



Applied Seismic Research
IN-SITU SEISMIC STIMULATION

1400 Preston Road, Suite 400, Plano, TX USA 75093
972.665.9782 Phone 972.665.9783 Fax wow@zowi.to e-mail

MEMORANDUM

Subject: Screening and Analysis of Field Candidate for In-situ Seismic Stimulation

Introduction

Prior to computer modelling of your field you might like to perform an “in-house” screening of your fields. The parameters you should consider in evaluating fields are:

- The greater the heterogeneity the better
- API gravity greater than 16
- Permeability-thickness governs how quickly a reservoir responds. For instance in the Lost Hills diatomite the permeability is extremely low, but the thicknesses can range up to 1500 feet, so in Lost Hills the response can be as short as a few days – conversely Permian Basin stimulations of 0.5 – 1 md with pay thicknesses of 12-15 feet can require 2 months to see substantial (26% increase in oilcut/production in one case) changes in oilcut/production –
- Typically, shockwaves cover less area in reservoirs with GOR’s greater than 2,200 scf/stb.
- We can install into all types of wells. We have a long history of installing into injection wells...however, recently we have been deploying our tools in abandoned production wells. In abandoned wells we place sand across the perms and a 100 ft cement plug on top of the sand; we then fill the wellbore with either oil or water. The cement plug only decreases the shockwave by less than 5% -
- Depth is not an issue – extremely deep operations will require a longer stroke pumping unit – Wells should be as vertical as possible -
- Porosity is not a governing factor, nor is wettability, rock -type, and/or FAULTING.

Data for ASR Computer Analysis of Field Candidates

If we have sufficient data ASR can model your field to determine the benefit of seismic stimulation. The result is a ranking from poor to excellent and a range of increase in oil production/oilcut, e.g. 5-10, 10-15, ...

The data that is required to run our computer program follows:

- Cumulative production of oil and water in the field on January 1st 2001
- Monthly oil, water, and gas production for the field from January 1st 2001 to the present.
- API gravity
- 3 to 5 core analysis reports
- 3 to 5 spinner/tracer surveys, if available