OPTIMIZING SUCCESS OF WATERWELL REHABILITATIONS

FRED ROTHAUSE

2016 NGWA GROUND WATER SUMMIT
WHAT IS WELL REHABILITATION?
Well Rehabilitation

(GROUNDWATER AND WELLS)

WELL REHABILITATION IS:

“THE ACT OF RESTORING A WELL TO ITS MOST EFFICIENT CONDITION BY VARIOUS TREATMENTS OR RECONSTRUCTION METHODS”
CHARACTERISTICS OF WELLS FOLLOWING REHABILITATION

Theoretical Useful Life of a Water Well

Specific Capacity (gpm/ft of drawdown)

Years of Service

Rehabilitate 1989
Rehabilitate 1996
Rehabilitate 2001
Retire Asset 2004


COTEY - Better Wells with Chemicals
Increased cost for a 1,000 gpm well to lift groundwater 100 additional feet would be about $16,900 every year *.

Glofelty, 2012
Steps for Effective Rehabilitations

WELL VISIT– Evaluate Symptoms, Determine Diagnosis and Provide Treatment and Record

- Water sample Analysis
- **Pre-Rehabilitation Pump Test**
- Pull pumping equipment
- Pre-Rehab Video Inspection
- Wire/Nylon Brushing and Bailing
- Chemical and Physical Treatment
- Re-Development
- Bail or airlift sump
- Post-Rehab Video Inspection
- Re-install pumping equipment
- Post Rehabilitation Pump Test
Most Well Rehabilitation Failures are contributed to:

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CHEMICAL TREATMENT CHOICES

• CHEMICAL TREATMENT – PRIMARY SUPPLIERS OF:
  • JOHNSON CHEMICAL - NU WELL PRODUCTS WATER SYSTEMS TECHNOLOGY – JOHN AND MIKE SCHNEIDERS
  • COTEY CHEMICAL
  • WELL KLEAN – HCT SCIENCE AND TECHNOLOGY – SAFE ACID HCL AND HYDROGEN PEROXIDE – TODD EDEN
  • BAROID WELL CLEANING CHEMISTRY – MIXED BAG
  • JET LUBE – DESIGN WATER – DAVE HANSON
  • LAYNE – QC-21 - WATER SYSTEMS ENGINEERING – JOHN AND MIKE SCHNEIDERS
  • AQUA FREED – INJECTION OF LIQUIFIED GASEOUS CARBON DIOXIDE
PHYSICAL TREATMENT OPTIONS

- PHYSICAL CLEANING AND RE-DEVELOPMENT
  - BRUSHING – NYLON – WIRE – ROTATING -
  - BAILING - SAND PUMPING – SOME SURGE AND SWAB ACTION
  - SURGING – PUSHING FLUID OUTWARD
  - SWABING – PULLING FLUID INWARD
  - HIGH PRESSURE JETTING – WATER BLASTING
  - SONAR OR OTHER PULSE TECHNOLOGY – AIR, WATER, NITROGEN, ELECTRONIC, POWDER - HIGH IMPACT ENERGY
  - PUMPING OR AIRLIFTING - EVACUATING FLUID FROM THE WELL
### PHYSICAL TREATMENT METHODS

#### CONSTRUCTION DATA:

- PRE REHABILITATION VIDEO
- FORMATION
- STATIC WATER LEVEL
- CASING MATERIAL
- SCREEN TYPE AND MATERIAL
- GRAVEL PACK
- DEVELOPMENT METHOD
- INITIAL PUMP TEST
UNDERSTANDING WELL DYNAMICS

Both, adding chemistry and flushing the Well requires knowledge of the aquifer characteristics and behavior.

As pumping and static levels change so does the wells behavior

Isolating and working smaller intervals will increase potential success.
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Double Swab Isolation Tool

Concentrates on defined interval

Used to add chemistry

Swab and Surge fluid thru the gravel Pac

Pump or airlift waste water and debris from the well.

Improves the chance for success
## COST

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<th>Service</th>
<th>Cost</th>
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<tr>
<td>Well Maintenance</td>
<td>20% of a Well Rehab</td>
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This all depends on many variables and assumptions.
REQUIREMENTS FOR LASTING EFFICIENCY

Get the Chemistry and Biology out!

- 75 to 80% of chemistry removed in 7 well volumes
- Normal operations may require 20 well volumes for total removal
- Evacuation of additional volumes of water may be needed to remove all chemistry from stagnant areas
- Pumping equipment/completion can influence pumping volumes
TOTAL DISOLVED SOLIDS
Pumping or airlifting excess TDS waste water and debris from the well improves the chance for lasting success.
THANK YOU

FRED ROTHAUSE
970 381-3788

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