

# **Liferview Enhanced Oil Recovery PRTISP Process**

**April 14, 2014**

# Who has been involved with the Development of PRTISP

- Harold Nikipelo
  - Sole designer of PRTISP and downhole tool, President of Lifeview Oil and Gas Management Services
- Dr. Alex [Turta](#), Alberta Research Council Calgary, Advisor to PRTISP process only
  - Head of the Enhanced Oil Recovery
  - Co-designer of THAI,
  - Author of many [EOR](#) papers
- Dr. Kenny Adegbesan, [KADE](#) technologies
- Reservoir Modelling Simulations
- Facility Engineering
- Downhole Tool Development Engineers ( Thermal)
- Thermal Engineering Firm for all downhole development
- Geomechanical Staff
- Geologists



# Building a better Mouse Trap

Current heavy and conventional Oil Recovery Technologies.

- THAI & [CAPRI](#)
- [SAGD](#)
- [Solvent](#) Injection
- Electrical energy
- Water flooding
- [Gas](#) Injection

# What if

- What would happen if you combine 4 proven technologies (Pulse, Thermal, Solvent Gas Injection, Toe to Heel Injection Production configuration )into 1 process?
- Dr. Alex Turta and Dr. Ken Adegbesan believe it may change the way we look at heavy oil recovery.

# The Concept & Benefits to you

- When effectively implemented, we believe our Process may be the most efficient way to accelerate fluid flow and disperse liquids through oil-bearing geological material.
- Economically efficient production, thanks to better oil mobility and anticipated well efficiency , Cheaper Facility due to less steam being generated
- The process of the present invention is adaptable for use in reservoir contexts including but not limited to the following:
  - Reservoirs with high viscosity bitumen or heavy oil
  - Reservoirs with mobile bottom water
  - Reservoirs with difficulty cap rock integrity issues
  - Reservoirs with depths not over 1100 meters
  - Reservoirs with narrow or restricted net pay over 6 meters
  - Reservoirs with depletion drive mechanisms for heavy oil extraction
  - Reservoirs for conventional oil production

# PRTISP

- Pulse
- Resonance
- Thermal
- Injected
- Syn-gas
- Process

# Pulse

- The process is a thermal pulse jet unit which would be fuelled by a fuel source (Propane or Natural Gas, preferred) of which its exhaust gaseous would be injected into the well.
- **Wet steam/water – syngas injection downhole in a pulsing mode for heavy oil recovery.**
- Each segment is controllable,
- Maximum benefit supersedes any known enhanced oil recovery program developed.
- The pulsing mode is adjustable based on design and exhaust port length. (Lifeview Pulsation Tool)

# Thermal

- The **thermal** temperature of the exhaust gases are regulated to meet the engineering working specifications as set forth by given parameters and the required sonic resonance frequency required to maximum production.
- Prior to exit point of the downhole pulsation tool, the gases will pass through a downhole heater (adjustable) thus increasing the temperature prior to being expelled through the downhole pulsation tool expulsion ports.
- Treated water/steam would be injected on the exhaust side. Steam Expansion (High Temperature Steam)
- This injection will be downhole at the exit point of the hot gas using our designed downhole pulsation tool.



# Resonance

- The **Sonic Resonance Frequency generated** by the pulse jet would be regulated based on both temperature and amplitude for the regulation of the wave's magnitude of oscillation.
- Causes penetration to within the reservoir and will generate flow to the production well.
- The sonic frequency is calculated to ensure cap rock integrity is maintained by Geomechanical methods and testing.

# Syngas

- The use of propane or natural gas as a main fuel source along with other thermal operations to produce its by-products (**SYNGAS**) would be used as a solvent gaseous solution based on the reservoir requirements.
- Please note that they may vary based on injection ratio, frequency cycle setting etc and the additional injection of makeup gas to meet our production goals. Temperature will be regulated by above ground activities and also by below ground activities by use of the electronic heating element designed inside the tubular string.

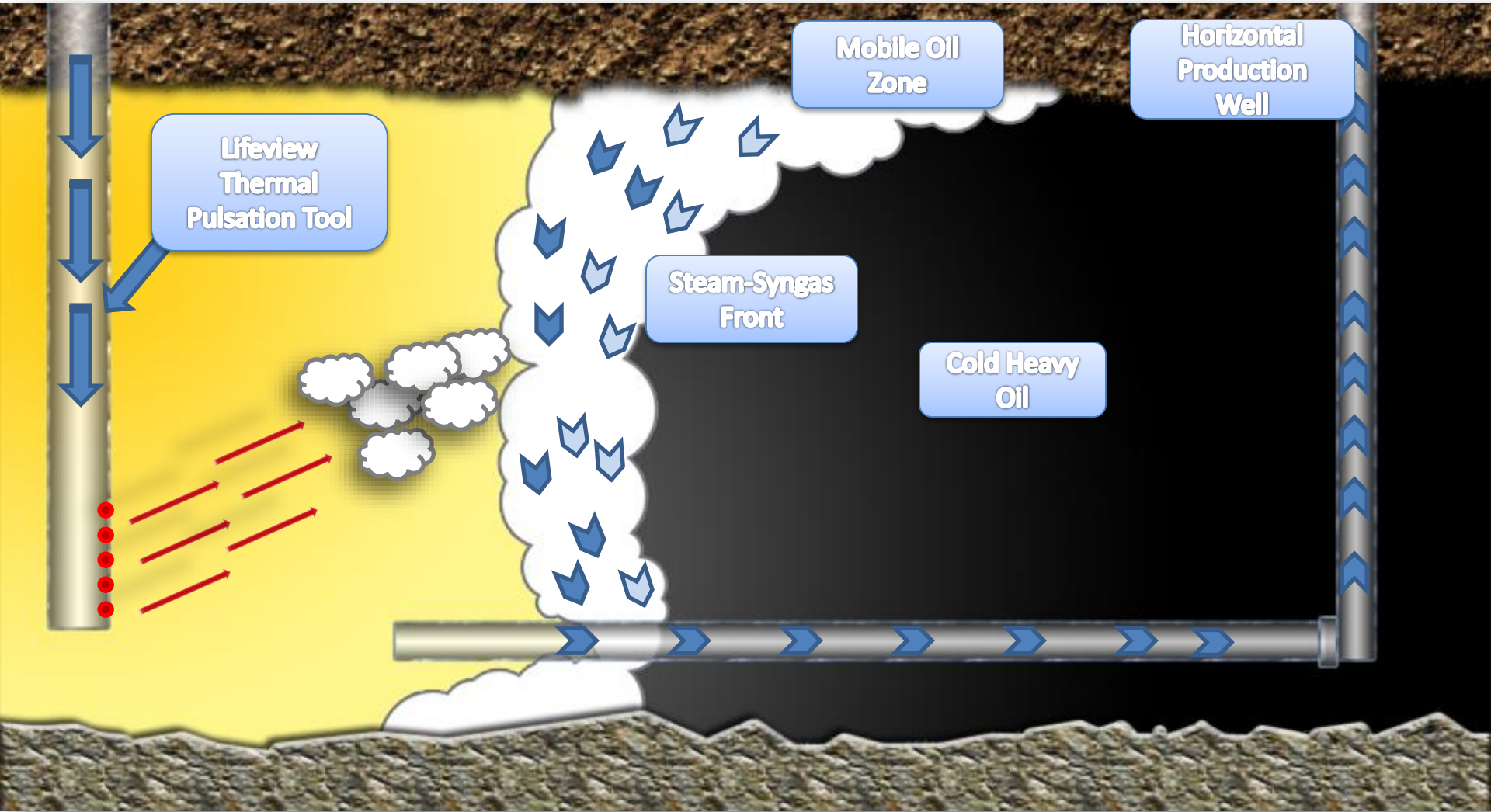
# Injected

- Finally, the **injection of water or steam** (treated) will be used to increase the mobility of the bitumen flowing to the production well by applying wet steam or water downhole in direct contact with high temperature gaseous.
- Designed downhole pulsation tool. This will harness the steam expansion characteristics to pulsate movement of the oil by **dilating the natural fractures** without causing damage to cap rock integrity.
- Toe to heel configuration well will be used.
- This **short- distance oil displacement** will preserve the upgrading. This benefit has been demonstrated in other existing enhanced oil recovery processes and can be controlled to meet the required benefit.

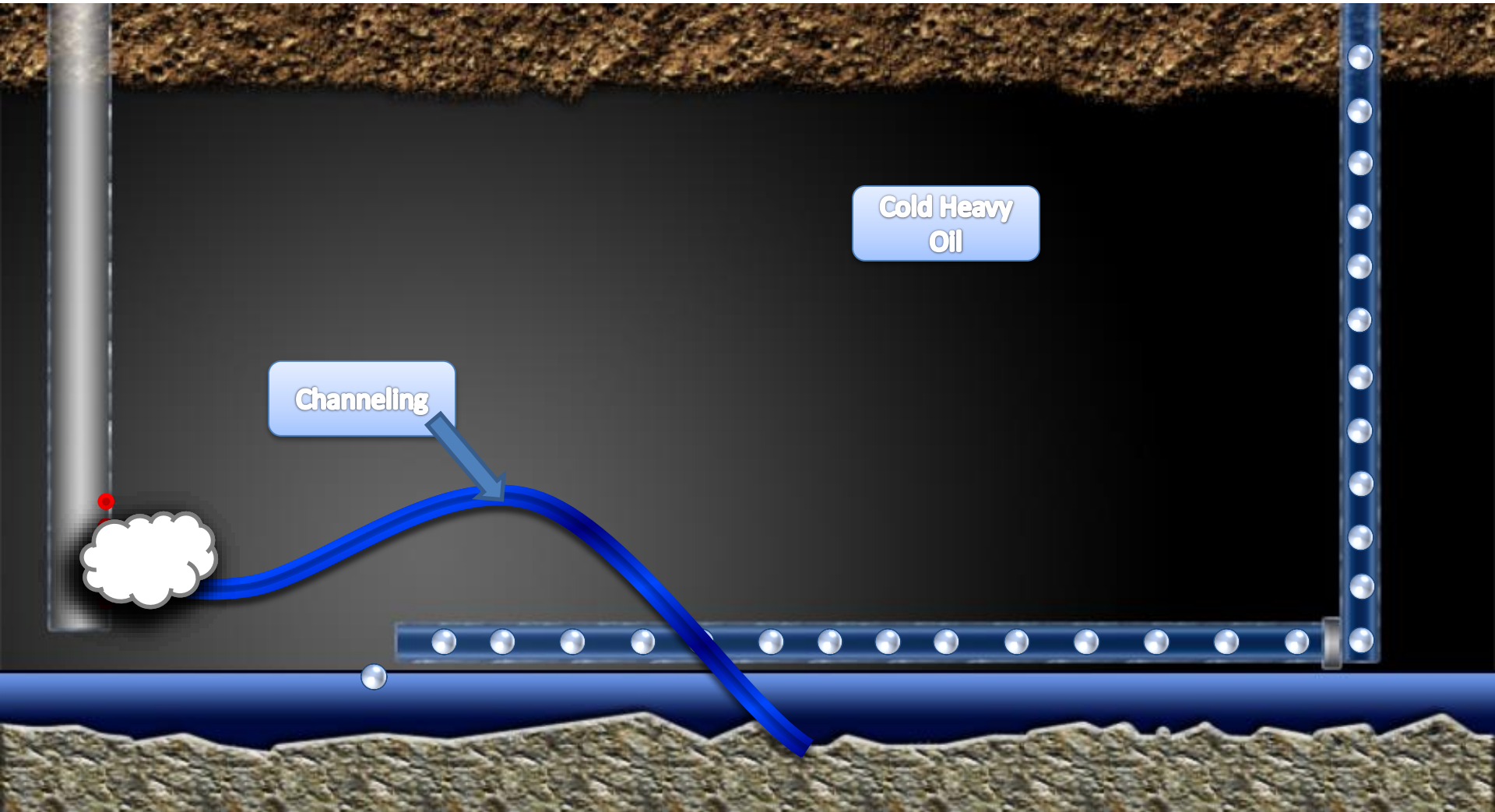
# Process

- The key is upgrading underground by making changes to the carbon chain and thermal application
- With the drive systems being used downhole, production is maximized.
- Zero Emissions from the injector process
- Green process

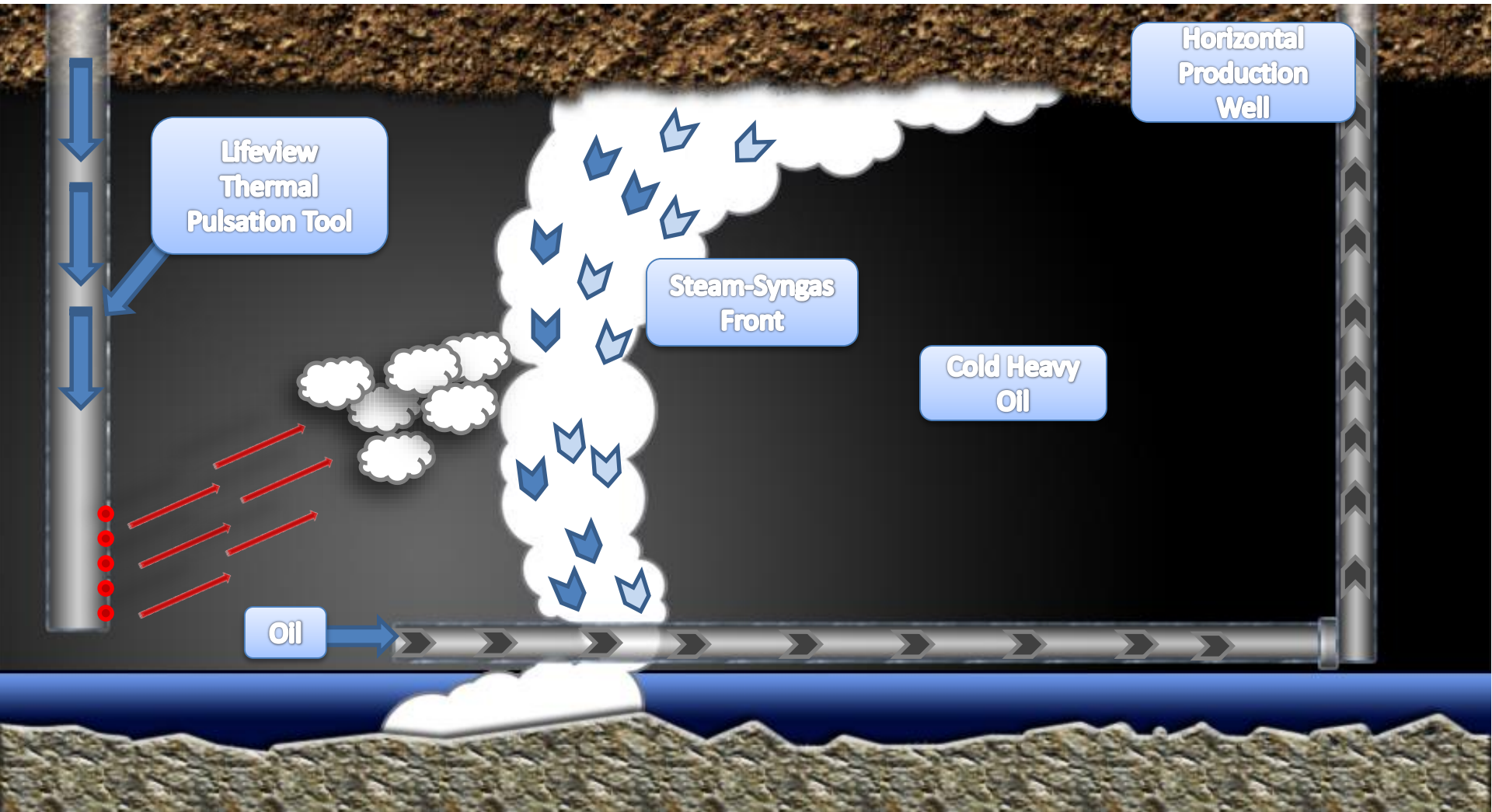
# PRTISP Process



# Bottom water Problems with continuous steam injection

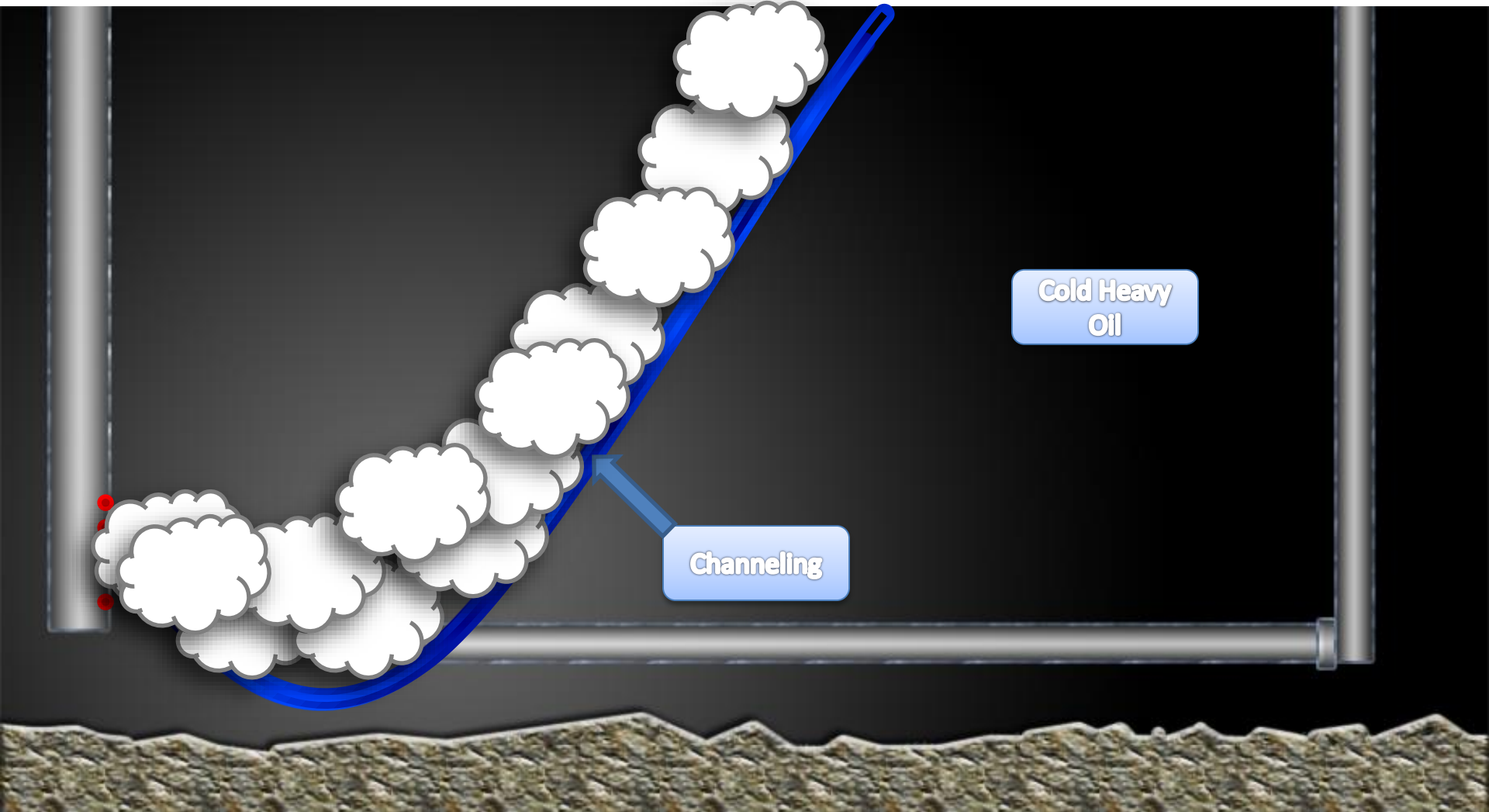


# PRTISP process in bottom water

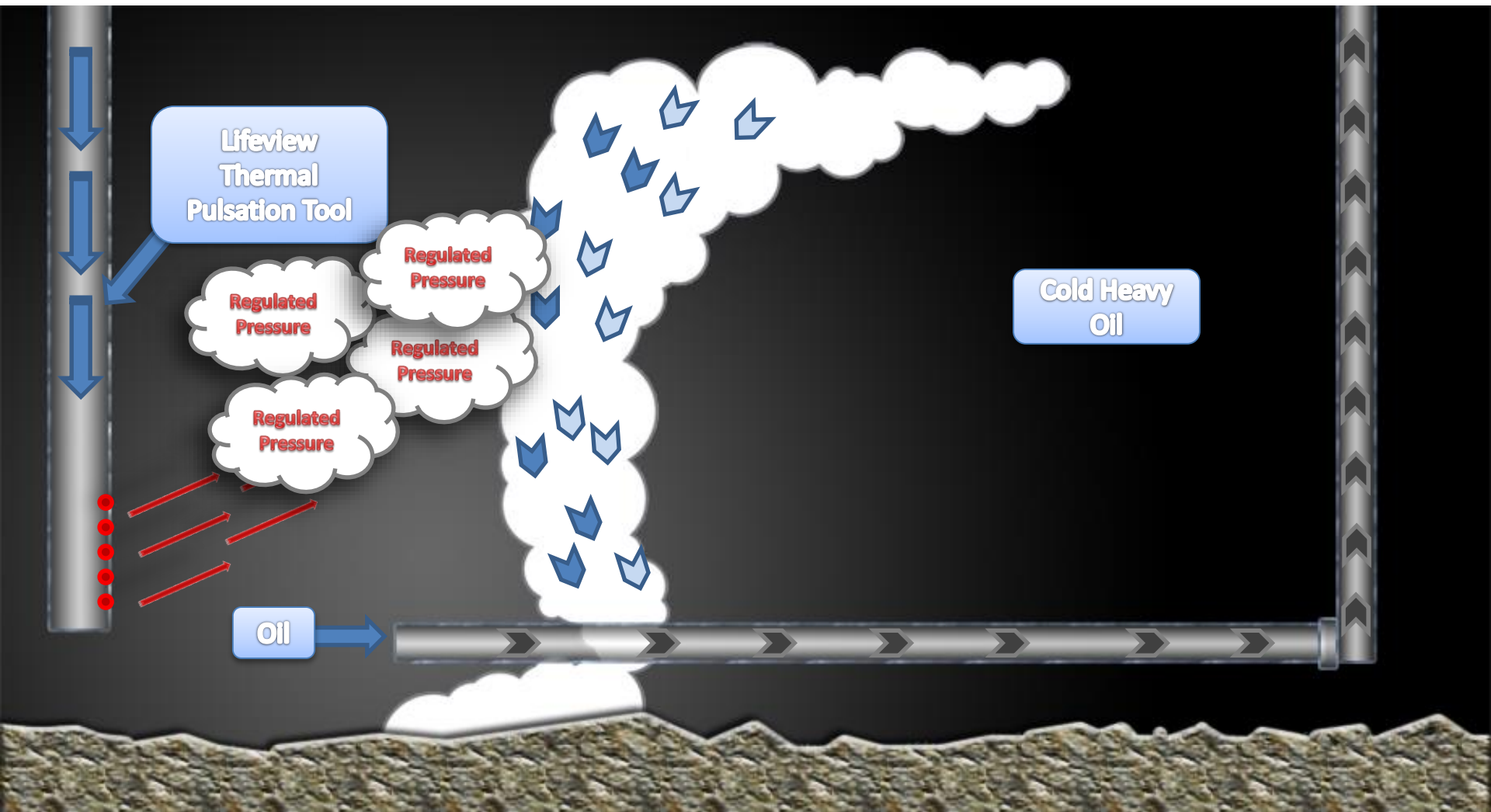


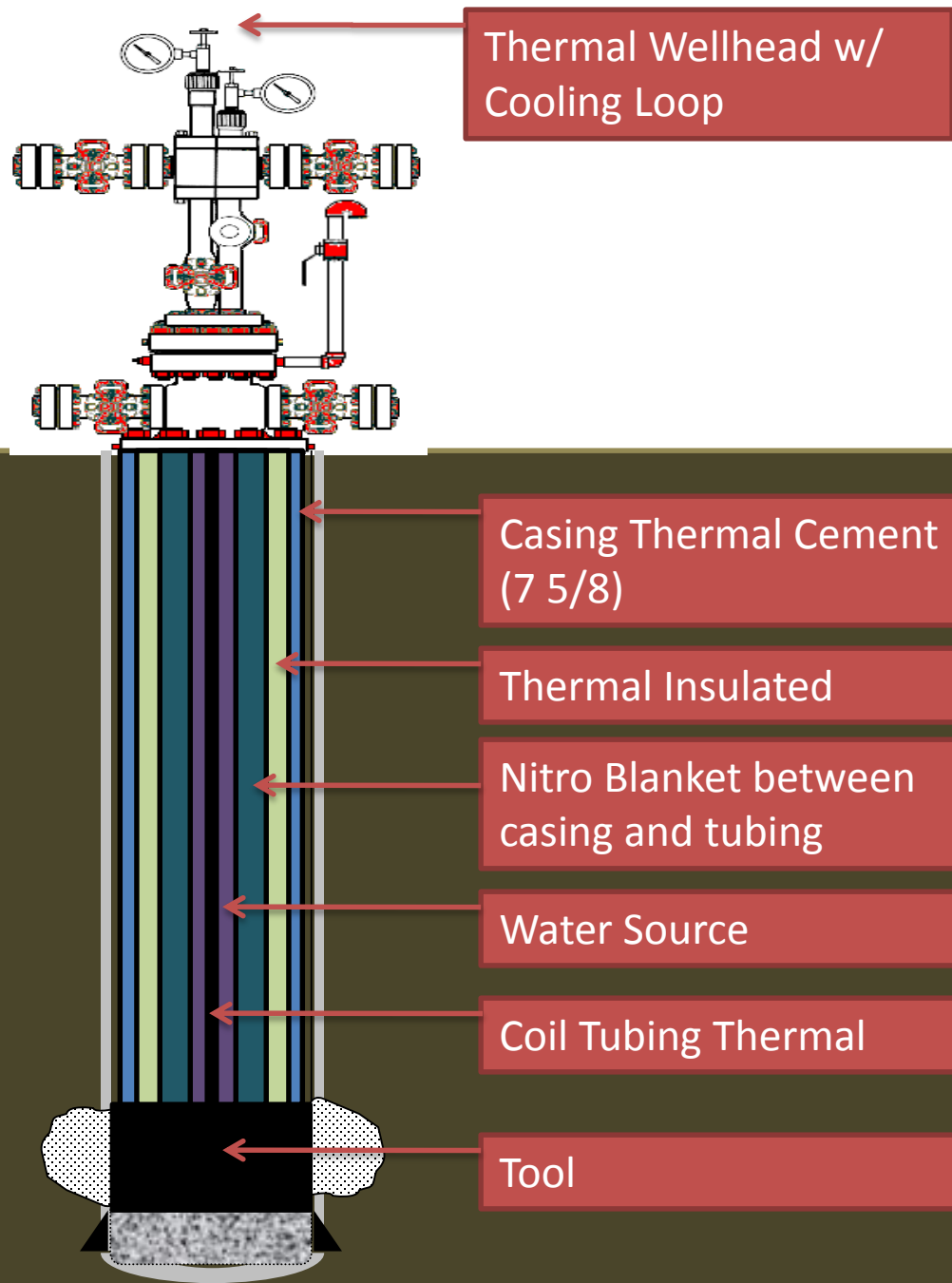


# Lack of Cap Rock Problems with Continuous Steam Injection



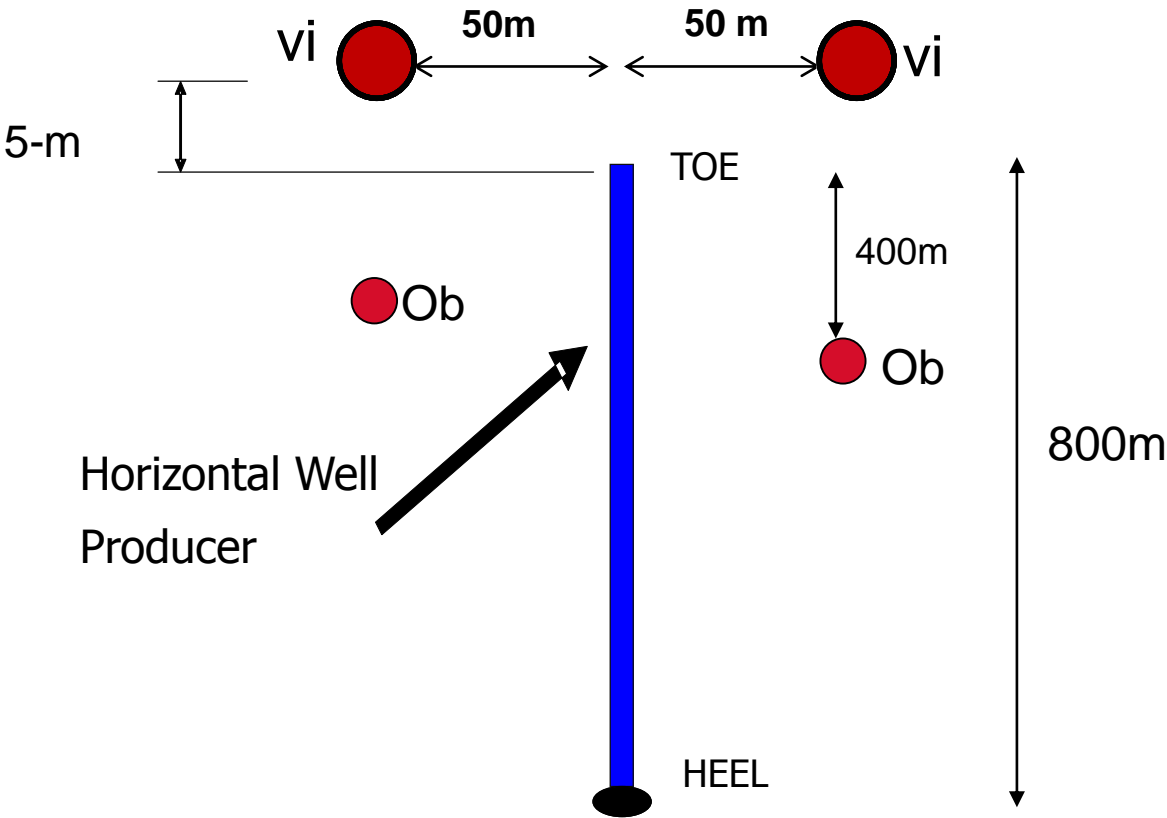






# Bird`s eye view of the TTH(Toe to Heel) steam-syngas flooding process; well configuration.

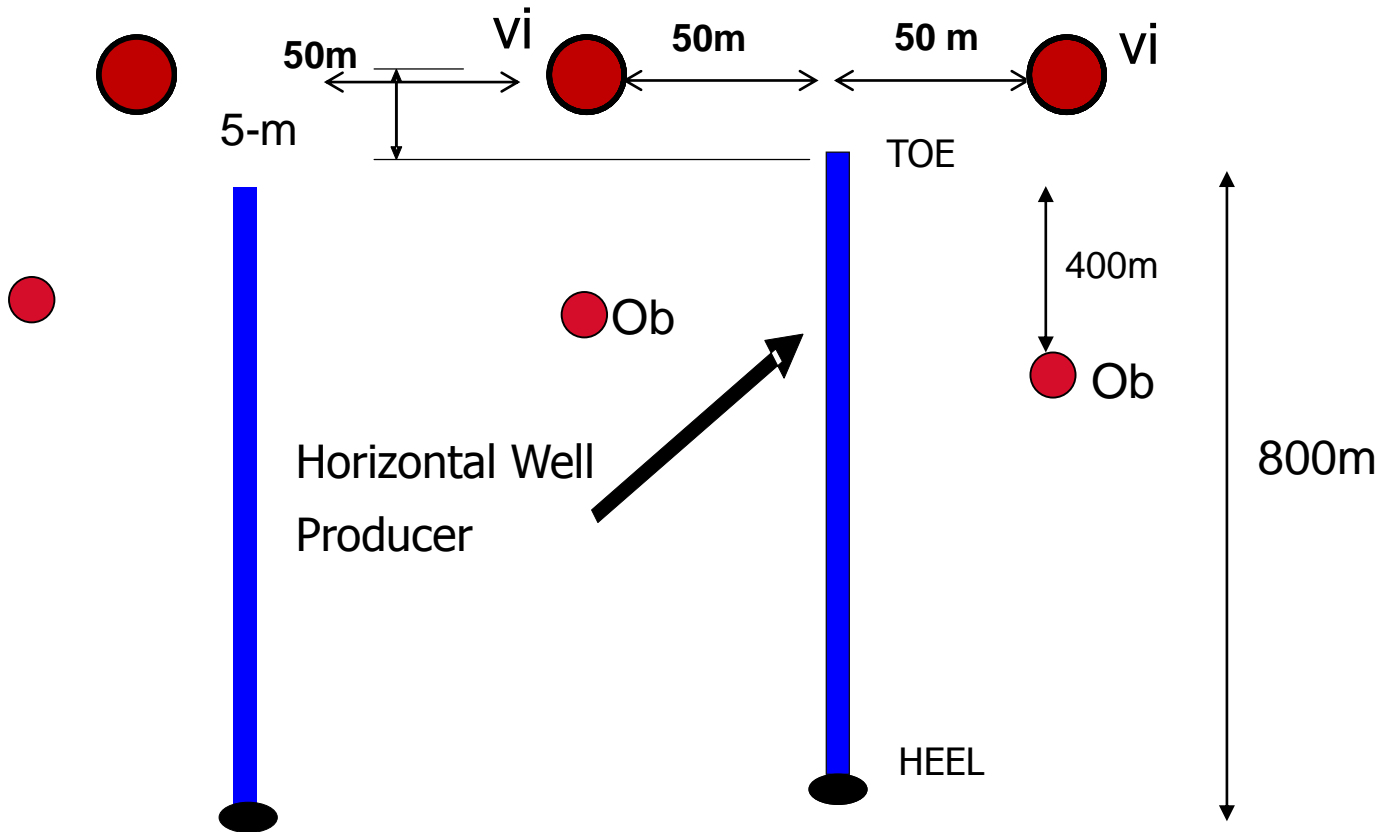
## Staggered Line Drive Configuration



Legend: Ob – Observation well, future VI  
VI - vertical injector

# Bird`s eye view of the TTH steam-syngas flooding process for Commercial Application

## Staggered Line Drive Configuration



Legend: Ob – Observation well, future VI  
VI - vertical injector

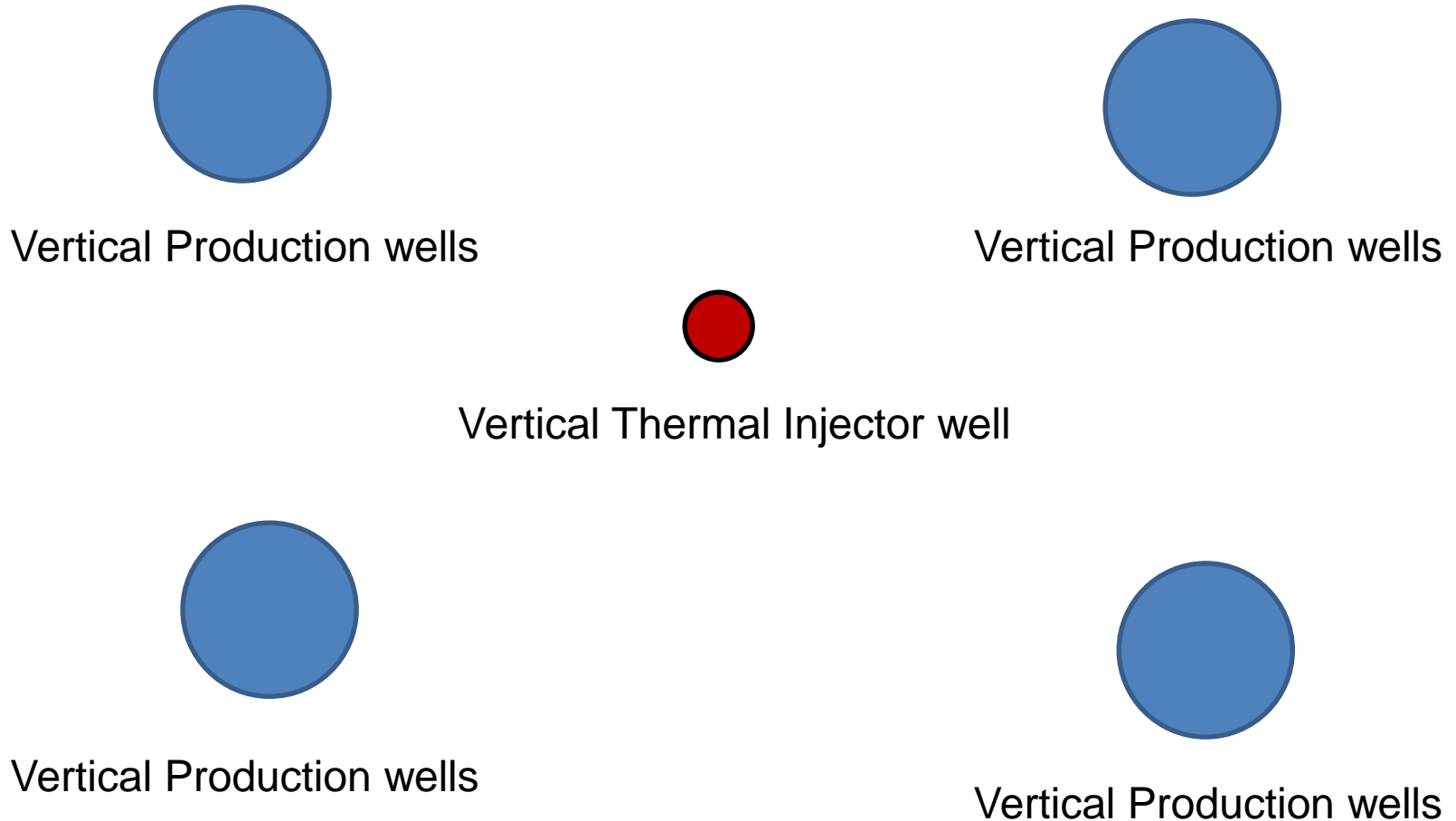
# Steps for Field development

- Due diligence on the Land
- Develop a seismic program to delineate New plays
- Develop a core hole and thermal drilling program to begin pilot program
  - 1000bbl per day
  - 5000bbl per day
  - 10,000bbl per day

# PRTISP Process for Heavy Oil Recovery and Conventional Oil

New deployment technique in areas  
with cold flow production

# Conventional Oil spacing per Section



# Current development Status

- Working with Oil firm for deployment into the Heavy oil field for testing
- It is based on the fluid property experience of Mr. Harold Nikipelo and confirmed using the science knowledge of Dr Alex Turta and Dr. Kenny Adegbesan of Kade Technologies.
- Initial Literature and patent searches
- Comprehensive Patent Pending