

DOWNLOAD PDF PRODUCTION ENHANCEMENT WITH ACID STIMULATION

Chapter 1 : Rockwater | Production Chemicals

In this new second edition, author Leonard Kalfayan has updated his book on acid stimulation, one of the primary methods for improving productivity of oil, gas, injection, and disposal wells.

View Solutions Iron Based Scales Iron based scale buildup in your well is a common issue that can cause corrosion damage and significant flow View Solutions Barium Sulfate Barium sulfate scale can be formed when barium levels in produced water are high. Although not a common type of View Solutions Calcium Carbonate Calcium carbonate scale is common in the oil and gas industry. Often caused by a temperature change or a pressure View Solutions Wax Deposits Wax is a common organic scale in producing wells that can lead to restricted flow and decreased production. View Solutions Calcium Sulfate Calcium sulfate is a common inorganic scale in formations containing the mineral anhydrite. This type of scale doesn't Acidizing and Production Enhancement Inquiries Need more information about acidizing and production enhancement? Connect with us Injection Well Enhancement When it comes to improving or restoring injection in a well, the best solutions come from a thorough investigation of the problem. Beginning with your formation, wellbore data and available wellbore samples, we gather information and study the issue. Using state-of-the-art equipment, our expert team designs a fit-for-purpose solution to meet your wellbore needs. Hydrocarbon Carry Over View Solutions Water Injection Profile Management Controlling water injection profiles not only leads to better production, but also saves money. To do this, each job View Solutions Water Quality and Filter Analysis The productivity of an injection well depends greatly on the quality of the water injected into the formation. Chemical Diversion Applications Enable even distribution of fluids across the treatment interval with a wide range of chemical diversion solutions Mechanical Diversion Applications Conventional acid treatments tend to follow the path of least resistance, leaving much of the formation un View Solutions Bio-Mass Accumulation Continual injection of fresh water into a formation can lead to the deposit and creation of bio-mass. View Solutions Injected Solids Remediation A major cause of formation damage in injection wells is the injection of solids. Removing these solids by improving

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Chapter 2 : Well Production Enhancement | Mobility Oil & Gas

In this new second edition, author Leonard Kalfayan has updated his book on acid stimulation, one of the primary methods for improving productivity of oil, gas, injection, and disposal wells.

There are two basic methods of using acids to stimulate production: Fracture acid stimulation Matrix acid stimulation Fracture acid stimulation Fracture acidizing is to pump the acid treatment above the fracturing pressure of the reservoir rock, which create long, open channels from the wellbore penetrating deep into the formation. Fracture acid stimulation is usually carried out on carbonate reservoirs, which have lower permeability than sandstone reservoirs. It can be used to either remove formation damage or stimulate undamaged formations to produce conductive channels within the fracture where oil and gas can migrate. A problem with fracture acid stimulation is that much of the acid is used up near the wellbore and is not available for etching the fracture faces farther from the wellbore. In addition, the acid stimulation fluid follows the paths of least resistance and create typically long-branched passageways leading away from the fracture interface, which are called "wormholes". Later injected fracturing fluid tend to leak off into the wormholes rather than lengthening the desired fracture. Leak off control techniques need to be utilized to avoid this. Matrix acid stimulation Matrix acid stimulation is pumped into the formation at or below the fracturing pressure. Carbonate matrix acid stimulation is also useful to treat carbonate cemented sandstones and formation damage from acid soluble species such as calcium carbonate CaCO_3 or sulfide scales, lost circulation materials, etc. In sandstone matrix acidizing, the primary purpose is to remove acid-soluble damage in the well and near wellbore area. Treating an undamaged sandstone well with matrix acids does not usually lead stimulation unless the reservoir is naturally fractured. Acids used in acid stimulation Acids for carbonate formations The most common acid used in carbonate fracture or matrix acidizing is hydrochloric acid HCl . Lower concentrations can be used as pickling acids to clean up the well in a preflush to remove scale and rust or an afterflush. In high temperature applications, HCl does not produce acceptable stimulation results due to its fast reaction that leads to lack of penetration. Organic acids, like formic or acetic acids, can be used to offer a slower-reacting and thus deeper stimulating acid [5] Acids for sandstone formations Sandstone reservoir is mainly composed of quartz and aluminosilicates such as feldspars. Migration of these particles fines into the pores of the near-wellbore area can reduce production and they will not dissolve in strong acids such as hydrochloric acid, but will dissolve in hydrofluoric acid HF . Although highly corrosive, HF is classified as a weak acid due to its low ionization in water and it is very toxic. HF , or more usually HF -releasing chemicals such as ammonium bifluoride NH_4HF_2 , is used for sandstone matrix acidizing, combined with hydrochloric HCl or organic acids. In sandstone acidizing, one has to be particularly careful of reprecipitation of reaction products, which could cause new formation damage [7]. They occur mostly if the well is shut-in for a long period of time. The basic chemistry is HF reacts first with aluminosilicates to form fluorosilicates, which react further with clays to form insoluble sodium or potassium fluosilicates. CaF_2 and AlF_3 can also precipitate in the spent acid. Potential formation damage from acidizing There are several other ways that acidizing, both for sandstone and carbonate reservoirs, can lead to formation damage if not carried out correctly. Loss of near-wellbore compressive strength due to using too much HF either in volume or concentration; Formation of emulsion or asphaltic sludge due to incompatibility between the acid and production fluids; Water-blocking and wettability alternation damage, which can be repaired with mutual solvent treatments mixed with water or hydrocarbon solvent containing surfactants; Fine migration after acidizing - this is fairly common in sandstone acidizing. Bring the well on slowly after treatment can minimize this damage. For sandstone formation acid stimulation, the resulting permeability improvement peaks at certain acid volume and then drops as the volume increases in oil wells, but is proportional to acid volumes in gas wells. Permeability improvement in gas wells is typically better than oil wells. Acid stimulation additives Acid stimulation flush almost always contain: Corrosion inhibitor Iron control agent - to prevent iron minerals from dropping out Water-wetting

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surfactant - this is needed to remove any oily film from the rock or scale so that the aqueous acid has good contact. A mutual solvent can also be used. Many other additives can also be used, such as clay stabilizer, fines fixing agent, antisludging agent, demulsifier, scale inhibitor, H₂S scavenger, drag reducer, foaming agent, etc. Acid placement Treatment design and planning are often performed to ensure that the acid is placed across the entire interval. The successful acid placement in matrix treatments of open-hole horizontal wells is even more difficult due to the length of zone and potential variation of the formation properties. A successful diversion technique is critical to place the acid to the location where damage exists. Either mechanical or chemical placement techniques can be used to improve contact of the acid solution with the interval. Mechanical Packer systems, ball sealers, or coiled tubing. Chemical diverters The diverter is usually applied in a preflush to temporarily plug the zones of highest permeability zones, allowing the main flush to react with other less permeable or more damaged zones. On back production, the diverter is removed from the formation. Solid particles that degrade, dissolve, or melt in hot produced water or oil Polymer gels.

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Chapter 6 : Top Select > Services & Products > Production Enhancement > Acid Fracturing

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Chapter 7 : Production Enhancement With Acid Stimulation by Leonard Kalfayan

Acid stimulations is one of the primary methods for improving productivity of oil, gas, injection and disposal wells. A properly designed and executed acid job can improve cash flow.

Chapter 8 : Top Select > Services & Products > Production Enhancement > Matrix Acidizing

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Chapter 9 : Production Enhancement with Acid Stimulation (2nd Edition) - Knovel

Stimulation by acidizing is an old production enhancement technique dating as far back as the nineteenth century [2]

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when Herman Frasch of Standard Oil patented the use of hydrochloric acid (HCl) to stimulate carbonate formations.