

The Economics and Implementation of EGS

Stimulation Technology: Economics and Application

May 2015

What is EGS?

How does it relate to
Stimulation?

What are the different
forms of stimulation?

Innovation1: AltaRock™ ZIM Technology

Challenge Low flow per EGS well Need >75 l/s,
>1200 gpm

Solution:


Multizone Stimulation and TZIMs

Innovation 3: Stimulation pumps

Challenge:

Solution:

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← 2000 psi
1000 gpm

Pump curves for HP Mode

Economics

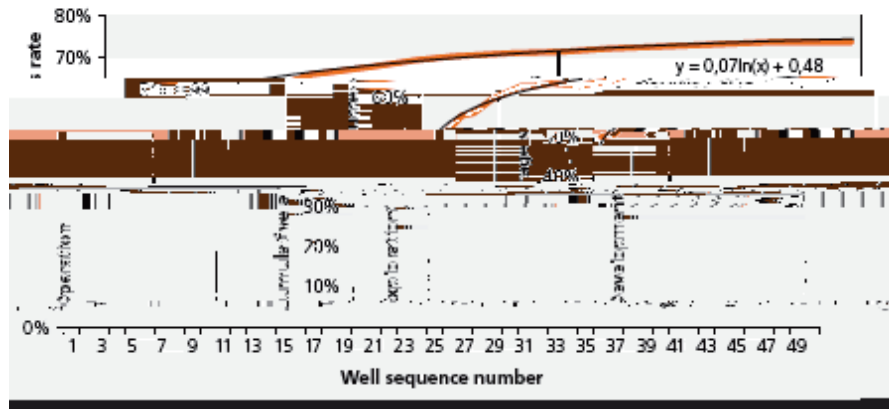
Two Scenarios for Improving Geothermal Economics with Stimulation

Infield Stimulation for Improving Existing Projects

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Dry Hole Risk in Geothermal

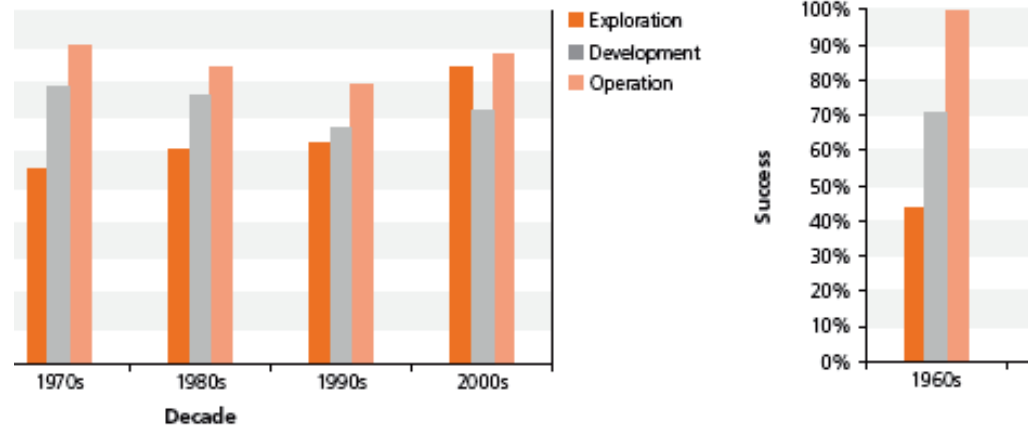
Cumulative average well success rates



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Drilling success has improved over time, but not by much. We aren't getting much better at exploration.

Drilling success rates over time by phase



Sensitivity Analysis of the Impact of Stimulation on New Geothermal Development in the Basin and Range

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Cost Comparison for Basin and Range Project With and Without

Cost Comparison for Basin and Range Project With and Without Stimulation: Moderate Initial Productivity/Injectivity

Field Testing

2015 Stimulation Summary

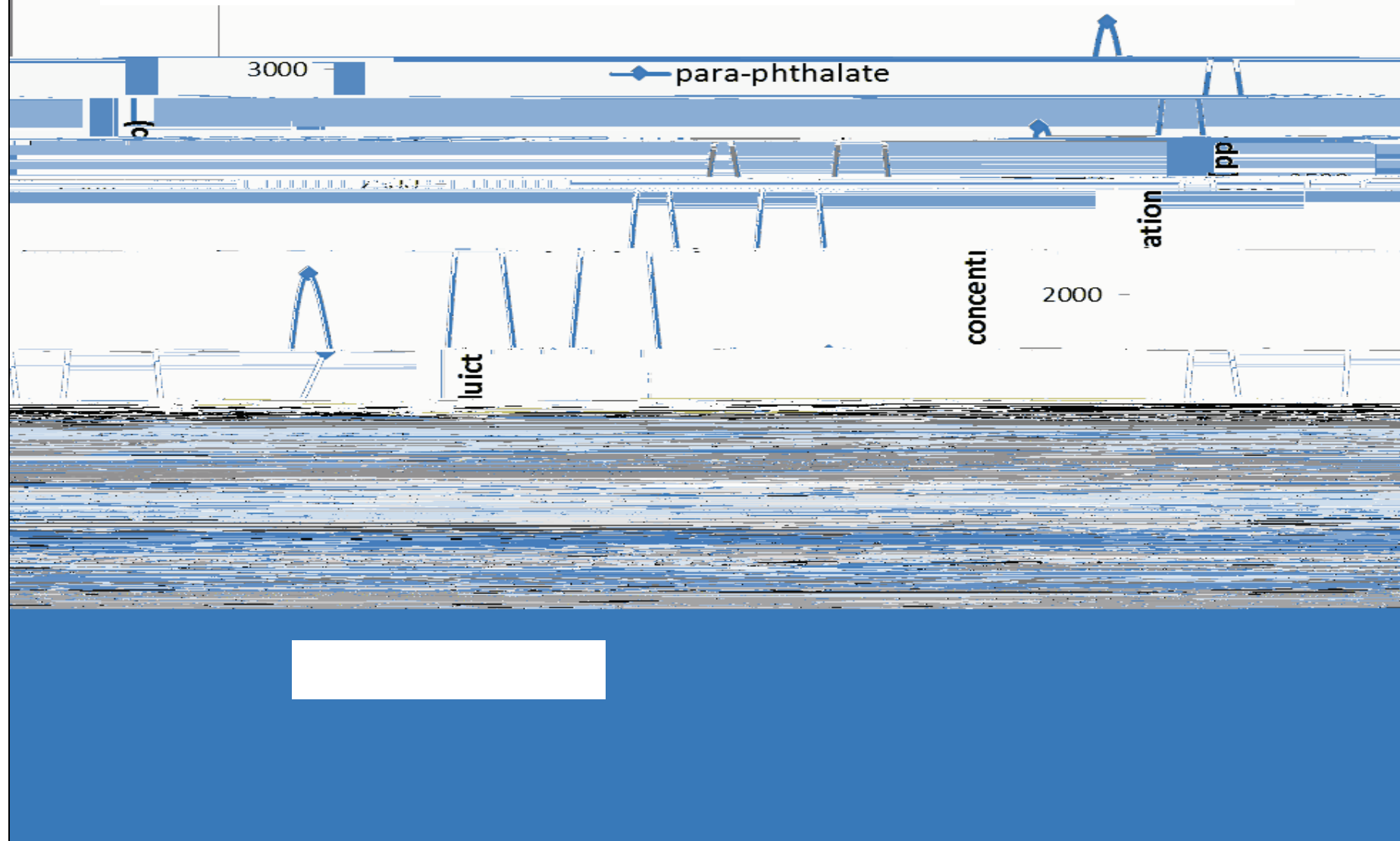
Gillian Foulger Moment Tensor Locations

LBNL Relocations

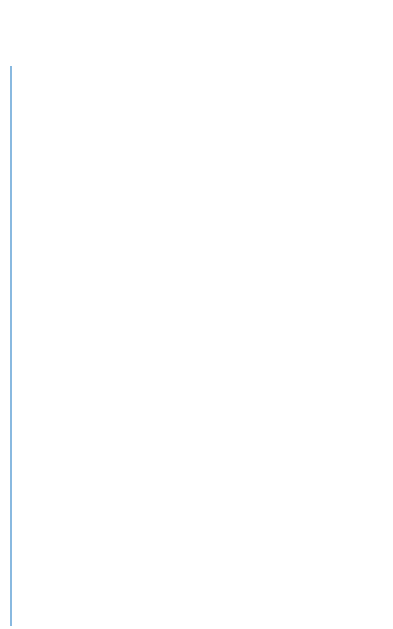
List of event catalogs and their relative weights

Catalog	Number of Events	Weight
ISTI Original Locations		
LBNL Hand-picked Locations		
LBNL Relative Relocations		
Foulger MT Locations		

Nov. 24-25 flowback TZIM degradation product



Derivative Analysis of Pressure fall-off



Conclusion

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