

# Construction of an Unconventional Oil Well

## Phase 1 Exploration (Normally 4 months to 1 year)

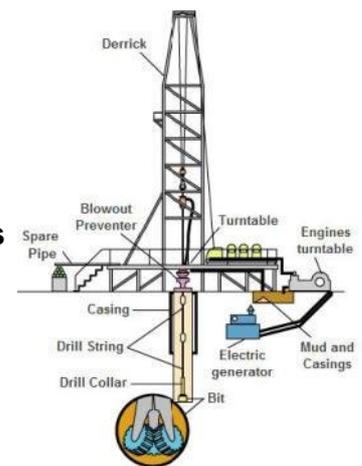
1. A well pad up to 1 to 2 hectares is created on land cleared for the purpose and concreted, lined with a non porous layer, fenced off and lit 24 hours per day during the life of the well.



2. **Materials, structures, chemicals and an average of 430,000 gallons (67 HGV tanker loads) of water per well bore will be hauled by multiple HGV transporters and tankers to this site where it will be stored for use.**

**Surface spills from tankers and storage tanks en route or on site are documented as common.**

3. 30 to 50 metre high rigs will be set into the constructed and fenced off well pad and other containers and infrastructure built. Normally there will be residential units on the site for workers. Drilling and operations take place 24 hours per day



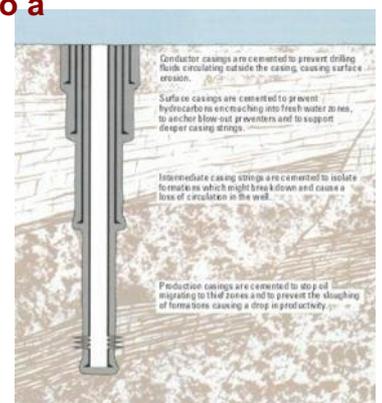
4. **An EXPLORATION well can be drilled as far down as 3 kms in order to explore the potential of the seismic analysis results of the site.**

5. The resulting backwash of drilling slurry or mud, containing the polluted water, drilling chemicals, acids, heavy metals and naturally occurring salts and toxic minerals from the strata, will be pumped from the well bore and will need to be disposed of safely. **Currently the Environment Agency would consider this to be mining waste and would issue a permit for this to be stored on site for use in further well construction or to be re injected underground into a waste water well.**

6. A number of layers of steel pipe (depending on the type of well) and cement casings are set to separate the well from water supplies as it is drilled and to bond the well to the strata.

7. **If oil is found to be present and viable for extraction then phase 2 begins.**

8) **IN ALL PHASES ESCAPING METHANE GAS IS EITHER VENTED, HARVESTED OR FLARED**



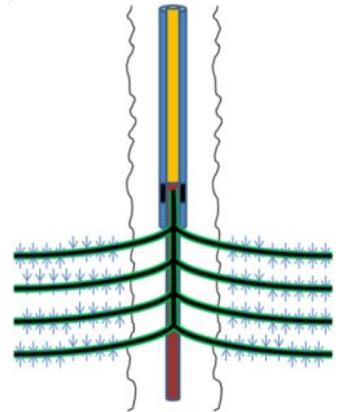
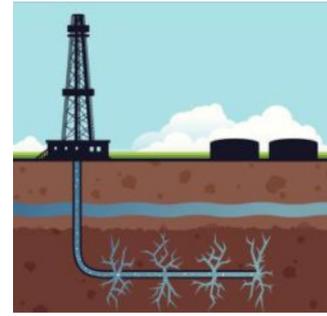
## Phase 2 Appraisal (Normally from a few months up to 2 years)

1. An APPRAISAL well is created down the vertical shaft and turned horizontally to run into the seam of fuel bearing strata at a depth of anything up to 1000 metres and a mile or more in length.

2. **Waste water disposal is as above.**

## Construction of an Unconventional Oil Well

3. A smaller diameter main steel pipe is inserted into the full length of the well and cemented in place to bond it to the strata and to the outer section of the well closer to the surface.
4. This steel casing is then ready to be punctured using explosive charges and a fracking gun to puncture the casing to expose the strata and spread the flow of acid and then receive the flow of oil.
5. An Acid Stimulation Technique (Sometimes called Limestone or Carbonate Stimulation) may then be employed to pump a **15% to 18% of Hydrochloric Acid in a carrier gel, sometimes combined with Hydrofluoric Acid**, at high pressure into the well and strata, to dissolve the surfaces of the limestone fissures to open them further thus increasing the oil flow rate.
6. Once flow rates have been assessed it will be decided whether additional stimulation or hydraulic fracturing may need to be used to increase the flow. If proven to be profitable, and if planning and permissions are in place then full production takes place.



### Phase 3 Production (Normally 20 to 30 years)

1. Additional structures, materials and machinery are hauled to the site.  
It is probable that additional horizontal flow wells, usually 6 to 10 can be drilled from the site.
2. Further wellpads may also be constructed to maximise access to the oil play depending upon its spread and economic viability to extract.
3. Once oil is flowing wells are then capped and cased and fitted with special collars to take pumping equipment to pump the oil from the well for processing and storage in tanks on site and ultimately for transportation by tanker or through a constructed pipeline.
4. Residential facilities and other structures may be removed once in full production since only a skeleton team of workers and possibly security guards will monitor the site.

