

# MAPPING PREFERENTIAL FLOW PATHS IN OPERATIONS SUBJECTED TO STEAM OR WATER FLOODING

Willowstick LLC - RMOTC



On location in Wyoming

## Introduction

In August of 2005, Willowstick Technologies, LLC performed a study at the Teapot Dome oil field near Casper, Wyoming. The project was performed with the Rocky Mountain Oilfield Testing Center (RMOTC), a unit of the United States Department of Energy. The purpose of the project was to demonstrate how the Willowstick technology can be applied to subsurface oil reservoirs that are subjected to water or steam flooding, and to map the subsurface water paths.

## Investigative Approach

For this pilot study, Willowstick strategically targeted the Shannon formation, situated approximately 400 feet below the ground's surface. This geological layer has been the focal point of numerous enhanced oil recovery (EOR) activities, including fire floods, water floods, and steam floods.

The survey, which covered about 48 acres, utilized five existing wells for electrode placement. Over a period of two weeks, data was systematically collected to assess the formation. The methodology involved energizing the groundwater in the Shannon formation from two distinct perspectives. Electrodes were placed in well 55-66-SX (an injection well), while a pair of wells to the west and east of the main survey area served as return electrode placements.

## SUMMARY

### LOCATION

Wyoming - USA

### CHALLENGE

Portray the ability for Willowstick to map subsurface oil reservoirs. Even when including variables of water or steam flooding.

### SOLUTION

Willowstick will be conducting an investigation attempting to find these oil reservoirs. Giving a previously difficult or impossible way to map these subsurface liquid paths.

### BENEFIT

Allows for accurate information to be gathered and processed, facilitating the ability to understand and further map the oil production in the area.

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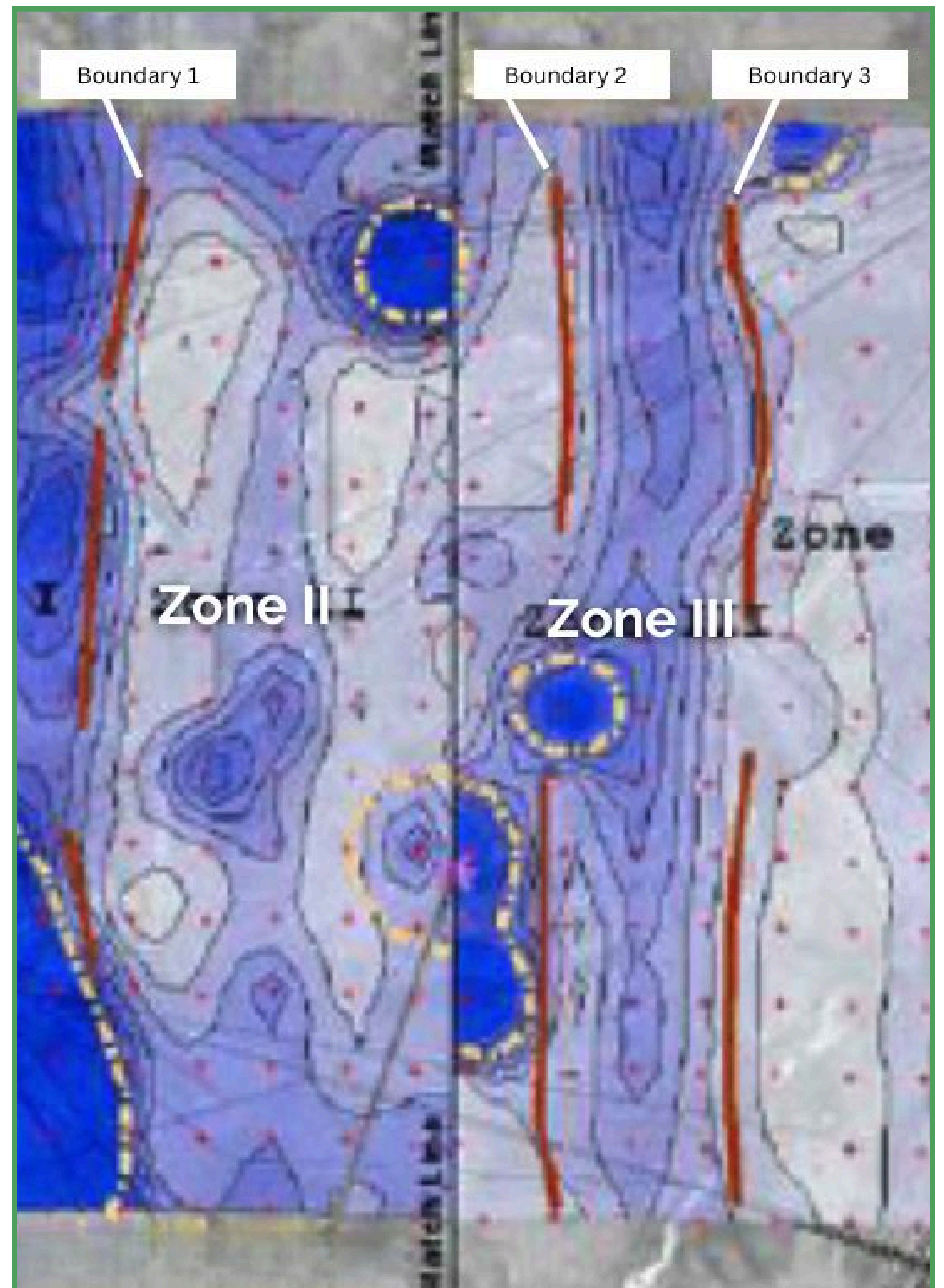
## Investigative Approach Cont.

A 100 ft by 100 ft grid was established on the surface directly above the oil reservoir.

Results from the two survey perspectives revealed similar anomalies, indicating the existence of three major hydrogeologic barriers. These findings suggest the presence of four distinct saturated zones within the formation, aligning in a north to south direction.

## Conclusion and Benefit

Analysis of historical production data, along with reservoir studies of the Shannon Sandstone, confirm that the hydrologic boundaries detected by the Willowstick technology likely exist. These boundaries or zones are probably due to geologic changes affecting permeability across the formation. The information obtained from this survey can facilitate the understanding of how water flood practices are likely to influence oil production within the area of investigation.



Model created showing the well 55-66-SX





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The Willowstick logo features a stylized graphic of three overlapping, curved, leaf-like shapes in a light gray color. Below this graphic, the word "willowstick" is written in a lowercase, white, sans-serif font.