3D SEISMIC REFLECTION SURVEY DESIGN AND MODELLING AT THE BEENYUP WASTE WATER TREATMENT SITE, WESTERN AUSTRALIA

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In Perth, Western Australia, there has been both an increasing demand for water and decreasing rainfall over recent years. Managed Aquifer Recharge is a water recycling method identified as having the potential to reduce pressure on Western Australia's surface and ground resources. For this reason a treated waste water injection trial is planned for the Beenyup Waste Water Treatment plant. The treatment plant is located in the northern Perth suburb of Craigie. The trial will include detailed hydraulic flow and reactive transport modelling of the injected water. Accurate modelling requires precise knowledge of the hydrostratigraphy below the injection site. Consequently a high resolution 3-D seismic reflection survey will be used to assist in building a detailed groundwater flow model. Optimal 3D survey geometry has been designed based on a preliminary 2D survey, VSP data and the resolution required for the target injection zone within the Leederville formation. 3D survey design was faced with various difficulties as it needed to be designed with a number of exclusions zones related to topographic mounds, vegetation and existing infrastructure. Future construction plans at the site were also factored in to allow for future time lapse seismic surveys after long term injection has pressurised the target aquifer. Forward models of the expected seismic response of the injection process are computed using borehole information and velocity-pressure tests from core sample tests.

Technical area: Environmental-groundwater