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EIS application 201700053
Submission Against Materials Recovery Facility – Fyshwick

This site is not fit for its changed use from fuel storage to recycling and transfer station. There are several known hotspots of contamination on the site and probably additional unknown ones. In these places chemicals of concern including BTEX have been found exceeding thresholds for human health. The size of the enclosed spaces on the site totals approximately 7733 sq. metres in total. Buildings will need to be constructed over those hot spots. They cannot be avoided.

The potential risk to human health has not been adequately assessed in the Draft EIS. Issues of concern for the workers arise regarding the demolition and construction phase of the development where large earth works will be required to level the site and where asbestos, lead and PFAS will have to be removed. Adverse health impacts for construction workers arise from inhalation, ingestion and dermal contact with contaminated soil and perched groundwater. However, the greatest level of concern is the potential for vapour intrusion into the facility buildings.

The potential risk to human health from vapour intrusion should be evaluated as part of a Vapour Risk Assessment. There was none done for this EIS. This evaluation is particularly relevant to buildings with a slab-on-ground construction or basements where air flow is reduced and exposure may be a higher risk. Soil or groundwater that is contaminated with chemicals which are volatile, for example, petroleum hydrocarbons, can be a source of vapours which can move into buildings, confined spaces or excavations on a site.

Appendix G offers a mitigation measure of the installation of a geo-membrane vapour barrier under the slab but provides no scientific or technical details. Geo-membrane performance however is not guaranteed over a long term such as is required in this circumstance. The actual long term performance of these liners is not known. GCL liners have only been manufactured since 1989. There is little data on their performance Even the most robust and flexible liner materials are subject to risk with numerous conditions able to cause degradation sometimes within days of their coming into operation. These can include; UV degradation, chemical degradation, applied stresses and elevated temperatures. These can cause a multiplicity of effects; elongation, creep, shrinkage, embrittlement, cracking, tears and wrinkling. When subjected to a sustained stress in a chemical environment at an elevated temperature, the membrane will yield and undergo creep, becoming less ductile with time through strain hardening, resulting in brittle failure or rupture.

The conclusion must be drawn that a barrier system for the MRF on this site is inadequate as protection for occupational health. Geo-membranes inevitably fail over time and some fail from the beginning since they can arrive with manufacturer's faults. The downturns which mark the transition to brittle behaviour can prematurely result from defects or localised damage in the membrane sustained during construction, protrusions during contact with soils or from installation faults. The shape and size of the defect and the presence of a chemical environment which promotes stress cracking will affect the time at which the transition occurs.

Geo-membranes are not intended to support heavy loads for sustained periods and deformation giving rise to high localised stresses should be prevented. How this is possible at this site for this activity must be demonstrated. To mitigate against these risks, in most applications geo-membranes are supported by a geo-textile to provide tensile strength and enhanced tear and puncture resistance. However, this brings about another series of problems in the installation phase because the multiple layers need an intimate fit. If this cannot be achieved then leaks can occur but the formation of gaps between the various layers. Appendix G recognises the need for superior QA/QC supervision. This will considerably add to the cost.

There is a generally recognised conclusion that eventually barriers leak and rupture while damage is irrecoverable. It is totally unacceptable to put the workers at risk on an unremediated contaminated site from a liner system which cannot be guaranteed. It has been known for some time that certain organic chemicals can rapidly pass through intact (no holes) geo-membranes used for vapour barriers. Nor does it require these to be present in high concentrations. Permeation of benzene toluene and Xylene though high density geo-membranes even in dilute solution occurred in laboratory tests in a matter of days.

Of all the geo-synthetics, geo-membranes are the most unforgiving. The smallest leak when placed under hydrostatic pressure will produce alarmingly high flow rates. A geo-membrane would have to be about 7.3cm (about 3 inches) thick in order to retard organic penetration for a period of 25 years. After that time those organics would pass through even that thickness of liner. Arguments weighing up the strength, thickness, life and flexibility should have been offered. Manufacturers recommend that for every additional 5 years of life an extra 0.5 mm of liner thickness should be employed. There has been no effort to predict the service life of this liner.

ACTPLA should require more information about the performance characteristics of the barrier selected for this facility and those characteristics under various operating conditions. Environmental and human health demand it.

Yours sincerely,