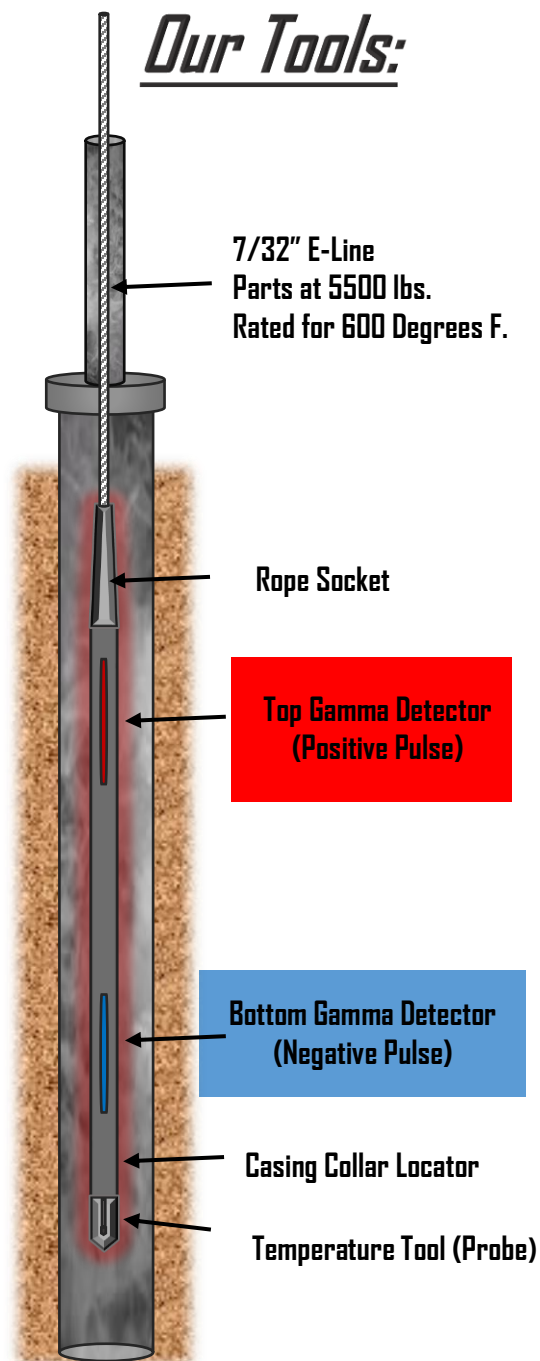


## *Our Tools:*



## *About Us:*

FIRST Energy Service is a wireline services company located in Bakersfield, CA. FIRST Energy opened their doors in 1996 with 3 trucks. In 2023 FIRST Energy runs a fleet of 7 trucks and is progressively expanding. The FIRST Energy service family is constantly growing yet obtains solidarity due to the care shown to each individual employee. Safety is important to us, so working under the highest safety standards according to the customers and our guidelines is highest priority. From management to our entry level workers we are instilled with the importance of our customer's time and business.

Welcome to the FIRST Energy Service family and we are excited to be working with you.

### *Contact us:*

1031 Carrier Parkway Avenue

Bakersfield, CA 93308

(661) 387-1972



# Steam Injection Surveys

# Steam Injection Survey

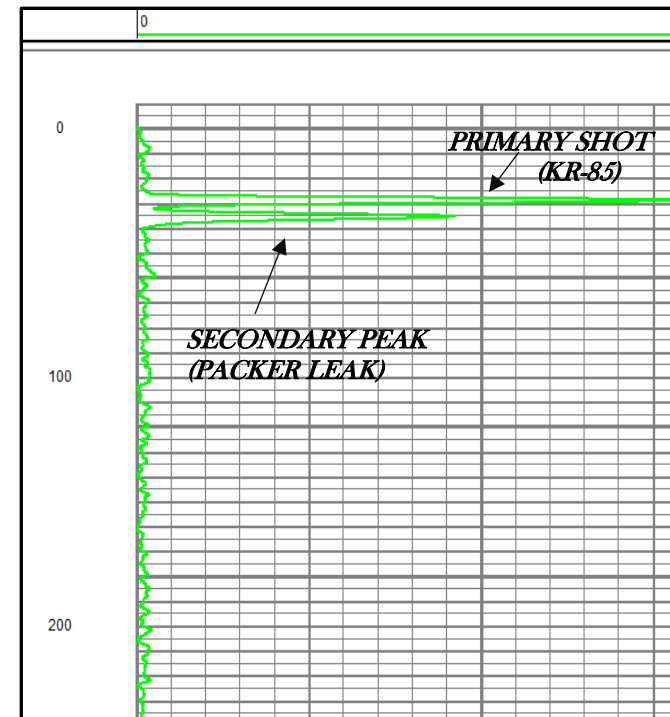
## Procedure:

**Profiling** a steam well is accomplished by running a temperature survey over the perforated interval. A break in the temperature profile often indicates the fluid level. Then a radioactive gas tracer is injected at the surface. Transit time is measured between two gamma detectors or detector depth interval. The transit time among other factors (i.e. well psi and steam quality) will determine steam velocity, volume and rate. Additional velocity measurements are done by moving the tool to new depths. A single shot of water-based tracer is then shot to confirm open perforations and fluid level. As well as possible movement below fluid level.

**Migration and Leakage** of steam or water moving up behind the casing or into the annulus is checked by placing detector at required depth above the point of interest (i.e. packer, top perforation, and or tubing/casing hole). A shot of tracer from surface then passes detector tool(s). A secondary peak of tracer often indicates that tracer is moving up in annulus or upward migration behind the casing.

## Radioactive Tracers:

ISOTOPE	FORM	HALF-LIFE (DECAYS 50%)
IODINE 131	LIQUID	8.1 DAYS
XENDN 133	GAS	5.2 DAYS



## Summary:

- Determine which perforations or perforated intervals are taking steam. Find ineffective perforations, perforations below fluid level or fill.
- Determine how much steam exits each perforation and perforated interval. Measured in percent (%) and barrels of steam per day (BSPD).
- Find fluid level and determine if any hot water moves down below to lower perforations or leaking plug. Water can then be measure in barrels of water per day (BWPD).
- Find packer leaks. Find migration behind pipe or movement in annulus. Find holes and leaking collars within the tubing or casing.

