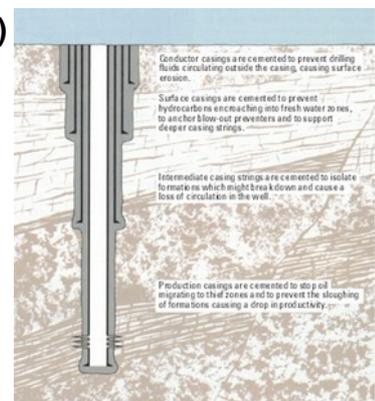
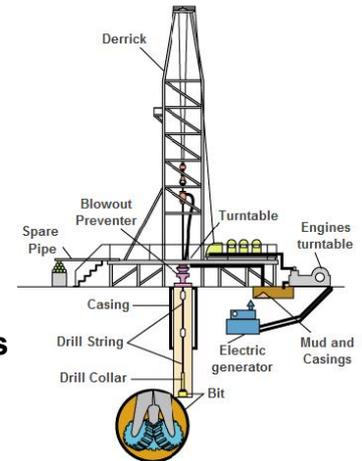


# Construction of an Unconventional Hydraulically Fractured Well (FRACKING, as judged by government definition)

## 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 OR MORE (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 will be drilled as far down as 4 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 MAY consider this to be mining waste and would issue a permit for this to 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 product 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

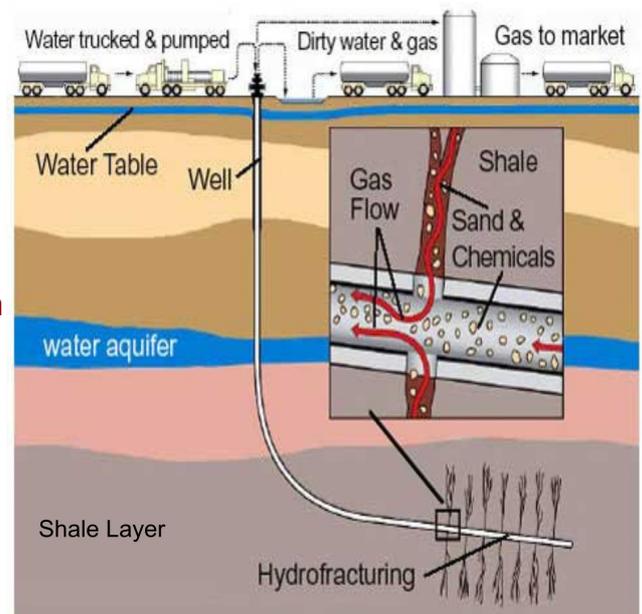
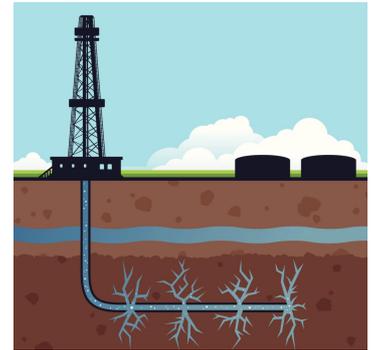


## Phase 2 Appraisal (Normally from a few months up to 2 years)

- 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 4000 metres and a mile or more in length.
- 2) **Waste water disposal is as above.**

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- 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 fractured using explosive charges and a fracking gun to puncture through the casing to expose and fracture the strata and create fissures into the shale or strata containing the gas or oil
- 5) 4 to 5 million gallons of fresh water are mixed with a cocktail of chemicals, acids and other additives from 0.2% to 5% of the volume of water used (USA data).
- 6) **Silica (fine sand) is added as a proppant to keep the fractures in the strata open.**
- 7) This fracking fluid is then pumped and extreme high pressure into the well and forced into the cracks in the strata to expand them further and prop them open with the sand. Around 60% of this toxic mix remains in the fissures.
- 8) **Around 40% of this fluid is pumped out of the well and is called flowback and now contains, not only the original chemical and acid mixture, but also new materials from the strata, resulting in additional toxins, and NORM (naturally occurring radioactive material).**
- 9) **Flowback is classified as HAZARDOUS WASTE and must be either; stored on site and re-used in further fracking operations, or transported to a special facility for disposal in the same way as nuclear waste.**
- 10) The gas flows to the surface and the rate of flow is assessed.
- 11) **Once flow rates have been assessed and proven to be profitable, then full production takes place.**



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

- 1) Additional structures, materials and machinery are hauled to the site.
- 2) **Additional horizontal wells as described above will be drilled from the site, usually 10 wells per well pad. Further well pads will also be constructed to maximise access to the gas play to make it economically viable to extract.**

## Construction of an Unconventional Hydraulically Fractured Well (FRACKING, as judged by government definition)

- 3) Wells are then capped and cased, fitted with special collars and structures to collect the gas for processing and storage in tanks on site, finally transported from the site by tanker or through a constructed pipeline.
- 4) Residential facilities and other structures may be removed once in full production since a skeleton team of workers and possibly security guards will monitor the site.



Images from Gas fields in the USA

