

Long Term Stewardship of Uranium Mill Sites in the USA: Emerging Issues from Technological Advances in Oil and Natural Gas Production

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Particularly since 2005, hydraulic fracturing (“fracking”) and directional drilling has dramatically increased oil and natural gas (oil/gas) production in the USA. Fracking has allowed production from shale and other rocks of low natural permeability that were historically not considered oil/gas resources. Because directional wellbores can now be drilled up to 10 km, hydrocarbons can be recovered from zones without accessing the surface above them. The DOE Office of Legacy Management (LM) is responsible for long term stewardship (LTS) of 26 closed uranium (U) mill tailing sites in the USA and will begin LTS for others as their closure is approved by the Nuclear Regulatory Commission. There are mill sites, both closed and undergoing closure, in two states, Wyoming (WY) and Texas (TX), which have oil/gas production near them because of fracking/directional drilling.

Possible impacts of this type of hydrocarbon recovery could include ground motion (including induced seismicity) and cell subsidence; and fracturing into aquifers contaminated by ore processing. However, in these areas, hydrocarbon production begins at depths of 3 km or more. Also, the Bear Creek, WY, Site “aquifer” was artificial, and groundwater at TX sites are mostly of poor quality with high levels of naturally occurring U, sulfates, and total dissolved solids. Finally, 98 percent of induced earthquakes are from subsurface injection of wastewater from oil/gas production, rather than drilling/fracking itself.

Potential impacts of fracking/directional drilling were not considered when most UMTRCA sites were closed or began undergoing closure largely because the technology did not exist to make rock units in the region hydrocarbon resources. Directional drilling reduces the effectiveness of land ownership as an institutional control. Finally, WY and TX are “split estate” states where the surface and subsurface can be separately owned. At the Falls City, TX, DOE owns the surface but not the subsurface minerals.