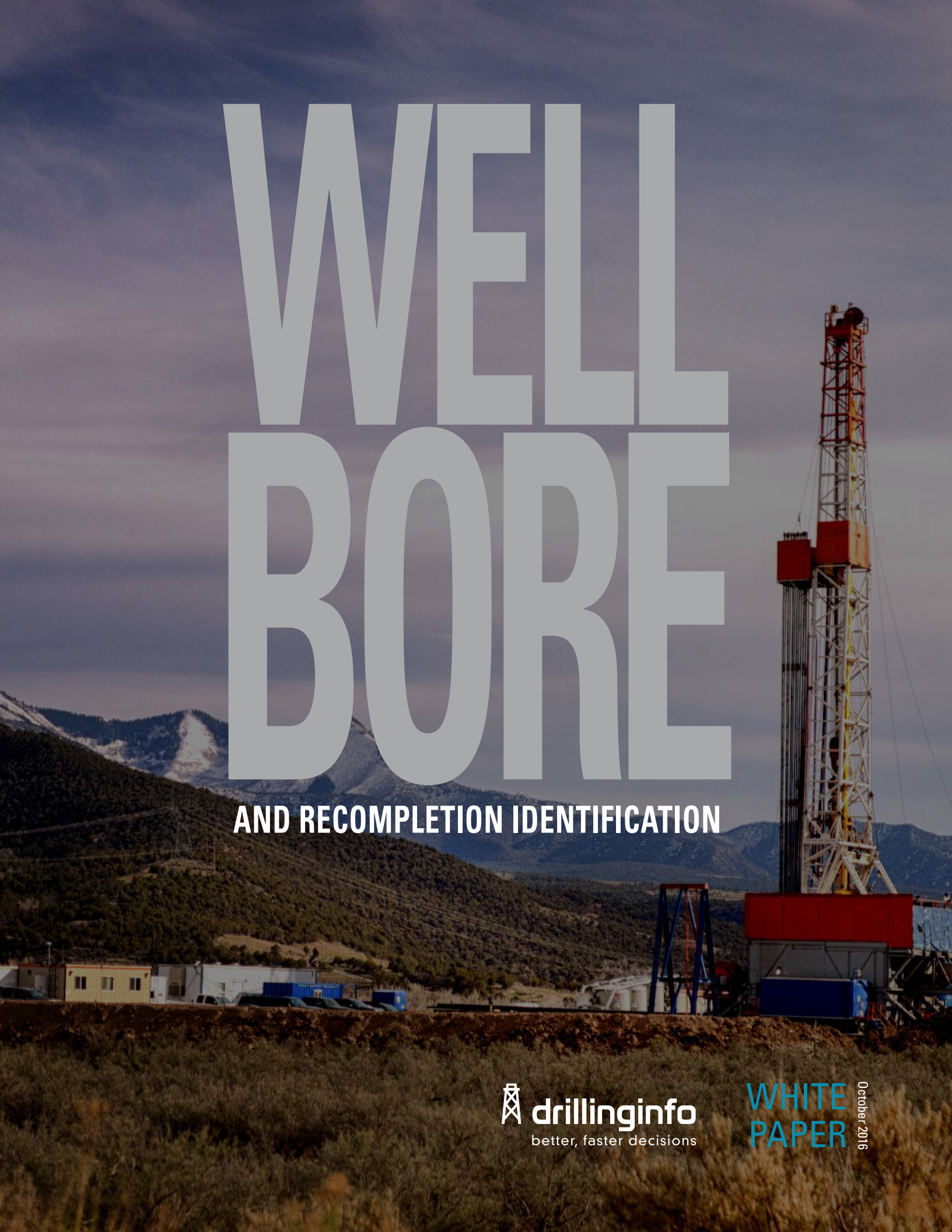


WELL BORE

AND RECOMPLETION IDENTIFICATION

drillinginfo
better, faster decisions

WHITE PAPER

October 2016

Wellbore and Recompletion Identification

Background/Introduction

Drillinginfo has made a strategic decision to support and conform to industry standards for identifying petroleum wellbores in the U.S. As a result, we are in the process of assigning a 12-digit number to every wellbore and adhering to a well lifecycle model. In 1966 the American Petroleum Institute (API) defined a standard for uniquely identifying wells in the United States.[1] Jumping ahead to today, the Professional Petroleum Data Management (PPDM) Association updated these numbering standards to increase clarity and specifications for identifying all types of wellbores.[2] These standards play a critical role in not only identifying wells and their components (the well hierarchy), but also understanding them.

Our well hierarchy consists of a well origin, wellbore, and completion. In addition to conforming to the U.S. 12-digit numbering standard, we are implementing the optional extension and adding a 13th and 14th digit to identify the original completion and any recompletions that follow. Generating 12- and 14-digit API numbers by using industry standard business rules to integrate the data components adds significant value to the Drillinginfo solutions platform; it also allows for further compatibility with oil and gas engineering applications as well as G&G applications and software, while enabling users to continue making even better and faster decisions.

API Numbering Standards

The process to conform to industry standards for 12-digit API numbers includes maintaining the defined structure of an API number—state, county, well surface, and wellbore(s) for digits 1–12. Taking identification a step further, our implementation includes identifying the original completion and any recompletions through the optional extension of the 13th and 14th digits (**Fig. 1**).

Throughout the manufacturing process for the 12- and 14-digit API numbers, we maintained the following assumptions to structure the overall hierarchy:

- There is at least one wellbore for every identified well. Drillinginfo only identifies multiple wellbores when there is concrete evidence.
- There is at least one completion for every identified wellbore. Drillinginfo only identifies recompletions when there is concrete evidence.
- Engineering data will be matched to its corresponding wellbore when there is concrete evidence; otherwise, it will be tied to the '00' wellbore. The '00' wellbore serves as both an identifier for wellbore-specific intentions and the first discovered physical wellbore.

Both the global assumptions and API numbering structure are key to the foundational structure and connection of each data component.

1 PPDM The API Number Standard: An Identifier for Petroleum Industry Wells in the USA

2 Ibid

TAKING IDENTIFICATION A STEP FURTHER, our implementation includes identifying the original completion and any recompletions through the optional extension of the 13th and 14th digits.

Two-Phased Approach

Creating the well hierarchy and curating the data is a two-phased approach. The first phase requires gathering all currently available source data in the Drillinginfo ecosystem (DI Classic, DI Desktop, etc.). This data is identified, matched, aggregated, and blended to create the foundation of the Drillinginfo well-lifecycle model, including the manufactured 12- and 14-digit identifiers. This first phase is based on a physical well model, while the identification of bores is based on a combination of directional surveys, bottom hole locations, and additional reported data.

The second phase of the hierarchy creation centers around the well lifecycle from the time of intent and continues through abandonment. This allows us to capture a bore from the time a permit is filed and track its status through completion in a linear order.

Wellbore and Completion Numbering Scenarios

Even with a defined structure, business rules, and global assumptions, different scenarios determine the visual output of our well hierarchy implementation. For example, data manufactured from a permit with a purpose of filing listed as "Deepening" will look completely different than data manufactured from a permit categorized as "New Drill" or "Directional". The following examples provide a baseline of the numbering practice and identification methods used for our implementation when encountering different scenarios.

Figure 2 is an example of our numbering standards for a sidetrack. Each wellbore has a unique wellbore code (11 and 12 digits) starting with 00 for the original and incrementing by one for each additional sidetrack. The first 10 digits of the API number are consistent to represent the same well origin.

Figure 3 is an example of our numbering standards for a recompletion. Each wellbore has a unique wellbore code (11 and 12 digits) starting with 00 for the original and incrementing by one for each additional wellbore. Each identified completion also has a unique code (13 and 14 digits) starting with 00 for the original completion and incrementing by one for any additional recompletions as defined by Drillinginfo. The first 10 digits of the API number are consistent to represent the same well origin. If the 11 and 12 digits of the API number are also consistent, they represent the same wellbore.

Figure 4 is an example of our numbering standards for a multilateral. Each wellbore has a unique wellbore code (11 and 12 digits) starting with 00 for the original and incrementing by one for each additional wellbore. The first 10 digits of the API number are consistent to represent the same well origin.

Figure 5 is an example of our numbering standards for a deepening. The process of deepening and lengthening creates a new wellbore and requires an increment of the 12th digit. The first 10 digits of the API number are consistent to represent the same well origin.

Figure 6 is an example of our numbering standards for a plug back. The plug back process is a physical recompletion to an existing wellbore and requires an increment of the 14th digit. The first 10 digits of the API number are consistent to represent the same well origin.

Conclusion

The last decade in the Oil and Gas Industry and the rise of unconventional drilling has created the need for better understanding and identification of what is intended to be drilled, completed, recompleted, abandoned, and all other additional details included in the well lifecycle. Currently, DrillingInfo supports a well and production model where well data and attributes are tied to a well surface location; but with our migration to a well lifecycle model, we will focus on the relationships between a well and its components while showcasing the history of the well lifecycle. These modifications to our data structure and manufacturing process ensure additional insight and granularity to our data not yet seen in Drillinginfo solutions. To learn more visit our Frequently Asked Questions.

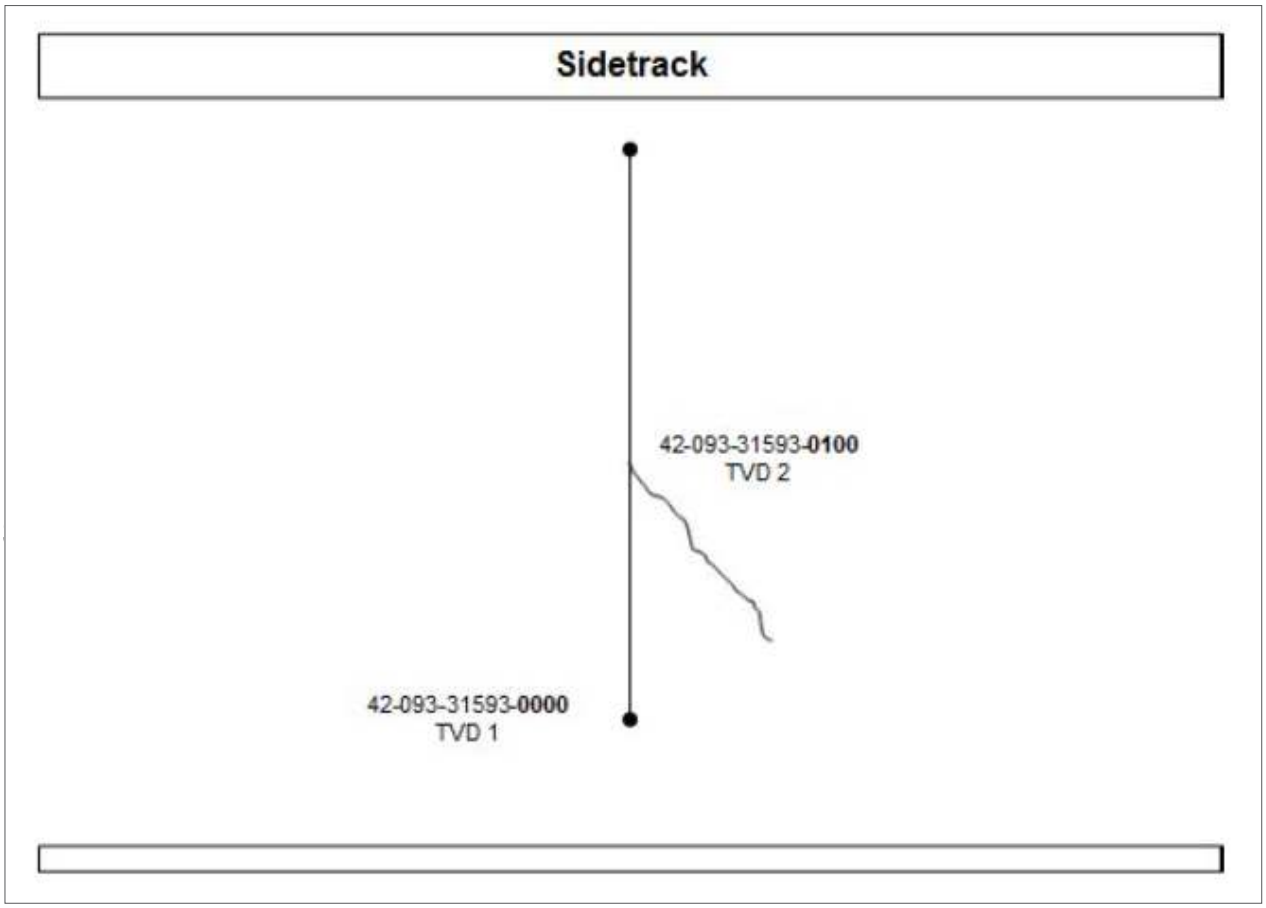
Appendix

Figure 1

Numbering Standards by Digits

Appendix

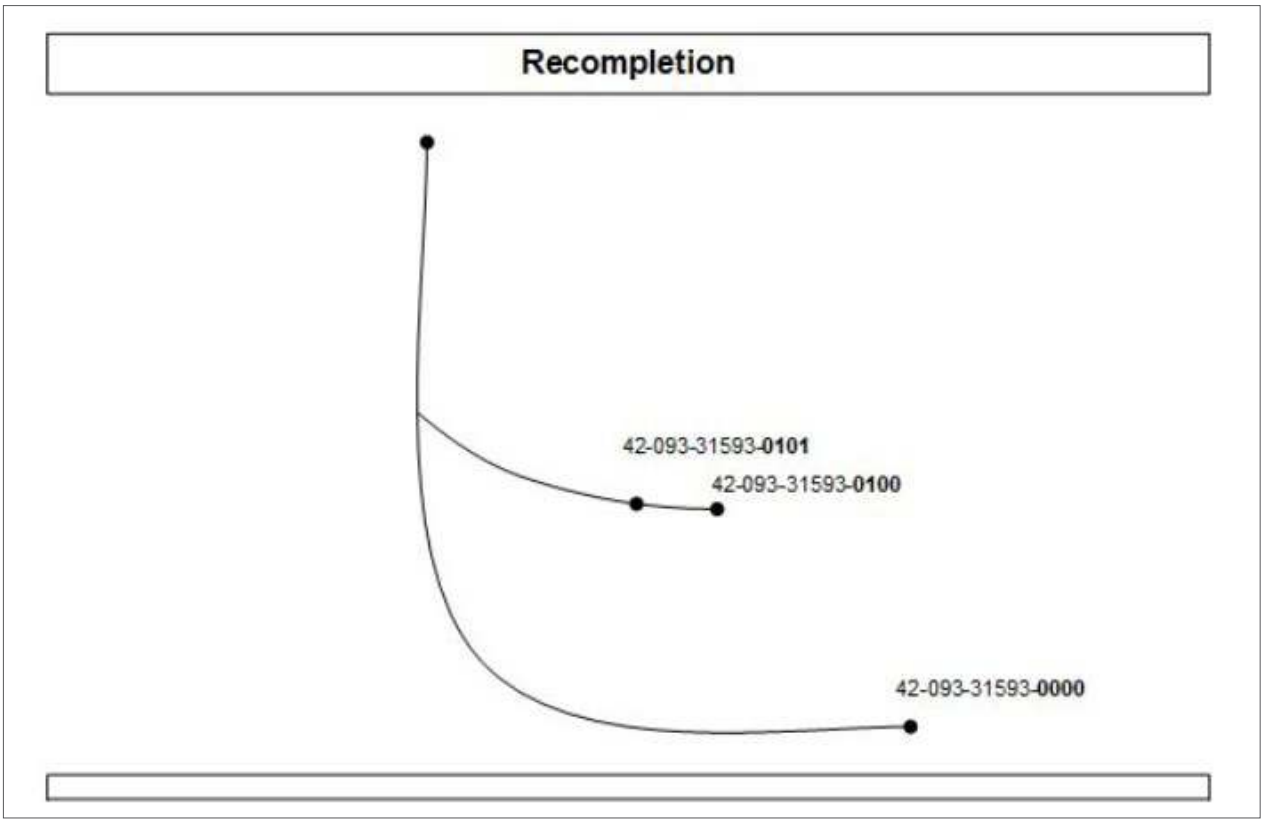
Figure 2



Sidetrack Example

Appendix

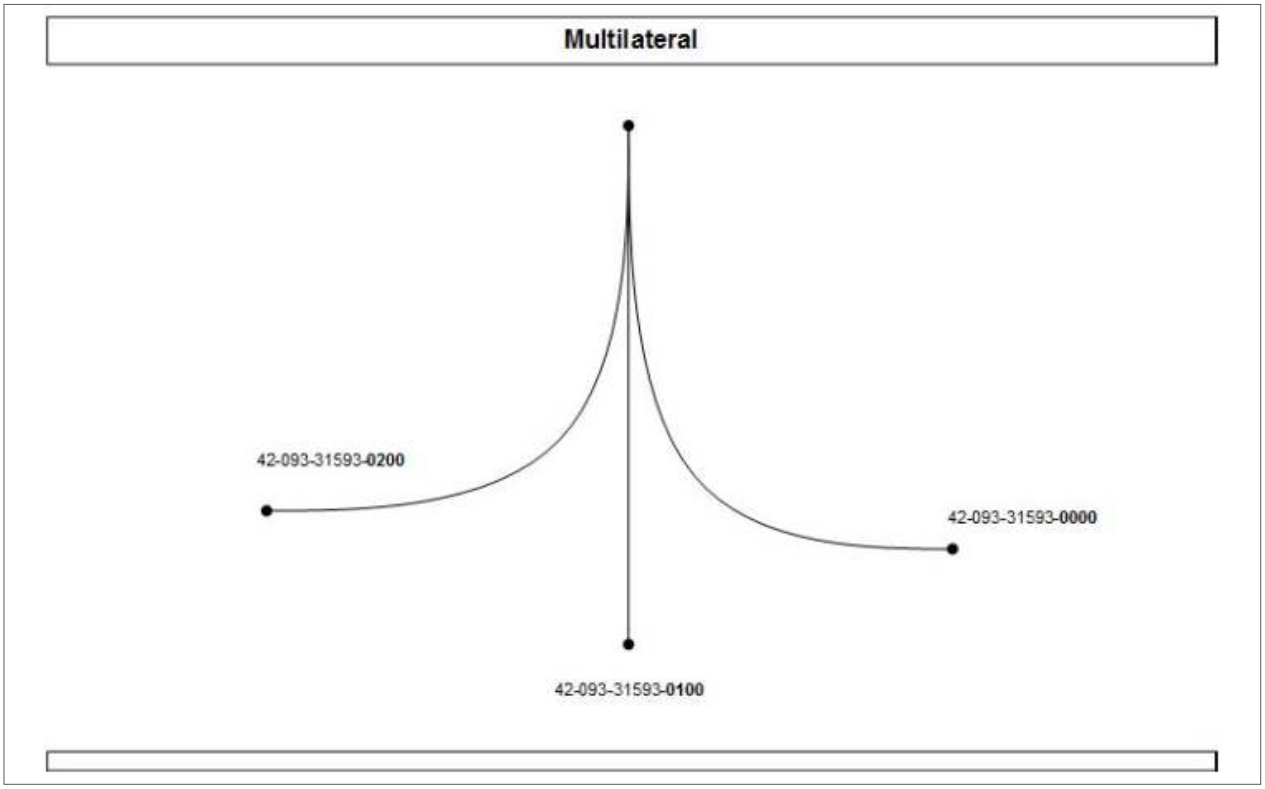
Figure 3



Recompletion Example

Appendix

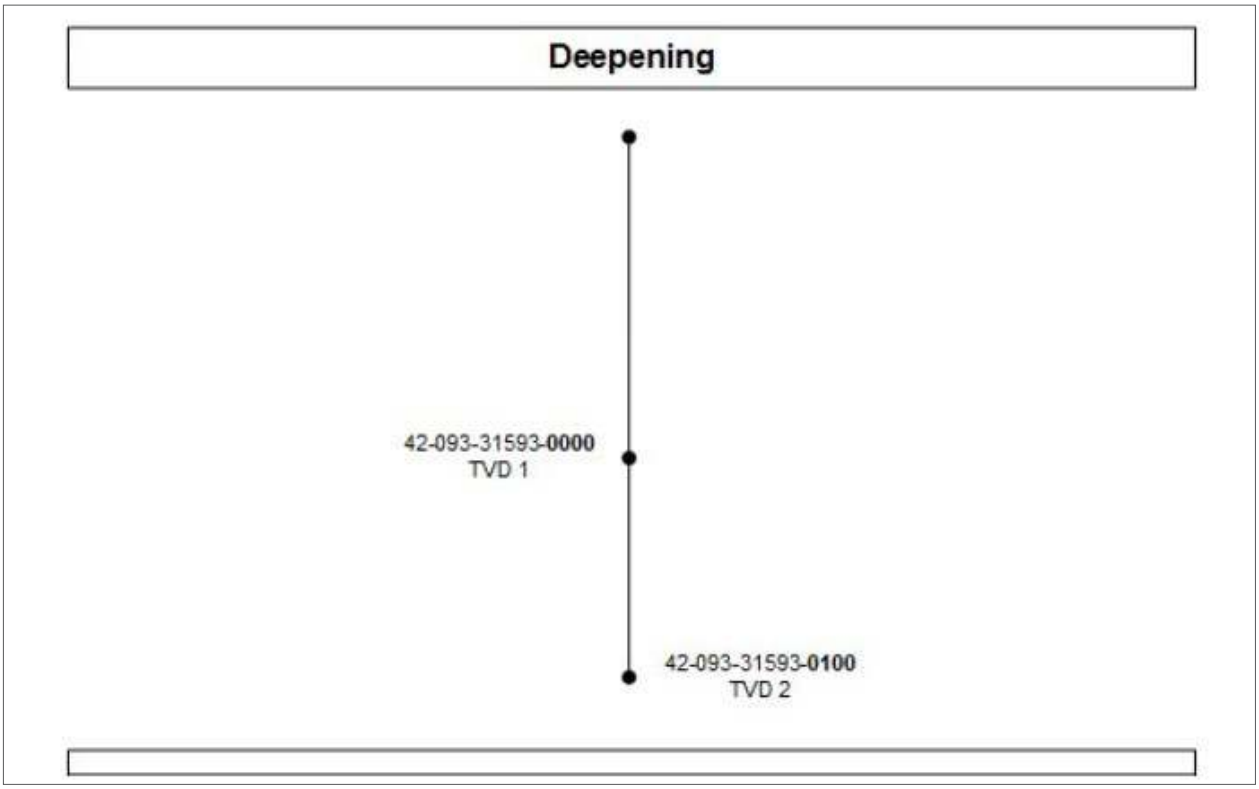
Figure 4



Multilateral Example

Appendix

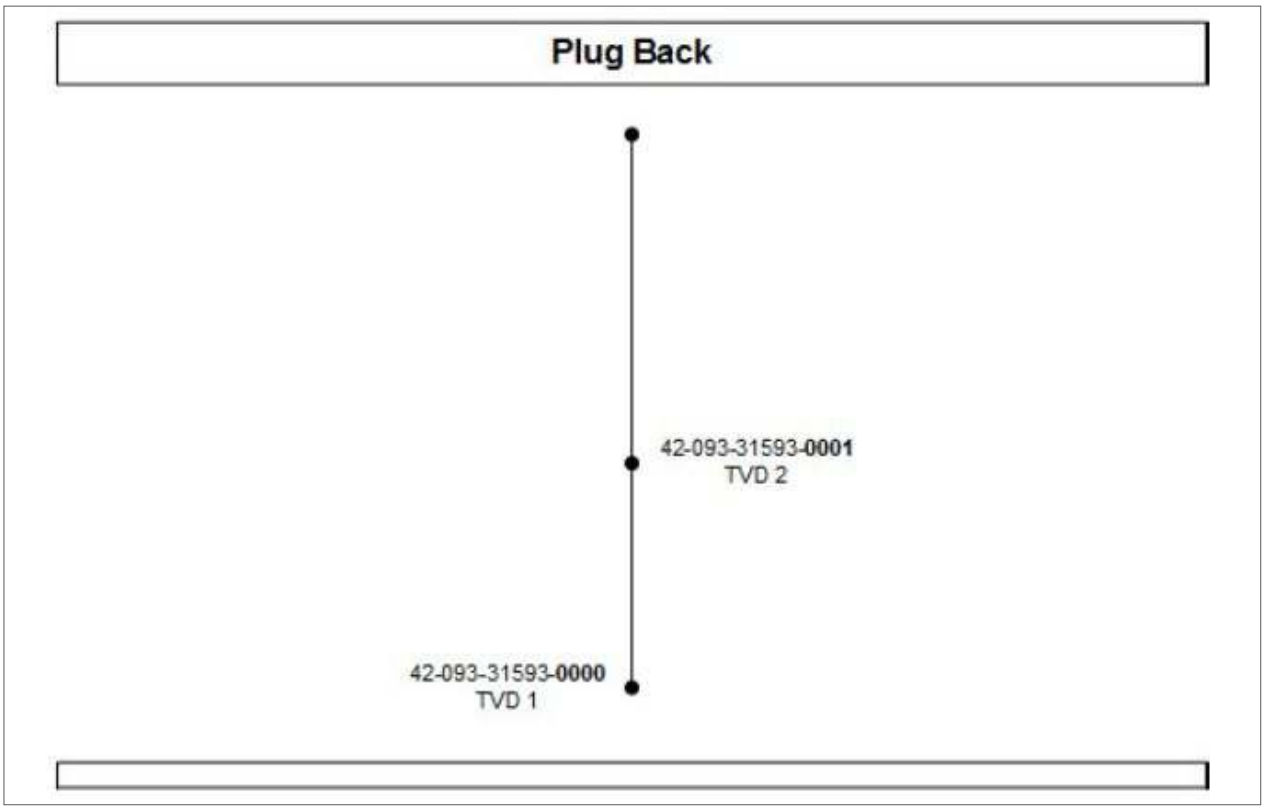
Figure 5



Deepening Example

Appendix

Figure 6



Plug Back Example

Appendix

Key Definitions

Key Definitions	
Well Hierarchy	Represents the connection and relationships between a well and each of its components, including, but not limited to, the well origin, wellbore(s), and completion(s)
Well Lifecycle	The documented narrative of all activity (physical and regulatory) that happens to a well including each phase from exploration, permitting, drilling, completing, producing, recompleting, and abandoning
Well[3]	A proposed or actual drilled hole in the ground designed to exchange (or facilitate the exchange of) fluids between a subsurface reservoir and the surface (or another reservoir), or to enable the detection and measurement of rock properties
Well Origin[4]	The location on the surface of the earth or sea bed where the drill bit is planned to penetrate or does penetrate the earth to establish or rework a well
Wellbore[5]	A path of drilled footage from the well origin (top/start) to the terminating point (bottom/end)
Wellbore Completion[6]	A set of one or more wellbore contact intervals that function as a unit to produce or inject fluids
Recompletion	The physical process of re-entering and re-preparing a well for enhancing production in the same zone or different zone
10-Digit API Number	First 10 digits of API number, representing state code, county code, and surface identifier
12-Digit API Number	First 12 digits of API number, representing state code, county code, surface identifier, and wellbore identifier
14-Digit API Number	14-digit API number, representing state code, county code, surface identifier, wellbore identifier, and physical completion identifier

3 PPDM "What is a Well"

4 Ibid

5 Ibid

6 Ibid