ANALYSIS OF ACIDIZING

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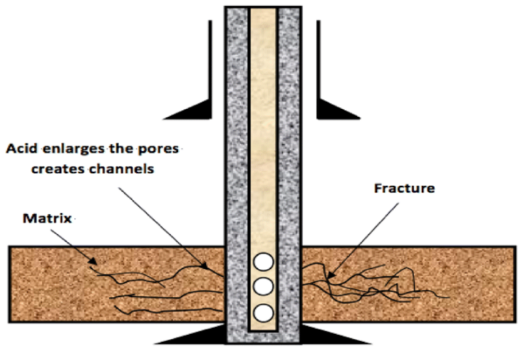


Abstract. Oil and gas well productivity has been increased with acid treatment (acidizing) for almost 120 years. The development of hydraulic fracturing techniques came after the history of acidizing. In addition, all other techniques for stimulating the well in general. Because there were no efficient inhibitors of acid corrosion up until the early 1930s, steel tubing in wells was shielded. As these inhibitors advanced through time, gas wells started to be treated with oil and acid more often. Today, one of the most popular and efficient technologies accessible to oil and gas operators for stimulating the productivity of wells is acidizing. Both new and aged wells undergo acidizing. It is carried out in old wells to enhance energy recovery and boost productivity.

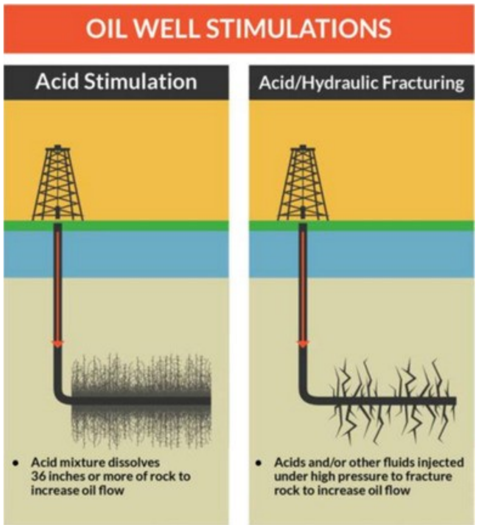
Key words : acidizing,matrix,acid washing,fracture acidizing,productivity

Basics of Acidizing. Acidizing is the process of pouring acid into a geological deposit that can produce oil or gas or a wellbore. Acidifying serves two key objectives: 1. To boost the well's productivity 2. To boost the well's ability to pump.**Matrix acid, acid wash,** and **acidizing fractures** are the three main types of acid treatments.

1) The only thing that **acid washing** is used for is cleaningcleaningto clean pipes and wells.To remove well flow restrictors, rust, and other debris, hydrochloric acid (HCl) mixes are most frequently employed in acid washes. Fracturing acid and matrix are both formation techniques.

2) Acid is injected into the **matrix** during the layer's fracture pressure. The acid is injected into the acid crusher until it reaches the reservoir's fracture pressure.

3)The major goals of **matrix acidizing** are to either dissolve the formation rock itself, to reinforce the current one, or to generate new flow pathways to the well intoin order to restore (raise) the productivity of the oil or gas well. When organizing an acid business, there are often two key considerations. a) Type of formation (carbonate, sandstone, or shale)



The kind of acid required depends on the type of formation, and the pressure is determined by the formation's permeability.

Matrix Acidizing and Fracture Acidizing. One of two stimulation procedures, matrix acidizing is based on the injection of acid into the wellbore, which affects the rock pores at pressures lower than the fracture pressure. To increase flow, repair damage, and stimulate the well, acidizing is utilized. Acids dissolve sediments and mud particles that obstruct rock permeability during matrix acidizing. As a result of the reservoir's natural pores expanding at this time, the flow of hydrocarbons is stimulated and improved. InToIn order to eliminate formation damage around the well in the best and most efficient way possible, effective acidizing is performed based on limitations on the volume and types of acid.Acidizing can be used to prevent damage or to accelerate well matrix reservoir flow. These are two distinct objectives. There are essentially two types of acid treatment. which depend on injection pressures and rates. Fracture acidization and matrix acidification are terms used to describe injection rates that result in pressures above and below the fracture pressure, respectively.

Acidizing to enhance productivity. The main purpose of matrix acid is to clean up damage from drilling, completion, and work fluids as well as particulates that have precipitated from the formation of water or hydrocarbons. Strong plugs can be removed using sandstone or carbonate, which can significantly boost well productivity. Or, if there is no damage, matrix treatment, depending on the size of the treatment and the depth of the acid, as indicated in the photo, seldom boosts natural production by more than 50%.

1)WormholesWarmholes.Wormholes are minuscule, unbroken tubes formed when acid increases carbonate pore openings. Their diameter ranges from 2 to 5 mm. In his practical model of worm generation during matrix acidification in carbonates, Gdanski demonstrated that the practical limitations of hydrochloric acid's (HCl) effective penetration ranged from roughly 1 to 5 feet. Injection amount and rate determine the extent of penetration. The relationship between carbonate permeability and the maximum permitted velocity. Because carbonate has such poor radial penetration (permeability), fracture acidification is better illustrated by this phenomenon

2) Incorrect or poorly carried out acid treatment.When carried out incorrectly and badly, acid treatment can decrease formation permeability and production even in the absence of damage to the well.Gidley presented the findings of a thorough statistical analysis of one company's performance with acidification in American sandstone reservoirs.

3) Assessment and quality assurance.The percentage of successful treatments has improved to 75–90% in areas with reasonably adequate evaluation and quality control. Brannon et al. created one such program, acidifying 35 of 37 wells with success (95% success rate) intoin order to boost production. There are still regions and substances that experience poor acidification reactions, indicating that there is yet room for technological advancement.

5)Advantages of Acidizing. Since roughly 120 years ago, acid treatments have been used to increase well productivity. Consider these four advantages of goodwill goodwillgoodwillgoodwell stimulation instead of dismissing the notion of reservoir acidification.

a)Preservation. Well, acidization is primarily used by oil and gas companies to prolong the life of their wells. When an oil or gas well is adequately maintained, its usable life is increased and more resources can be recovered before the well is abandoned in favor of a new (or younger) location.

b) Enhances Effectiveness. The increased effectiveness of routinely activating wells is another advantage. Debris and silt can reduce a reservoir's effectiveness even if it still has plenty of resources and isn't getting close to the end of its useful life. Rocks or other loose debris that are present along the well's outlines or that are floating somewhere in the middle are therefore dissolved during the process of injecting acid into the well.

c) Potential Costs Are Reduced. What if your reservoir clogged or was rendered utterly useless? To remedy a problem that could have been avoided with regular maintenance and acidizing, you would need to spend hundreds of dollars.

d) Substitute for fracture. While acidizing stimulation and hydraulic fracturing may be employed in conjunction in some circumstances, stimulation by acidizing alone may be preferable. For instance, in regions with considerable tectonic activity, acid might be more successful at releasing oil deposits. If high-pressure water injections turn out to be too complicated for the circumstance, it can also be more advantageous.

7) Limitations of acidizing. Under reservoir conditions, most organic acids employed for acidizing do not completely react with carbonate deposits. The reaction's scope is thermodynamically constrained. It is possible to compute the fraction of unreacted acid as a function of temperature and initial acid strength thanks to a correlation that is shown. To determine the parameters utilized in the correlation, experimental measurement of the degree of reactivity between various organic acids and limestone and dolomite was necessary. The results demonstrated that at the temperatures and concentrations examined, chloroacetic acid reacts virtually entirely. In decreasing sequence of reaction extents, formic, acetic, and propionic acids.The approach has been expanded to take both into account because the precipitation of calcium-acid salts is both a possibility and a probability, and the transfer of carbon dioxide to the residual oil phase is both a possibility and a likelihood. When compared to experimental data, a straightforward solution to the latter issue utilizing CO2 solubility data was determined to be appropriate.

8) Conclusion. In general, the pumping pressure increases as permeability decreases. With relatively low pumping pressures, acid can be injected into the matrix of high-permeability highpermeabilityhigh permeability formations. The procedure is known as "matrix acidizing" if the pumping pressure is lower than the formation fracture pressure. When acidifying sandstone, a preflush made of hydrochloric and acetic acid might be employed. This mixture may be used as a preflush acid to dissolve carbonates and other substances that cause precipitation during acidification before the primary acidification procedure. When used in the main stage, orthophosphoric acid can penetrate deeply into the formation. Steel, aluminum, or chromium-made plated equipment equipmentequipmentequipments, which are important parts of many pumps, are severely corroded by HCl. To prevent rust, it needs pricey corrosion inhibitors. Therefore, injecting at higher temperatures considerably increases the cost of acidizing. Because of their direct correlation, the corrosion rate increases with increasing temperature. Orthophosphoric Acid does not require corrosion inhibitors. The mineralogy tests and color change tests both demonstrate it.When formic acid and orthophosphoric acid are utilized, no carbon was found during mineralogy tests. It exists when HCl is utilized, and when HCl is included in the acid combination, the values of permeability and porosity increase less. When acidifying sandstone, the mixtures of hydrofluoric and phosphoric acid and fluoricfluoboric and formic acid can be used as the primary acids. The most effective mixtures are 3% HF: 9% H_3PO_4 and 3% HBF_4: 12% HCOOH. Hydrochloric acid does not perform as well as phosphoric (H_3PO_4) and formic acid (HCOOH) do as buffers (HCl).

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STEAM-ASSISTED GRAVITY DRAINAGE.

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Abstract. Heavy crude oil and bitumen are produced using the increased oil recovery technique known as steam-assisted gravity drainage (SAGD). A pair of horizontal wells are dug into the oil reservoir, one a few meters above the other. This is an advanced method of steam stimulation. In order to heat the oil and diminish its viscosity, high pressure steam is continuously fed into the upper wellbore. This causes the heated oil to drain down the lower wellbore, where it is pumped out. In the 1970s, Dr. Roger Butler, an engineer who worked for Imperial Oil from 1955 to 1982, developed the steam assisted gravity drainage (SAGD) method. Butler “invented the idea of developing certain bitumen resources thought to be too deep for mining utilizing horizontal pairs of wells and injected steam.”

Key words: crude oil, bitumen, SAGD, horizontal wells , injected steam.

Description. The steam injection methods that were initially created to produce heavy oil from the Kern River Oil Field in California have been improved by the SAGD process for producing heavy oil or bitumen. Delivering heat to the producing formation