

BP National Compound Study



Client: BP Australia
Location: nationwide, Australia
Date: 2006 to present

Since 2006, BP Australia has been reviewing compliance of their existing fuel storage compounds (tank farms) in accordance with the standard AS1940 (2004). ATC Williams* was commissioned in 2006 to develop and execute an investigation program to assess the ability of the compounds to adequately retain fuel spillage and to determine whether the compound geometry complied with the requirements of AS1940.

Field investigations were performed at 17 terminals in Western Australia, New South Wales, Queensland, South Australia and Tasmania. Assessment of liner and subsoil permeability was undertaken using a modified Talsma-Hallam permeameter. Soil samples were recovered for laboratory tests in conjunction with field density measurements by nuclear densometer. A general audit of the condition of the compound floors, bunds, walls and pipe entries was also performed.

The compound “retention time”, defined as the time for a spill to reach the site vertical boundary (the depth of the deepest sump, the groundwater table or 2m, whichever is the shallowest), was calculated for each site. A comparison was then made with the anticipated remediation response time for the site. Those sites where the spill impact would occur before practical remediation were then prioritised by a process of risk estimation and a remedial action

program developed, to be implemented over several years.

ATC Williams provided recommendations and design services to select the most appropriate liner solution for these sites, including comparison of four brands of geosynthetic clay liner (GCL), HDPE, concrete, lime stabilisation, resin stabilisation and compacted clay options. GCL was generally found to be the most suitable liner type.

Test tanks were established at BP Kewdale to independently measure the hydraulic conductivity of the GCL products and enable observations of the impact of hydrocarbon permeant and evaporation on the integrity of the bentonite materials.

A design concept was subsequently developed to maintain a saturated granular layer above the GCL which would prevent dehydration and provide a barrier to hydrocarbon contact, whilst significantly increasing retention time. Recharge of this layer occurs by bore reticulation or hydrant delivery.

3D CAD modeling was also undertaken to assess compound holding capacity and bund, tank separation distances etc.

Subsequently, the compound survey program has been extended to inland depot sites in NSW, WA and QLD and is ongoing. ATCW are also assisting BP with the planning and execution of large scale compound flooding trials and soil stabilisation trials at various marginal sites and earthworks design for compound reconstruction.