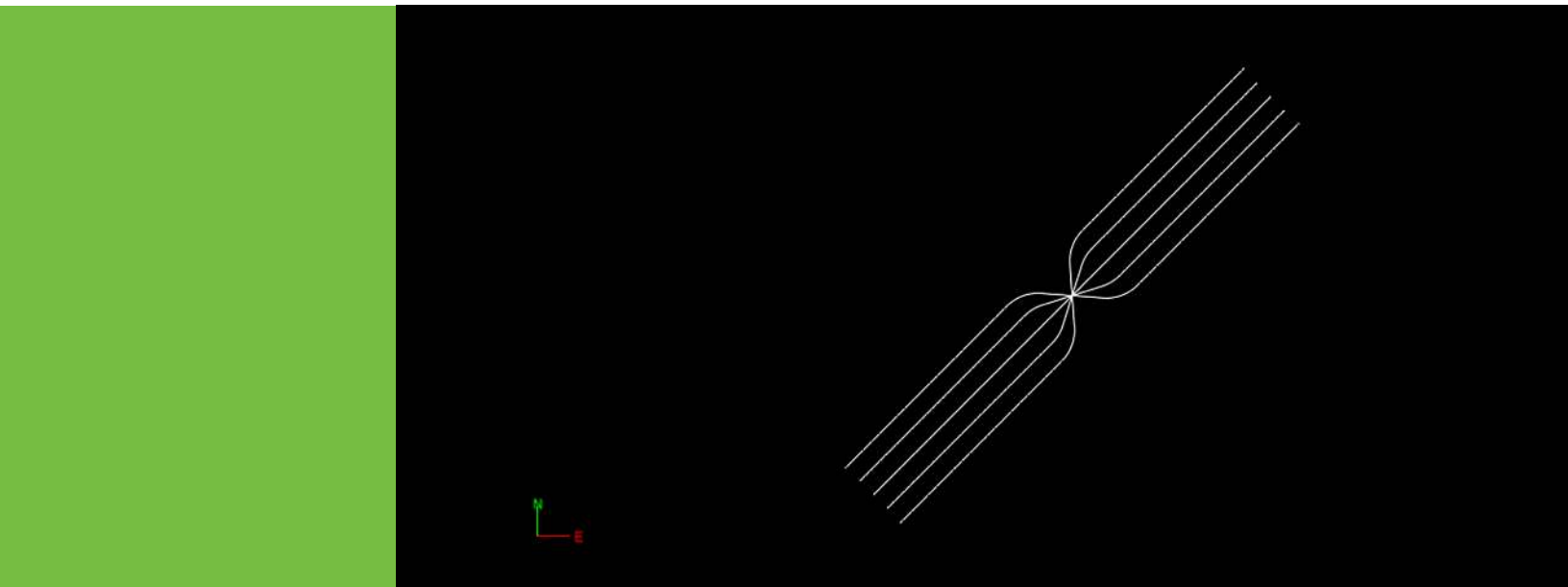


Pad and Field Planning with DI Transform

Set the Foundation for Your Field Through Precision in Pad Design



OVERVIEW

Well planning is one of the most critical elements of a successful drilling operation, and one of the most demanding as well. It involves multiple actors and decision makers across a diverse set of disciplines, such as Geology, Engineering, Executive Management, Legal, and more. There is not one, clean formula for planning an oilfield; rather, the set of engineering methods specified for a plan must cohere to the geology of the formation, requiring geoscience and engineering teams, in particular, to be connected at the hip.

The fastest way for this to happen is the use of common software to develop one well plan simultaneously. When a well plan is allowed to come to life on a single platform, with real-time touchpoints by multiple teams, the workflow becomes the catalyst for collaboration and engagement across disciplines.

CHALLENGE

A cross-functional field planning team at a large E&P company has been tasked to determine an optimal field plan for a specific area of interest.

SOLUTION

Using Drillinginfo, the team planned an entire field of well pads with precision, saving many hours by collaborating together in an uninterrupted, centralized workflow.

PRODUCTS USED

DI Transform

CUSTOMER CHALLENGE

Unfortunately, various members of a field planning team must use multiple software packages for each step in the planning process; yet, only a fraction of important data is utilized in each software package. These team members, including Petroleum Engineers, Geologists, and Landmen, lack a single, centralized workflow for collaborating with each other.

In this example, a field planning team at a large E&P company has been tasked to determine an optimal field plan for a specific area of interest. The multi-disciplinary team must create a pad template which accommodates drillable acreage, including buffers around natural barriers and lease constraints, stratigraphic targets, and optimal well spacing.

This pad must be configured within the following parameters:

- Azimuth: 45 degrees
- Buffer Around Missing Mineral Rights: 100 feet
- Buffer Around River Systems: 50 feet
- Heel and Toe Depth: 5% grade
- Target Depth Zone: 12,000 feet
- Wellbore Length: 4,200 feet
- Wellbore Spacing: 900 feet

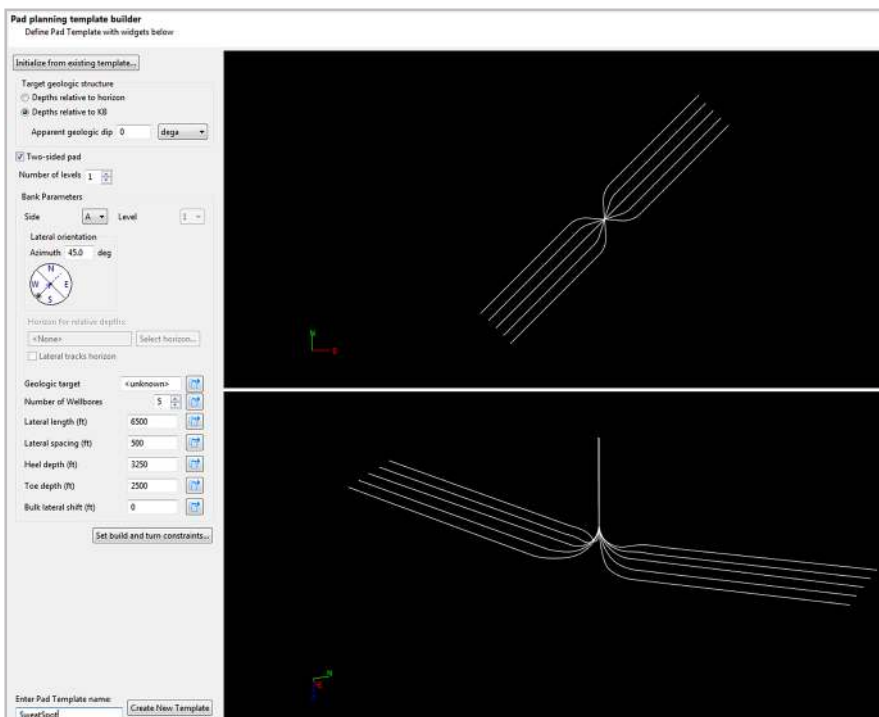
The end deliverable is a set of wellbore surveys that the team can provide to a third party drilling company.

Before using DI Transform, an all-in-one geology, geoscience, and engineering (GG&E) platform, team members worked in siloes, using separate applications to complete their unique tasks. Excessive time spent on translation between software programs, data transfer, and review cycles cut into valuable planning time. The team needed to act more quickly with a better process to manage the many iterations that are unavoidable in field planning.

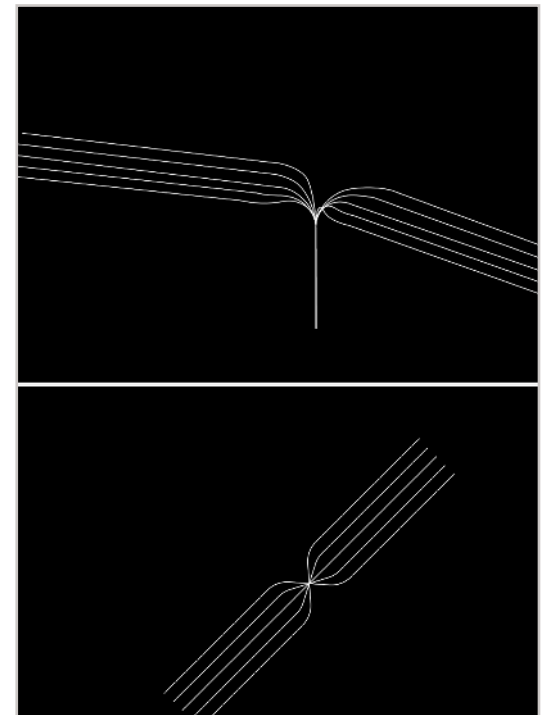
CUSTOMER SOLUTION WITH DRILLINGINFO

Using the DI Transform Pad and Field Planning Workflow, field planners can simultaneously plan an entire field of well pads with precision. The first step for the team is to design the pad, which sets the foundation for their field. The Engineer on the team begins to customize a template for their pad, specifying criteria for Azimuth, heel to toe grade, wellbore length, and wellbore spacing. He is able to enter the criteria quickly with progressive logic that auto-populates his parameters where possible.

Target zone depth can be applied, if known, or a structural horizon provided by the Geologist can act as the target zone depth. Intelligent logic automatically applies the criteria to opposing wellbores. Concurrent bird's eye and rotating, three-dimensional subsurface lateral views allow the Engineer to get up close and personal with the template as he designs it.



Enter your criteria quickly with progressive logic that auto-populates your parameters where possible



Get up close and personal with concurrent bird's eye and 3D subsurface lateral views that rotate

Using this template to “stamp” directly onto the base map, the Engineer on the team fits the pad to the field using precise, repeatable, and consistent steps. Built-in constraints such as lease boundaries, natural barriers (roads, rivers, etc.), and existing wells help him determine the drillable layer. Visual flags highlight areas of conflict to avoid, letting him specify a buffer zone around missing mineral rights and protected river systems that the drillable layer will automatically adjust to. The “snap align” feature automatically spaces wells according to criteria that the team specifies.



Use your template to “stamp” directly onto the base map



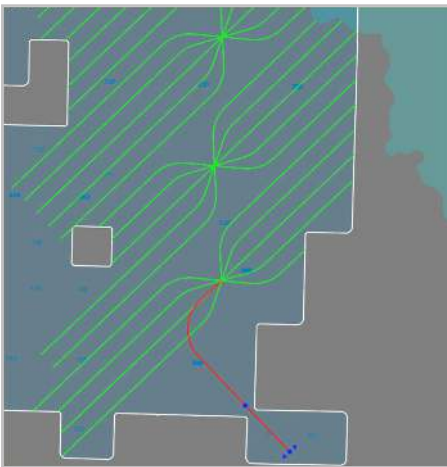
Visual flags highlight areas of conflict to avoid



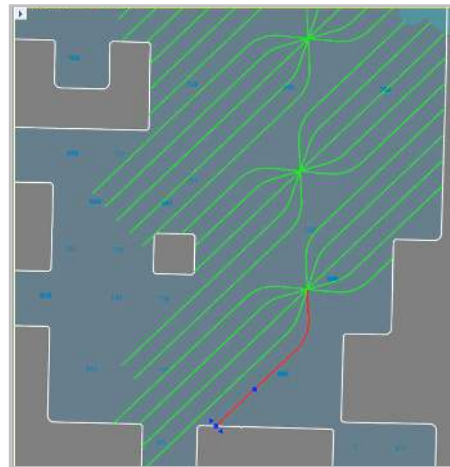
“Snap Align” feature automatically spaces your wells according to criteria that you specify

The Landman puts the finishing touches on the pad plan, clipping the bore length at lease boundaries. When necessary, he can adjust the wellbore angle to accommodate oddities in lease boundaries or rivers nearby. Feedback and approval from the Engineer is immediate, because the Engineer is already working directly in the same software as the Landman.

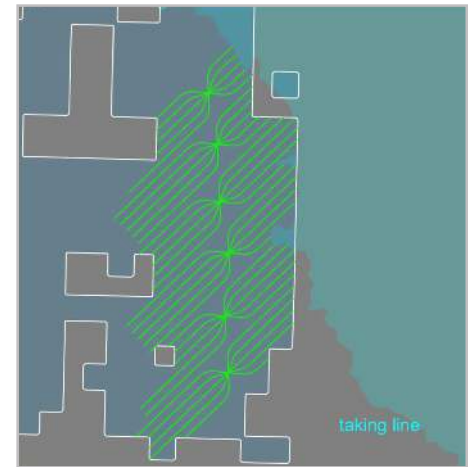
Any reservoir maps, such as porosity and production sweet spot, can be viewed behind the lease boundaries, allowing for both lease and reservoir optimization consideration at the same time. Both team members have the option to change the spacing of the stamp to adjust to the configuration of the lease; built-in engineering rules also adjust for violations of physical constraints. Intelligent logic removes wellbores that cross over lease boundaries.



Clip the bore length at lease boundaries; adjust the wellbore depth, length, and angle



Built-in engineering rules adjust for violations of physical constraints



Intelligent logic removes wellbores that cross over lease boundaries

After the pad plan is finalized, the team is ready to send the wellbore survey plans, in CSV and Shapefile formats, to a third party drilling company. Critical data points such as Kickoff Point, End of Bend, and End of Turn are included, and notable events are identified with simple visual markers to facilitate the conversation between the E&P team and the drilling company.

The parameters specified in earlier steps are all included in the following list of export fields:

- Aerial Length
- Bore Name
- End of Build
- Geological Layer
- Inclination
- Kelly Bushing Elevation (KB)
- Measured Depth
- Pad Name
- Surface Location
- Total Depth/End of Bore
- True Vertical Depth
- Vertical Section Azimuth

CONCLUSION

Through its Pad and Field Planning workflow, DI Transform enables all members of a field development team to simultaneously plan an entire field of well pads with precision. The pad is the critical unit that forms the foundation of a field plan, and field planners can get it right from the very start by customizing their pad design to exact well criteria and field conditions.

The ability to assess potential pad placements using a consistent template serves as a baseline to reduce variability and margin of error in the final plan. Field planners are also spared from as many manual touchpoints as possible through built-in logic that automates and pre-populates basic parameters. Most importantly, Drillinginfo saves hours spent on revisions in multiple applications, fostering collaboration through an uninterrupted, centralized workflow.



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