

Statement on the effects of Naturet geothermal fluid on groundwater

This statement was commissioned by Anora Group Plc, and it pertains to the properties and groundwater effects of **ready-for-use Naturet -17°C** and **Naturet GeoSafe -17°C** geothermal fluid in the event of an accident where the fluid ends up in the ground and in groundwater.

Naturet -17 °C geothermal fluid is a mixture of denatured ethanol and water which has had a corrosion inhibitor compound added to it. **Naturet -17 °C GeoSafe** is a similar product, but without the corrosion inhibitor. Geothermal fluid and its vapour are flammable. Geothermal fluid has not been classified as acutely toxic when consumed or harmful according to the safety data sheet.

Ethanol a chemical that evaporates easily, is water-soluble, and in biologically aerobic conditions, breaks down into carbon dioxide and water. The ethanol content percentage by weight of the ready-for-use geothermal fluid is about 28 per cent. The effects of ethanol on groundwater are moderately short-lived, if the compound is allowed to break down in an aerobic environment. Breaking down uses up oxygen and the most significant impact on groundwater is estimated to be a temporary decrease in oxygen levels.

The **denaturants methyl ethyl ketone** and **isopropanol** contained in the geothermal fluid are not dangerous for the environment and break down easily into organic compounds in both aerobic and anaerobic conditions. The most significant impact on soil and groundwater are estimated to be a temporary decrease in oxygen levels in groundwater.

Naturet -17 °C geothermal fluid contains a corrosion inhibitor compound which makes up less than 0.5% of the fluid's mass, that is at most about 0.4 ml/l. The amount of inhibitor in the geothermal fluid is small enough that it does not change its classification, meaning that despite the inhibitor, geothermal fluid is classed as non-toxic and harmless. The inhibitor is water-soluble and slowly biodegradable. If it ends up in groundwater, the inhibitor is strongly diluted from its concentration in the geothermal fluid.

In the event of an accident where geothermal fluid ends up in groundwater, its components will immediately begin to break down biologically and dilute through the flow of water. Even in the event of an accident, the effects of geothermal fluid on the quality of groundwater are minor and temporary. It is unlikely that groundwater would become hazardous to health or harmful in the event of an accident, due to the properties and small amounts of the substances.

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