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Post Combustion Carbon Capture Pilot Project

The post-combustion carbon capture pilot plant experimental program conducted at Munmorah, in conjunction with the CSIRO, was completed in August 2010. The pilot plant exceeded its targets for capture rate, carbon dioxide purity and sulfur removal.

The pilot plant was relocated by Delta and CSIRO in 2012 from Munmorah to Vales Point to provide a facility focused on improving the effectiveness of post combustion capture processes under real zue gas and power station operating conditions in NSW.

Since 2012, the facility has successfully hosted several research groups investigating different capture technologies and novel plant

configurations, including:

1. Chemical solvent absorption (CSIRO) – This technology uses a cheap, stable and locally available chemical, ammonia, as the absorption solvent to remove CO₂, SO₂ and other pollutants from the flue gas of power stations and other industries. CSIRO has demonstrated high capture rates using ammonia and other amines as well as multiple species capture potential to remove sulfur oxides;
2. Carbon capture with solar thermal (CSIRO) – This project investigated the integration of solar energy with the capture facility to provide steam for the operation of the pilot plant and demonstrated a reduction in the auxiliary energy requirement for the process;
3. Solid adsorbents (CSIRO) - The site trials were a world first in demonstrating capture by solid sorbents (carbon fibre structures) on real flue gas. The important experimental data and site operational experience obtained at the power station form a good basis for further development of the technology;
4. Membrane separation (CO₂CRC) – This project uses a hybrid membrane gas-solvent contactor aiming to reduce the capital costs of the capture technology;
5. Membrane separation (UNSW) – This physical separation technology is like a CO₂ sieve and has demonstrated excellent capture rates using a new generation hollow fibre membrane material;
6. Novel gas-liquid contactor (CSIRO) – The aim of this project was to validate the design, costs and performance of a new design liquid contactor in a post combustion CO₂ capture cycle under power station operating conditions; and
7. Aerosol formation study (CSIRO) – This study addressed knowledge gaps in understanding aerosol formation and possible environmental impacts from the post combustion carbon capture process.

The majority of research and development activities at Vales Point have been funded by the Department of Planning and Environment through

the Coal Innovation NSW Fund, which is administered by the Minister for Resources.

