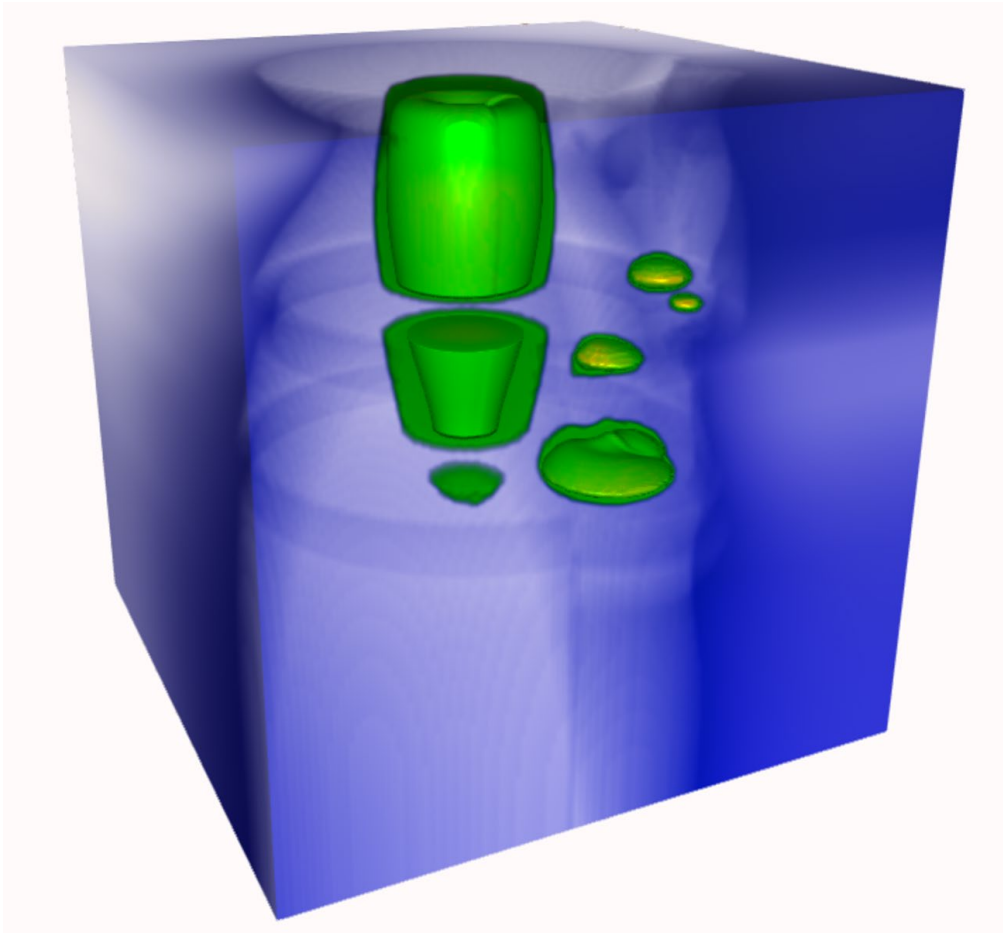


Retired Oil Wells



A Profitable Dogooder's Job
Really?

Dr. Norbert Schwarzer & Julius Schwarzer

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Retired Oil Wells – A Profitable Dogooder’s Job; Really?

By Dr. Norbert Schwarzer, Julius Schwarzer

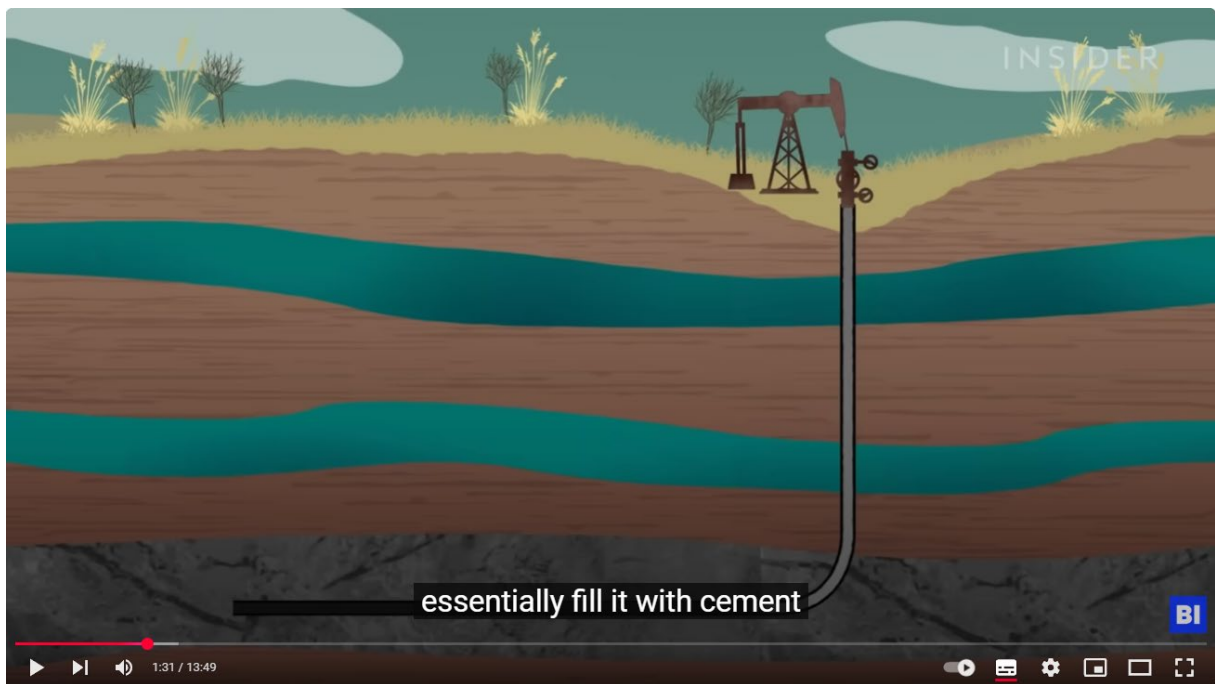
1 About This Paper

It should be pointed out that this publication is to be understood as demonstrator or application story for our book [1], the booklet about “A Higher Order Chemistry” [2], and the brief fundamental paper [3]. It is for this reason that we explicitly kept the style relaxed, easy, and refrained from the usual—and rather—heavy math our theory and its practical application require.

However, in order to give the reader the chance of assessing some “economic expectations” within a socioeconomic space-time (society) of quite some volatility and uncertainty, we will present the corresponding tool in the appendix of this brief paper.

2 An Apparent Problem

When searching the scientific literature, the mainstream and the social media, one usually finds just “disaster” when it comes to the topic of retired oil wells (figures 1 and 2).



*Fig. 1: “fill / seal with cement”—a typical “clean-up” suggestion with respect to retired oil wells
(from: <https://www.youtube.com/watch?v=8EjkgPzVWjE>)*

When taking only 400,000 of the 4 million retired oil wells in North America alone, we end up with about 20 to 30 billion US\$ when intending to securing these wells. Unfortunately, after about 10 to 15 years, we have to do a revision on the sealing, and those costs will have to be spent again... and this was for only about 10% of the retired oil wells.

But perhaps there is an alternative.



Fig. 2: “not much cleaner today” → “How Toxic Century-Old Oil Wells Trap Thousands Of Workers In Java | Risky Business”
(from: <https://www.youtube.com/watch?v=NwKWxDyRvMY>)

3 A “Small” Business Opportunity

We apply the following recipe:

- a) We take the about 4 million retired oil wells in North America
- b) We use RASA® technology [1, 2, 3] and extract the—at least—1 million oil residuals from each of those wells
- c) We calculate with a conservative estimate of only about 25\$ per barrel as revenue (including all costs and the subsequent sealing)
- d) We solve the environmental problem, the energy crisis, and help to Make America Great Again

Sums up to 100 trillion \$ revenue and a cleaned-up environment = win win win...

3.1 Has This Already Been Done?

Yes.

3.2 What Were the Results of Previous Experiments?

A properly monitored application was performed on 16 retired oil wells with the result of an average extraction in the retired or close-to-retirement state of 30% above the state in the active production period. Thereby, it should be pointed out that—for geographical and political reasons, which we cannot reveal here—this result was achieved in an environment being rather far from optimum regarding monitoring, doing timely adjustments, theoretical and computational undergirding, and subsequent optimization. This also concerned mid- and long-term studies and performance structuring regarding all degrees of freedom of the process.

Consequently, we expect much better results with the technology being installed within an R&D-friendly environment and with suitable monitoring of all essential components and observables. Hence, see next chapter.

4 Unleashing the Optimization Potential

We have already hinted that within the first practical realizations of the technology, no optimization process was applied (simply because this was not possible for a variety of logistic and political reasons). Thereby we refer to optimization with respect to the following aspects:

- a) Fine-structural adjustment of the Polar Selective Agent [1]
- b) Frequency- and amplitude-adjustment to the geological, environmental, and chemical complexities of the well-system in question. In accordance with chapter 14 in [1], this allows for an acceleration and hence, increase in production (key-word: anti-diffusion)
- c) Incorporation of real-time optimization regarding geological challenges and logistics [4, 5, 6, 7] (see figure 3)
- d) Intricate, in-process agent-attribute management (e.g., viscosity, host-material affinity and reactivity) via multi-dimensional property monitoring and recoupling processing (important hint: thereby no alien material injection is needed)

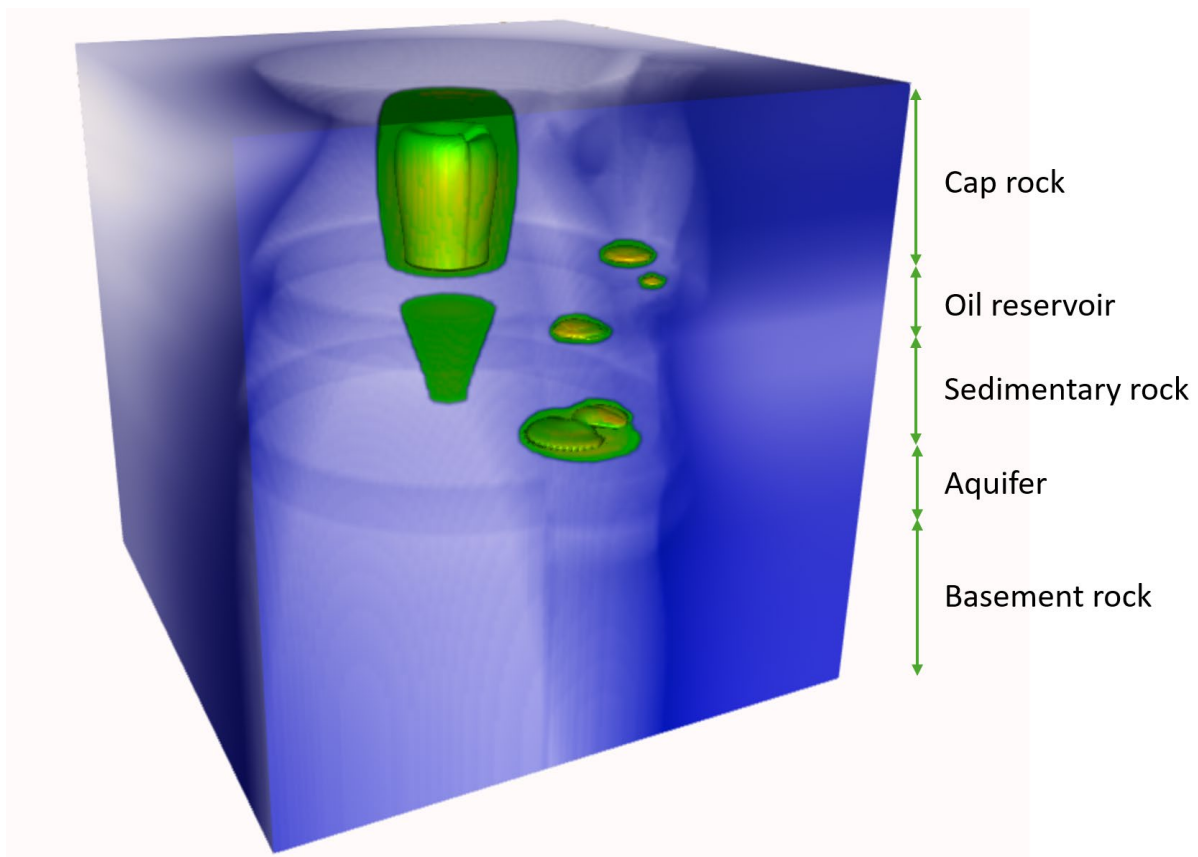


Fig. 3: Example for a geological analysis/optimization with our tool FilmDoctor [4] for a typical oil well extraction scenario.

Geological Mechanics

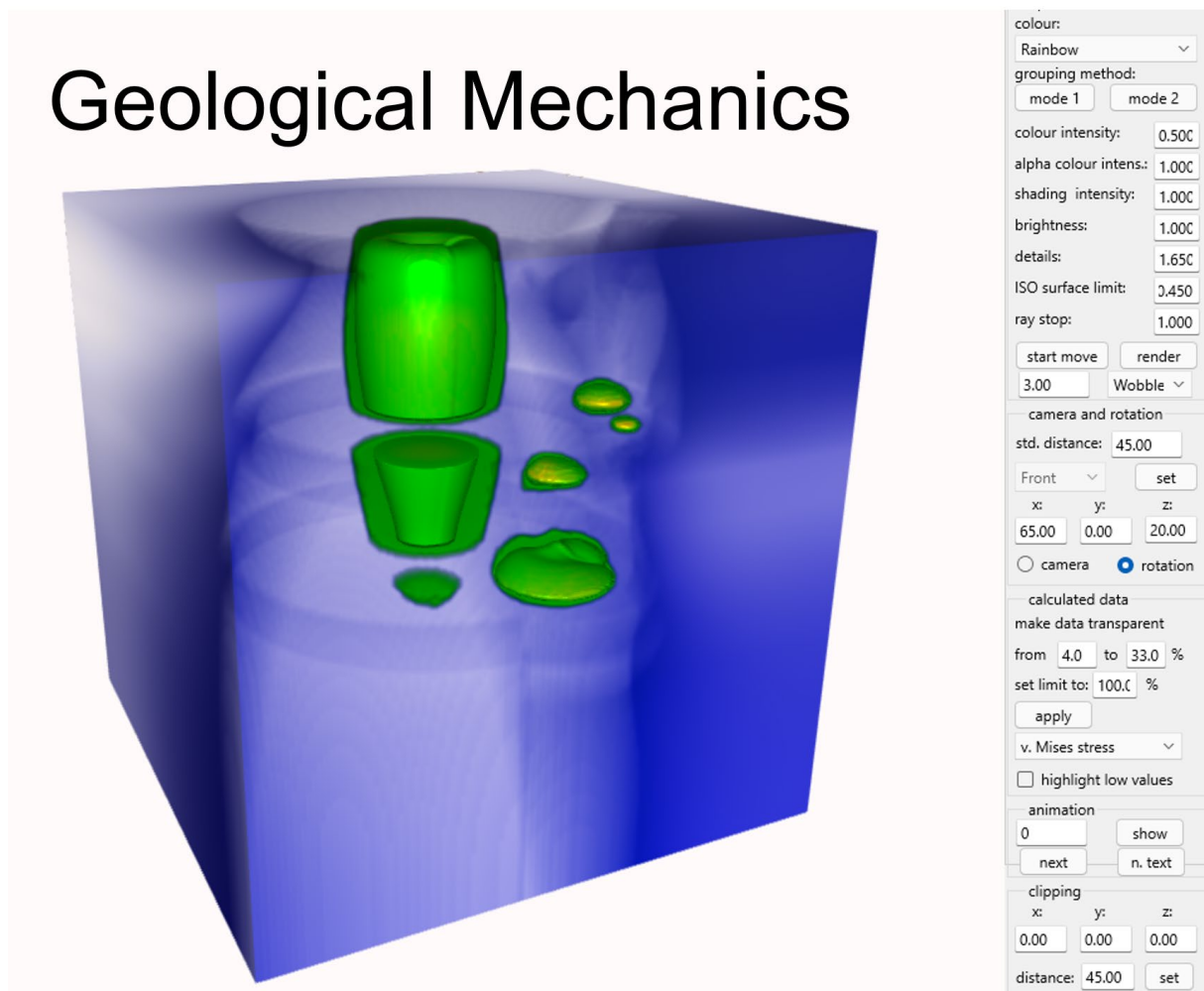


Fig. 4: Example for a geological analysis/optimization with our tool FilmDoctor [4] for a typical oil well extraction scenario. Due to the completely analytical and mathematical closed-form character of the solutions being applied, adjusting parameters is easy and much faster than in comparable FEM- or BEM-based packages (depending on the task up to many thousand times). Even optimization or other inverse evaluations—something fundamentally problematic in other models¹—can be done easily in FilmDoctor.

By unleashing and activating these optimization features, we do not only expect a significant increase in the extraction figures in comparison to the numbers given above BUT ALSO a dramatic raise in the total amount of extractable hydrocarbon.

¹ FEM and BEM require the incorporation of a half-empirical sensitivity analysis with the embedment of hundreds of forward evaluations into the process.

5 Appendix: The Socio-Economic Expectation or Why We Need a Fundamental Statistics

“If there is one thing certain in this universe, then this is uncertainty!”

Based on this fundamental observation, the question arises how one can still, which is to say, even though there is an omnipresent uncertainty, make a prediction and give proper “expectation values” for anything.

Applying the standard scientific approach, the answer immediately leads us to the usual and postulated apparatus of statistics with the uncertainty woven into it via perturbations, field functions ($\rightarrow$ “quantum statistics”), non-linear evolution equations with fractal sets and dimensions ($\rightarrow$ “chaos theory”), and related ansatzes. As being postulated, none of which is truly fundamental, and all these approaches come with a significant error and bias problem. What bothers us the most, however, is the apparent dimensional and scale independence of the current statistics. The number of attributes, properties, degrees of freedom, or dimensions residing in the system of interest (meaning the one we intend to evaluate certain expectation values for) should be a fundamental parameter in any universal statistical concept.

In order to avoid the bias and account for the number of attributes, we here want to present the concept of the Universal Quantum Gravity Expectation Value. It is based on a completely fundamental rigorously derived quantum gravity statistics [8, 9].

In the classical—quantum—apparatus, the expectation value $E[A]$ of an attribute A can be derived via the wave function Ψ and its complex conjugate Ψ^* as follow:

$$E[A] = \int_V d^n x \sqrt{|g|} \cdot \Psi^* \cdot A \cdot \Psi; \quad g = \det[g_{\alpha\beta}]. \quad (1)$$

Thereby, the symbol g stands for the determinant of the metric tensor $g_{\alpha\beta}$ of the socioeconomic space-time or system of which one wants to determine the expectation value of A . The expression (1) requires normalized functions Ψ , meaning:

$$\int_V d^n x \sqrt{|g|} \cdot \Psi^* \cdot \Psi = 1. \quad (2)$$

Even though already quantized, this is all postulated material and as we will show here, it is not truly fundamental.

The obvious way to define an average or expectation value of a property or attribute A in a given space-time volume V is via the sum of this attribute at all n possible positions and allocated values A_i of the attribute within the space-time. Mathematically this has to be formulated as follows:

$$E[A] = \frac{\left[\sum_{\forall i} A_i \right]_V}{n}. \quad (3)$$

Assuming continuity we should write:

$$E[A] = \frac{\int_V d^n x \sqrt{|g|} \cdot A}{\int_V d^n x \sqrt{|g|}}. \quad (4)$$

Thereby the covariance is guaranteed via the Jacobi-determinant $\sqrt{|g|}$.

In other words, any observable $E[A]$ within a given space-time volume V is defined throughout (4). Thus, the probability to observe A in a certain state $E[A]$ is to be obtained from a simple volume integral with the kernel function A , divided by the volume.

All other statistical properties are obtained in the same way, which is to say they are derivatives of (4), which we have covered in our papers [8, 9].

The big question is now, how to start with (4) and at least approximately end up with the postulated, but apparently reality-conform equation (1). In the current structure we see no way to achieve this.

However, when starting with the generalized Hamilton extremal principle [3] in the form of the Einstein-Hilbert action [10], which Hilbert only ever used to derive Einstein's General Theory of Relativity [11], we derive at a point where the most simple and simultaneously also the most universal expectation value should be evaluated by the means of a simple volume integral [8, 9]:

$$E[A] = \int_V d^n x \sqrt{|G|} \cdot A; \quad G = \det[g_{\alpha\beta} \cdot F[f]]. \quad (5)$$

We can easily show that (5) is a more general (quantum gravity) form of the classical expression (1). Thereby we only need to take into account the results of our Quantum Gravity Theory from [1, 2, 5, 6, 7] and expand the determinant G under the integral in (5) as follows:

$$\begin{aligned} E[A] &= \int_V d^n x \sqrt{|G|} \cdot A = \int_V d^n x \sqrt{\sqrt{G}^*} \cdot A \cdot \sqrt{\sqrt{G}} \\ &= \int_V d^n x \sqrt{\sqrt{g} \cdot F^n}^* \cdot A \cdot \sqrt{\sqrt{g} \cdot F^n} \\ &= \int_V d^n x \sqrt{\sqrt{g}}^* \cdot \sqrt{\sqrt{F^n}}^* \cdot A \cdot \sqrt{\sqrt{g}} \cdot \sqrt{\sqrt{F^n}} \\ &= \int_V d^n x \sqrt{\sqrt{g}}^* \cdot \sqrt{\sqrt{g}} \cdot \sqrt{\sqrt{F^n}}^* \cdot A \cdot \sqrt{\sqrt{F^n}} \\ &= \int_V d^n x \sqrt{\sqrt{g}}^* \cdot \sqrt{\sqrt{g}} \cdot \sqrt{\sqrt{F^n}}^* \cdot A \cdot \sqrt{\sqrt{F^n}} \\ &= \int_V d^n x \sqrt{|g|} \cdot \sqrt{F^{\frac{n}{2}}}^* \cdot A \cdot \sqrt{F^{\frac{n}{4}}} \\ &= \int_V d^n x \sqrt{|g|} \cdot F^{\frac{n}{4}*} \cdot A \cdot F^{\frac{n}{4}} \\ &\xrightarrow{\Psi = F^{\frac{n}{4}}} \\ &= \int_V d^n x \sqrt{|g|} \cdot \Psi^* \cdot A \cdot \Psi \end{aligned} \quad (6)$$

This, however, is just the classical equation for the quantum mechanical expectation value as we had given here in equation (1).

We see that our new quantum gravity expectation does not only contain a proper connection of the metric of the socioeconomic space-time with its own "ever-jittering" [3] uncertainty, but also sports the number of dimensions n as an important parameter. In [8, 9] we were able to show that only in systems with huge numbers of degrees of freedom (c.f. second line in (6)), we end up with the classical postulated apparatus and the equation (1).

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