

# Mountains of **DATA INTO** **INFORMED** **DECISIONS**

BY DAN LARSON  
PHOTO: ADOBESTOCK

**With Roots in Oil and Gas  
Consulting, B3 Grows  
Water Data Into High-value  
Solutions for Big,  
Thorny Questions**

**W**ith record oil and natural gas growth in Texas and New Mexico, the steady increase of produced water volumes threaten traditional disposal options. A Denver-based startup has found success by providing producers and disposal well operators with current field data and presenting it in familiar graphic formats to help drive informed decisions and avoid expensive surprises.

Kelly Bennett, co-founder and president of B3, says the company's focus is on "building data and analytical solutions at the nexus of water, land, and people."

Although the oil and gas industry was the initial focus during B3's development and it now makes up the biggest segment of industries served, the company also provides services to water utilities, financial services firms, real estate companies, engineering firms and the agriculture industry.

B3 services "go deep industry by industry," Bennett said. "When we understand what our customers need, we can provide the high value solutions to the big, thorny questions they have."

The company's roots in resource consulting go deep. Today, Bennett is a partner in Ponderosa Advisors, B3's

parent company and where, four years ago he helped build Water Sage, a water rights data management and analytics platform that is now part of the DNA of the B3 Insight platform.

## SAGE RUSH

The idea for a water rights data analytics service came from discussions Kelly had with his father, Porter Bennett, about water rights at a Montana ranch that Porter was thinking of buying.

The senior Bennett is president and CEO of Ponderosa Advisors, a company he founded in 2012. That company was formed as a follow up to Bentec, an oil and midstream information and analysis firm Porter started in 1985 and sold to Platts in 2011.

Ponderosa Advisors formed a subsidiary called Ponderosa Energy to provide oil and gas industry information and forecasting. Developed as a source for data-driven analytics for the industry, Ponderosa Energy grew its customer base, and visibility, until it was sold to Drillinginfo, of Austin, Texas, in Nov. 2016.

Based in Denver, ▶  
B3 is led by Kelly Bennett  
(top left), co-founder and  
president; Rob Bruant,  
product director; and  
Patience Peterson,  
director of marketing.



According to an Aug. 2014 company profile published in the Denver Business Journal, father and son were “tossing around ideas about what they should do next” and realized that available water rights information was “a mess.”

“If you’re a neophyte trying to understand water rights, good luck,” Porter said. “Understanding water rights in any state is very difficult, the websites are difficult to navigate and hard to understand and the data is fragmented. We wanted to pull all that stuff together so it’s easy to tell a story.”

Water Sage was an innovative web-based program that allowed users to search and map water rights information in five states, including key data such as owner name, seniority, diversion and specified use. When Ponderosa Advisors sold Ponderosa Energy to Drillinginfo, it retained Water Sage as the foundation for B3.

Today, B3 is “a data and analytics company with a proprietary software platform,” Kelly observed.

That oilfield data and analytics include information on salt water disposal, freshwater sourcing, treated produced frac water, and surface ownership.

## UNDER PRESSURE

During development and after starting the business in Jan. 2018, Kelly said B3 invested time and capital in aggregating data from more than 500 different sources ranging from federal, state and local regulatory agencies to conservation districts, non-profits, and legal filings. Today, the platform includes data for six states: Texas, New Mexico, Colorado, Wyoming, Montana and California.

The data aggregation process, according to Robert Bruant, product director at B3, involves sorting through electronic filings in 15 different formats and the image files of various permit applications, completion reports and production updates hand-written on paper.

“We can provide the user with clean, curated datasets that can be tracked back to an original record,” he said.

Bruant’s background includes oil company reservoir engineering and a research cycle at Princeton University. He holds a bachelor’s degree in geosciences, a doctor-

ate in hydrology from University of Arizona and is a licensed geoscientist.

As an example of how the B3 platform can assist an operator planning a new development, Bruant offered a fictitious drilling engineer who, in designing a new well in the Permian, was facing concerns about formation pressure differentials affected by offset injection wells.

“Previously, the best information available told you how much water was injected in the offsets over so many years,” he said, adding “you could then use that as a proxy to estimate formation pressure.”

However, formation pressure is determined not just by the magnitude of water injected but also the injection rate and for how long, Bruant noted.

A better well design will result when the operator understands the actual pressure the driller will encounter and not have to use proxy data that may not tell the whole story, he said. “We give the operator a way to understand the actual pressure, which was what they were after in the first place.”

Bruant noted that any analytics report will have gaps where data is incomplete or not updated as frequently as it might be. Information drawn from public sources depends on how complete the facts and figures are that get included in a filing.

“Better decisions come from better access to information and data,” he concluded. “Once people see what data are out there, they appreciate how much improved datasets can help.”

“Existing datasets are incredibly problematic,” Kelly added. “We have information going back to the early 1970s; some of the data started life as a paper document filled out mechanically or by hand. Our job is to extract that data and create structure and transparency around it so our customers can trust it in their own decision making.”

Bruant added: “We are not here to smooth data or make data better. We present data as it is.”

By identifying potential errors in a dataset and how they may have occurred, B3 can help customers adjust decisions accordingly, he said.

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## DATA DRIVES DECISIONS

Within the oil and natural gas industry, the typical B3 user could be an engineer, landman, analyst, regulatory and permitting tech, a business developer or in the C-suite.

“We see our customers as a pretty diverse group,” Kelly said. “The industry is rapidly changing as new segments are formed. Private equity now demands not just good drilling economics but understanding the role water plays in overall well economics.”

A well’s location can have a significant impact on its economics if disposal costs cannot be rationalized, Bruant observed.

“The operator has to be able to move produced water and dispose of it economically,” Bruant said. “Knowing what to expect in terms of produced water volumes, disposal well capacities and surface rights can drive better decision-making when determining where the water should go.”

“Our subscribers use B3 to view the competitive landscape as it is today and where current trends will go the future,” Bennett added.

## CLOUDS ON THE HORIZON

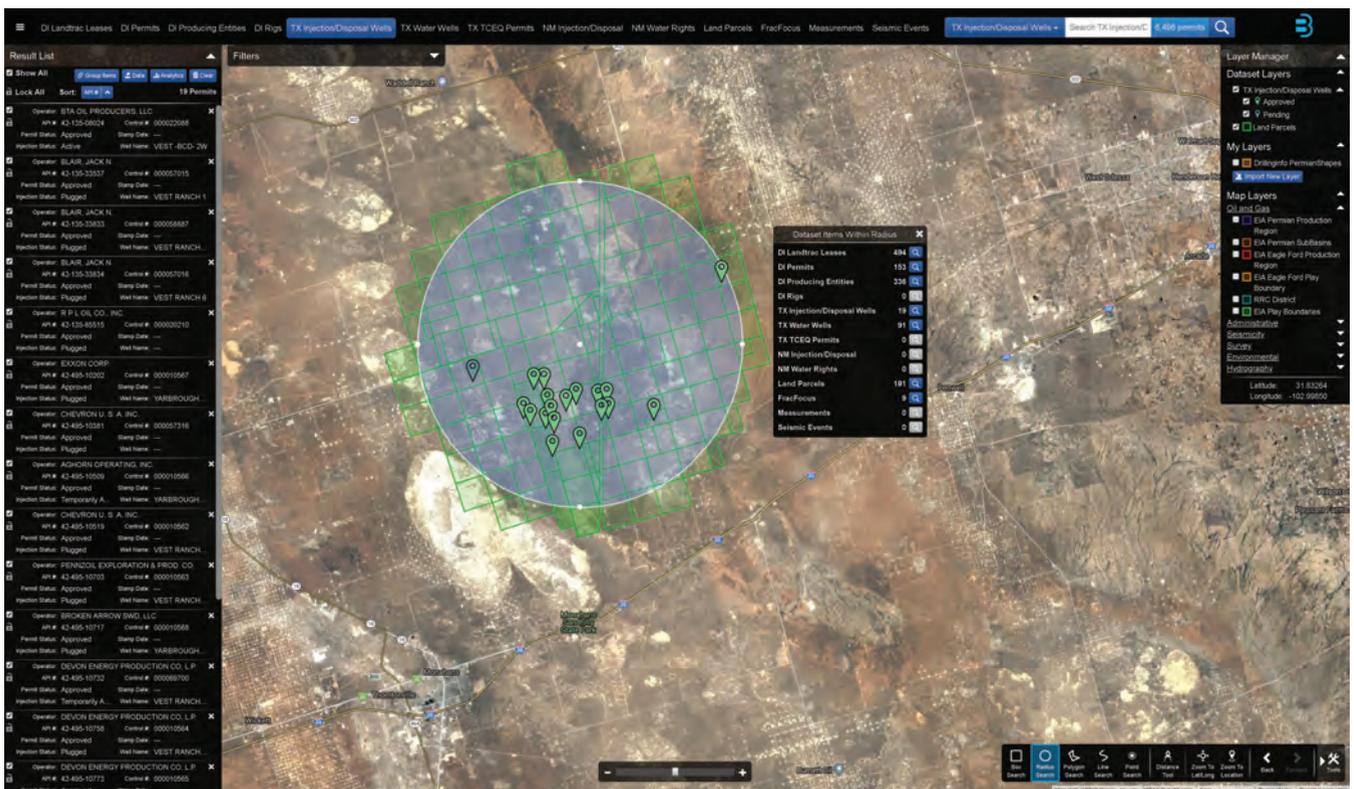
Bennett said the growing volumes of produced water in the Permian are like clouds forming on the horizon.

Part of the problem is that for most operators, a holistic view of water use, reuse and disposal in the Permian has not been available.

“Most Permian operators will tell you they have a high-level understanding of water in the basin, but not what’s happening in the next county,” Bennett observed. “There is no reason for them to chase down that information unless that’s where their next project will be.”

Part of the issue has been availability of information on water reuse. Bruant notes that there are few specific reporting requirements by regulators on water reuse. Companies are not obligated to provide “much more than broad strokes that don’t tell the whole story,” he said.

The same is true for water discharge, Bennett added. “There are at least 2,000 constituents in water produced across the Permian and there are no discharge standards for 95 percent of them,” he said.



▲ The B3 platform provides a GIS layer for viewing Texas well permits within a given radius.

There are also important questions about a connection between treated produced water and water rights ownership under Texas water law. “Without some clarification and some simplified discharge rules, it will be difficult to turn water reuse into a revenue stream,” Bennett said.

### FANTASTIC REPOSITORY

Even with possible new outlets for produced water in the Permian, underground injection remains the most available and economical option.

“Our information clearly shows that some areas are more receptive to disposal than others,” Bruant said.

In those areas where injection levels have surpassed the formations ability to accept it, the results can be felt across the field.

The San Andres formation north and east of Midland is a good example, Bruant said. The San Andres is described in a report by the National Energy Technology Laboratory as consisting primarily of limestone and dolomite with porosity between 8 and 16 percent, an average depth of 4,800 ft. and thickness of 200 to 400 ft.

Those features and its location in the heart of the Permian helped make the San Andres one the most over-pressured disposal zones in the country.

“Companies have been injecting into the San Andres since the 1950s,” Bruant said. “It’s a fantastic repository for produced water, but it is a finite resource.”

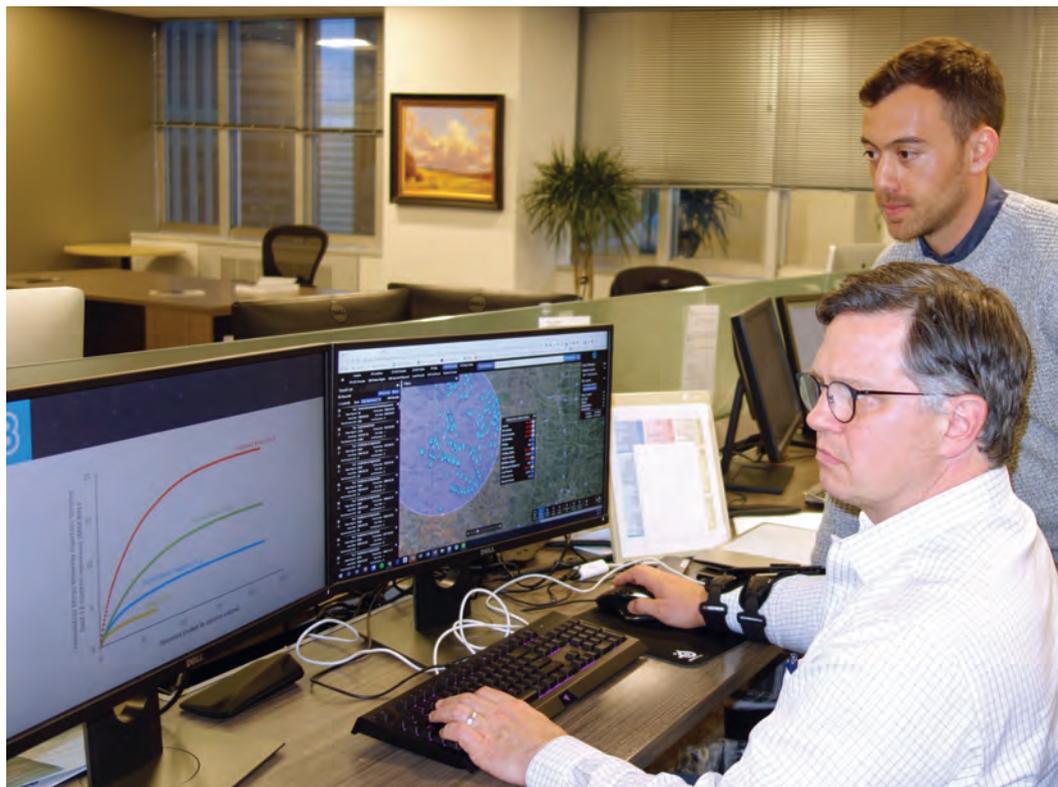
In addition to a handy formation for water disposal, the San Andres overlies two very productive oil-bearing formations, the Spraberry and the Woodford.

“There’s not an operator in that part of the Permian that hasn’t experienced a kick or washout or some pressure-related issue due to someone else’s activity,” Bruant said.

“When an operator has to go from a normal pressure zone to one that’s over-pressured to reach an under-pressured pay zone, it adds real cost to drilling,” he added.

Similarly, when over-pressure causes the SWD operator to reduce volume, produced water has to find somewhere else to go, and the cost of taking water somewhere else can cut deep into a well’s return.

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◀ Kelly Bennett (at right) discusses with Rob Bruant a graph of water statistics for an area of the Permian Basin.

“Any operator wants to minimize the amount of fluid movement they have,” Bruant said. “Often the deciding factor in where to drill the next well is how extensive the infrastructure is. The problem comes when other operators see a field the same way; before long, increased production inundates the field causing drilling and disposal problems.”

“As a result,” he said, “the situation starts looking like an example of the tragedy of the commons.” (For more about the tragedy of the commons, see sidebar.)

Bennett said a recent addition to the B3 platform makes data available that is gleaned from the Texas Railroad Commission’s P-18 Report. This data can provide operators with important insights into injection volumes and SWD utilization by operator.

Called the Skim Oil and Condensate Report, the RRC’s Form P-18 is a paper document required to be filed monthly by SWD operators with skimming or separation facilities. Form P-18 is a separate form from the Form H-10 and H-10H disposal well monitoring reports that are filed annually.

In an Aug. 2018 blog post, B3 announced it had “perfected a proprietary data digitization process” that matches thousands of rows of Form P-18 produced water data to individual disposal wells. With rising concern about disposal capacity, access to data about an individual SWD well or group of wells is critical, the blog post noted.

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The ability to aggregate the latest SWD data on the B3 platform “enables users to analyze and understand facility specific and regional trends in water production, disposal, utilization, commercial performance and market share,” according to the blog.

Bennett added that some manual entry of data from sources such as Form P-18, continues in the B3 data aggregation process. “We have built a quality assurance program that helps define what is acceptable. We add algorithmic reviews to help us understand what’s in the data so we know the information we provide our customers can be trusted,” he said.

Bennett concluded that “issues such as over-pressurization in the San Andres formation, which have appeared in just the past three years or so, cannot be resolved by a single operator. A collaborative solution can be achieved but only with a base of knowledge and information that is reliable and up-to-date.”



▲ B3 provides customers with access to aggregated data from Texas Railroad Commission Form P-18 filings showing SWD injection volumes. Originally filed as paper documents, Form P-18 data are captured by B3 with a “proprietary data digitization process.”

# Permian Produced Water a 'TRAGEDY OF THE COMMONS'?

The tremendous volumes of water produced from the oilfields in the Permian threaten to overwhelm the ability of industry to dispose of it and that could result in curtailed oil production. The occurrence of similar situations in history led to coining of the term "Tragedy of the Commons."

Originally used in England during the 19th Century to describe a tendency of livestock owners to overgraze public lands, or commons, despite the negative consequences, Tragedy of the Commons was modernized in a 1968 paper by the American biologist, Garrett Hardin.

Worried about the threat of overpopulation, Hardin called attention an apparent inability of societies to solve the problem of resource depletion for things like groundwater, grazing land and fisheries. His ideas were intended to oppose the theories of 18th Century economist, Adam Smith, whose "invisible hand" notions said that the people will make rational decisions to promote their self-interest and such decisions certainly promote the common good.

Instead, Hardin wrote, a cattleman will see the benefit of adding cattle to his herd but

only feel a fraction of the negative effect of overgrazing. As a result, any rational cattleman will be motivated to increase the size of his herd but eventually, when his neighbors are motivated to do the same thing, everyone will suffer the consequence of an overgrazed pasture.

Although this example is simplistic, correlations to water disposal in a massive field like the Permian are plain to see.

Even as tens of new SWD wells are developed and new produced water treatment plants are commissioned to pump thousands of barrels of water back for the next frac job, much more water is produced than the system can handle.

Hardin used his Tragedy of the Commons ideas to advocate for more public regulation of resource development. Other deep-thinkers say greater private ownership of resources will prevent over development.

Recently, we have seen the water management industry raise its awareness of the produced water tsunami threatening America's premier oil field. For an industry long known for its innovative solutions to knotty problems, confidence is high that solutions can be found.



The Tragedy of the Commons is a socio-economic theory that describes how individual self-interest can lead groups overwhelm a public resource. In the Permian Basin, growing oil production threatens to overwhelm the industry's ability to dispose of produced water.

## SEISMIC SCRUTINY

A new feature added to the B3 platform allows operators in Texas to correlate SWD data with reports on seismic activity within a user-defined radius.

Such knowledge is increasingly vital as some states now require seismic activity data on all new SWD permit applications.

Evidence is not conclusive of direct correlation between water injection and earthquakes in all areas, but apparent cause and effect is often reported in the news media and noted by regulators. In November, a report from the U.S. Geological Survey noted that earthquakes in the Permian measuring at least magnitude 2.5 have tripled to more than 60 a year.

Texas regulators have taken notice and in December, the Railroad Commission said it is considering new regulations that would limit injection volume and pressure on new SWD well permits in areas where seismic activity is higher.

These possible revisions are under discussion by regulators, stakeholder groups and the industry, according to a December report by Bloomberg.

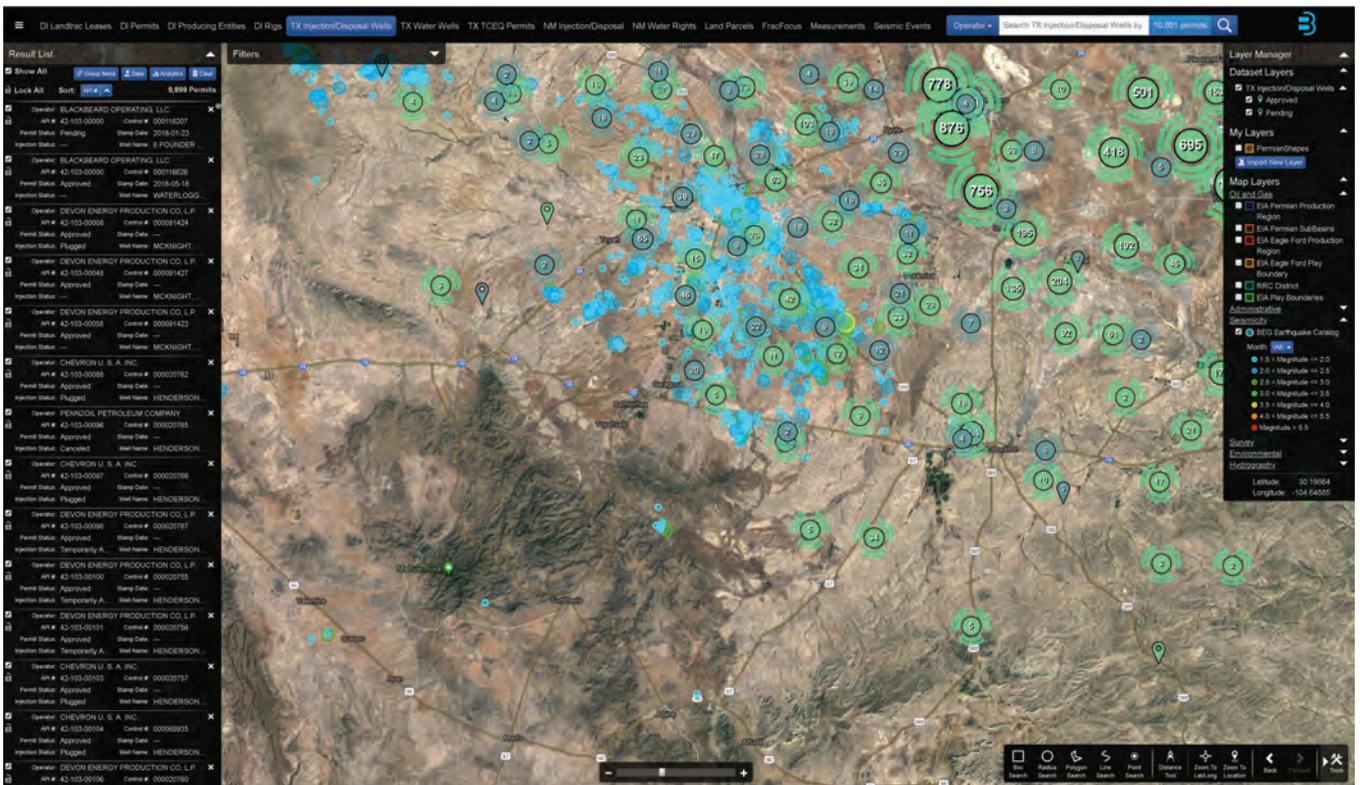
Using data provided by the Texas Bureau of Economic Geology, B3 can provide a user with a map overlay of seismic activity filtered by date and magnitude for a radius out to 5.63 miles around an existing or proposed disposal well.

For an operator looking to permit a new UIC well in Texas, data packages can be generated showing all seismic events recorded by the USGS back to 1974. Such information is required by the RRC as part of the permitting process, Bruant noted.

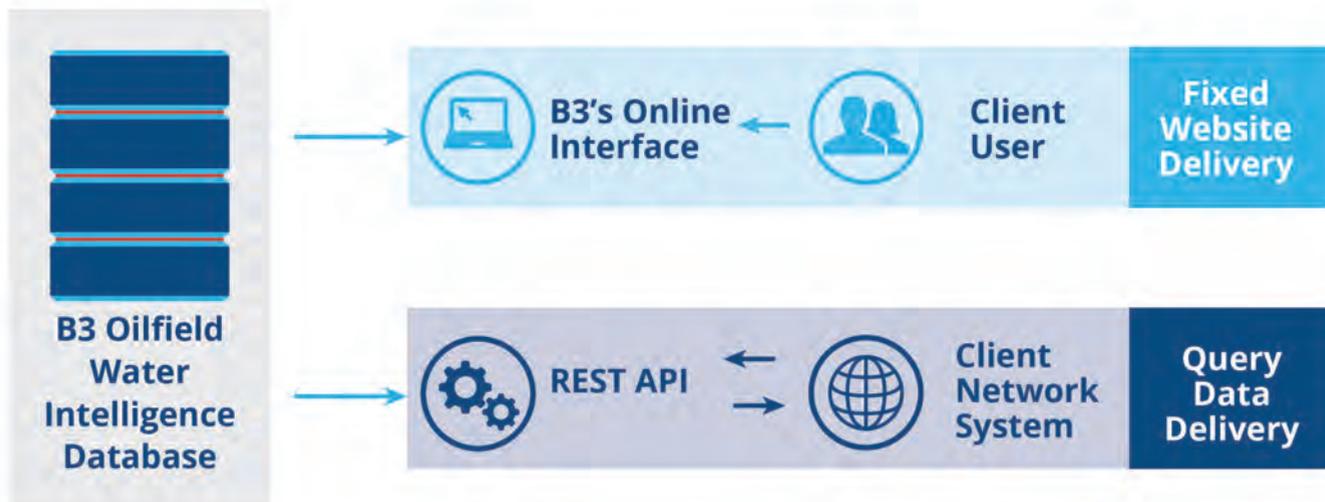
“We added that function after discussions with our customers,” he added.

## DATA AGNOSTIC

Providing solutions to complex information issues is a key driver for B3, Bennett said. In order to provide customers



▲ Screenshot showing disposal and injection well permits layered over Texas Bureau of Economic Geology data on seismic activity and color-coded by magnitude.



▲ The application programming interface (API) developed by B3 allows customers to import data directly into their data warehouse or internal applications for remote, private analysis.

with useful information about the nexus of oil and water, the B3 platform was designed to aggregate data from a variety of sources and formats.

Using proprietary software programs and an in-house data team, B3 can “collect, clean and integrate industry-specific third-party data with a customer’s proprietary data to provide a unique package of information,” according to a company statement.

“We take privacy very seriously,” Bennett said. “Our policy is built around a commitment to customers not to release or publish any information that can be attributed to a customer or company. And, we leverage industry standard security measures for our data.”

Bennett added that B3 has developed an innovative and useful application programming interface (API) that allows customers to import data directly into their data warehouse or internal applications for remote, unique analysis.

The B3 Direct Insight API was developed to save the customer time by allowing a direct connection to B3 servers for importing a variety of datasets to the customer’s internal systems. This allows the customer to make critical decisions quickly, with confidence based on up-to-date oilfield water information.

Finally, B3 allows customers to integrate their subscription to the Drillinginfo oil and gas platform into their B3 water information program.

“Customers can create their own unique analysis by integrating Drillinginfo data on drilling permits, rigs, wells, completions, production and leases with B3 oilfield water intelligence,” Bennett said.

### PERMIAN PATHWAY

Bennett said the intelligence gained from operating the B3 platform has made him aware of the existential threat to America’s premier oil field represented by growing volumes of produced water.

With access to data that were until now fragmented and nearly unusable, B3 intends to produce a Permian basin-wide analysis of produced water trends, disposal limitations and potential regulatory constraints. Bennett emphasized that oil and gas, and water companies, need to understand the big picture if Permian development is to stay on track.

“We have direct contact with different operators about what they are experiencing; with our analytics, we can look at the region holistically. With this assessment, we will tell a story that can help the industry arrive at a different outcome.”

Scheduled for release and sale this spring, B3’s Permian water study will include input from industry, environmental groups and regulators, Bennett said. “We want to open a dialogue about our knowledge of current trends and how we can create a pathway for the future.” ■