DEVELOPING NEW GROUNDWATER SOURCES: SCIENCE OR SERENDIPITY?

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PRESENTATION TOPICS

Groundwater Source Development

- Science
- Serendipity
- The Law of Unintended Consequences

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Oxford Dictionary Definitions

sci·ence
Sīəns

Noun

the intellectual and practical activity encompassing the systematic study of the structure and behavior of the physical and natural world through observation and experiment.

ser·en·dip·i·ty
serənˈdipədē

noun

the occurrence and development of events by chance, in a happy or beneficial way.

Romans 8:28 NIV

And we know that in all things God works for the good of those who love him, who have been called according to his purpose.

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The law of unintended consequences: Outcomes that are not the ones foreseen and intended by a purposeful action.

ground·wa·ter
ground ˌwôdər

noun

Groundwater is the water present beneath Earth's surface in sediment pore spaces and in the fractures of rock formations.

Why do we need science?

1. Groundwater is beneath the Earth's surface. We can't see it.

2. Can we find the pore spaces and fractures that contain the water?

3. Are the pore spaces and fractures in the area where we need the water?

4. Are the pore spaces and fractures large enough to store and transmit usable quantities of water?

5. Have interactions of the water with surrounding sediment and rock caused the water quality to be objectionable?

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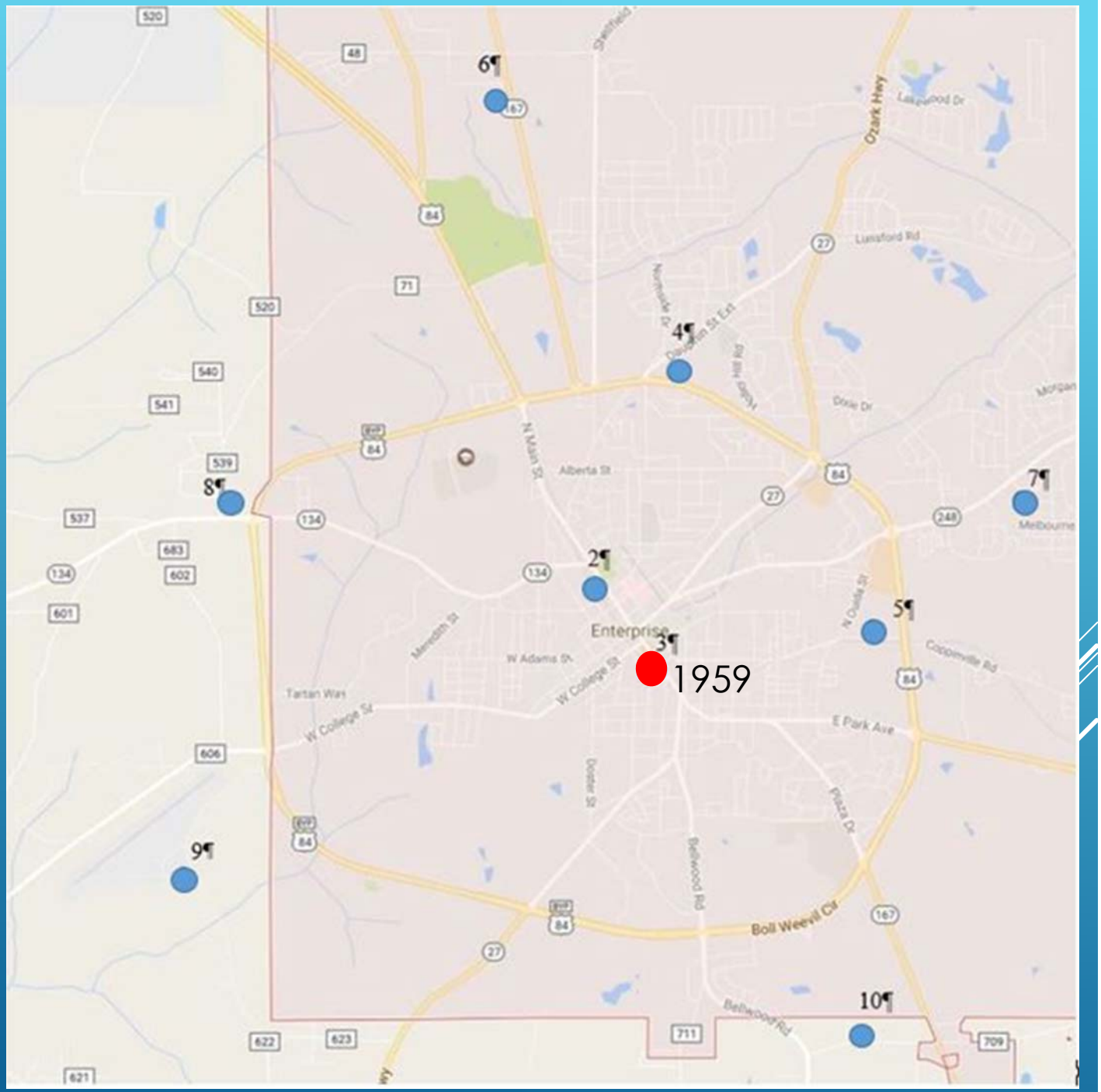
CASE STUDY

City of Enterprise Alabama Water Department Well #3

Enterprise Older Production Wells



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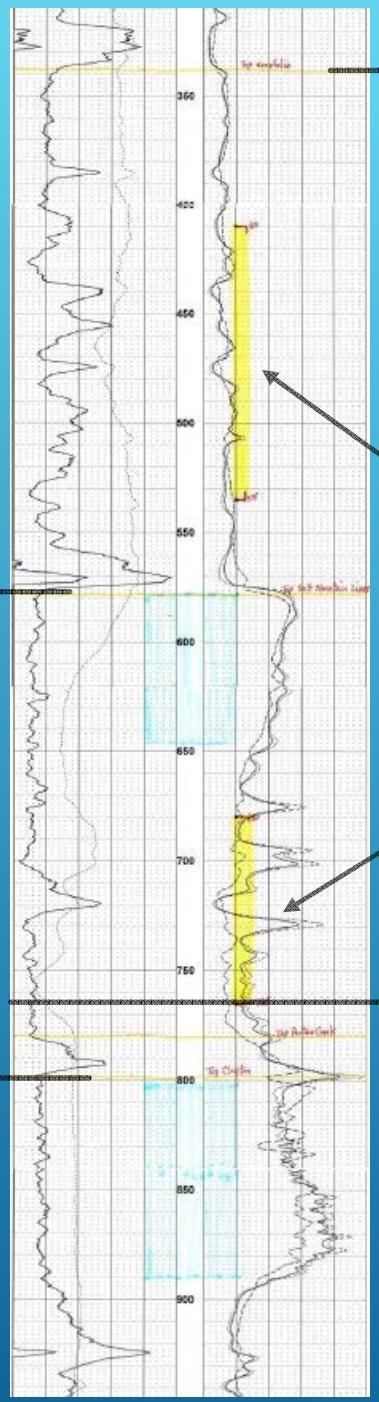
In late 2015, during a routine well workover, the drilling contractor experienced a catastrophic failure and Well #3 was a total loss.

In March 2016, the city of Enterprise and Poly, Inc. contacted Cook Hydrogeology to evaluate the situation.



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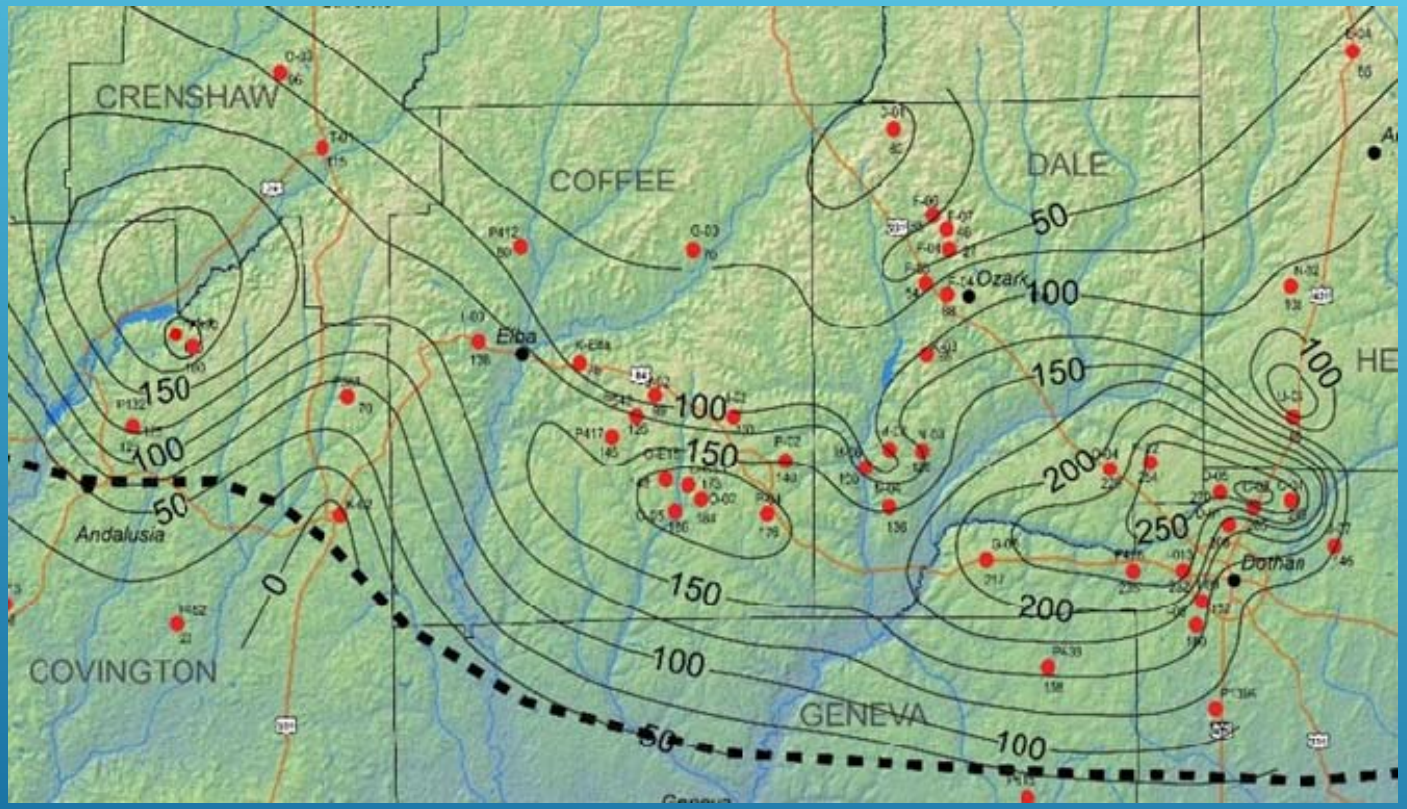
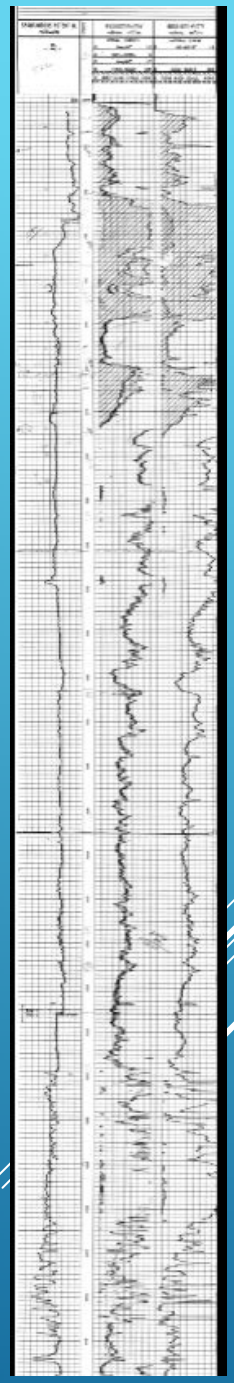
Clayton Formation





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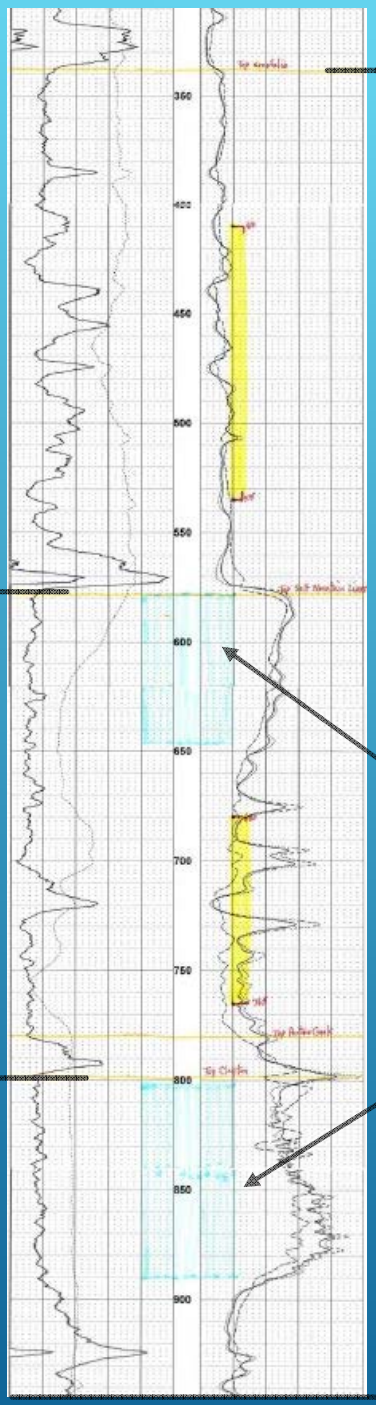
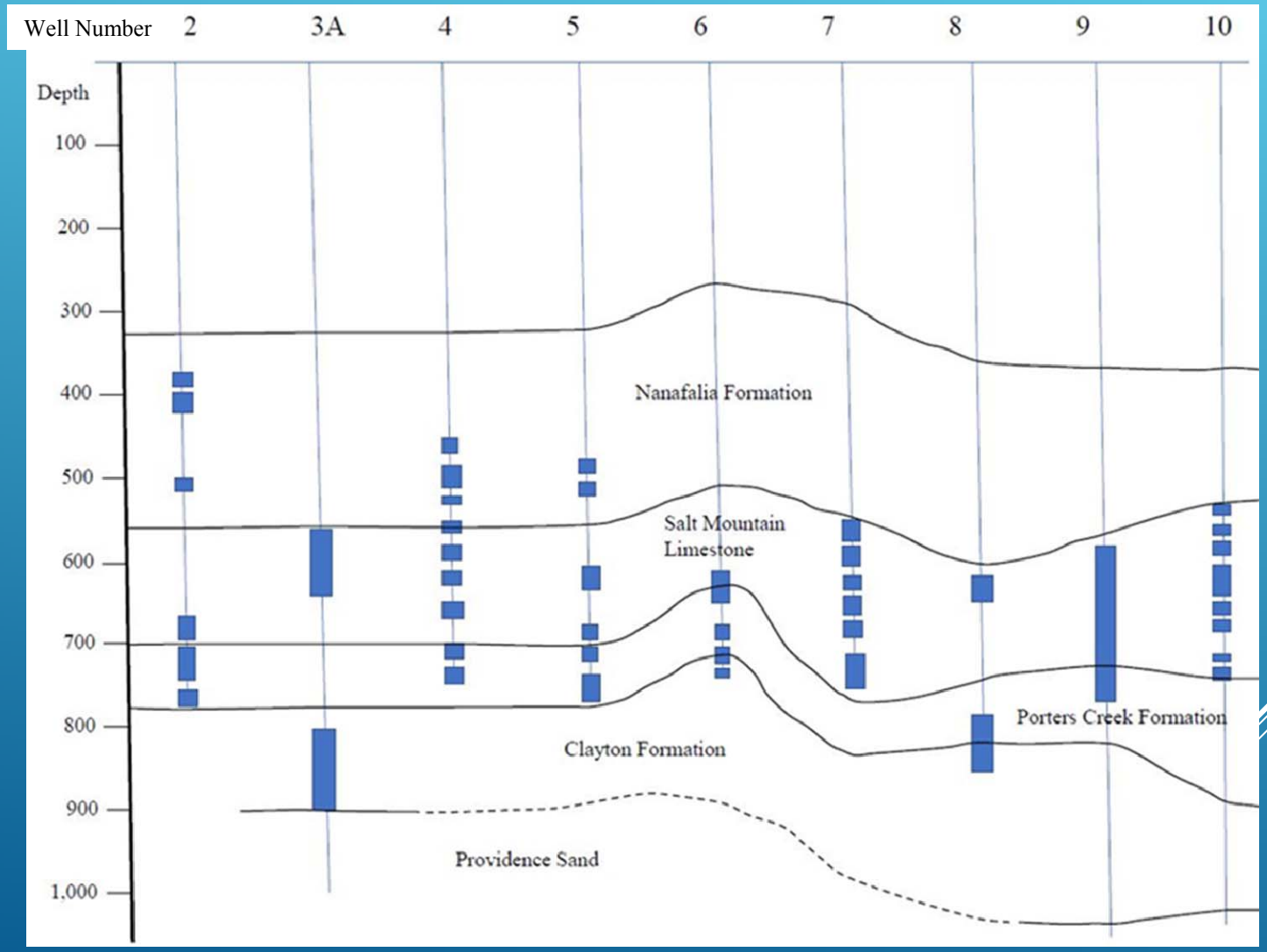
Cook Hydrogeology discovered that the original well was poorly screened and a much greater production potential was possible by correctly screening the Salt Mountain Limestone and drilling deeper to penetrate the Clayton Formation.

In April 2016, Enterprise negotiated a replacement well deepened to 950'

The production rate for the newly constructed well was more than 1,000 gpm



As a result of the successful replacement well #3, the city of Enterprise Water Department requested Cook Hydrogeology to evaluate the eight remaining older wells.



CONCLUSIONS

The city of Enterprise Water Department Well #3 case is only one of many examples of the combination of Science, Serendipity, and the Law of Unintended Consequences.

Karst groundwater sources presents its own spectacular examples as well as regulatory actions such as requirements related to disinfection byproducts.

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Thank you

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