Appendix G

Materials compatibility assessment summary

TECHNICAL MEMORANDUM

DATE	30 October 2009	**REFERENCE No.**	077623082-039-TM-Rev0
TO	Nick Johnson Manidis Roberts		
CC	Gary Schmertmann, Maria Dubikova Mark Shelley – Incitec Pivot Limited		
FROM	Lange Jorstad	**EMAIL**	ljorstad@golder.com.au

MATERIALS COMPATIBILITY ASSESSMENT OUTLINE – INCITEC COCKLE CREEK FACILITY

Golder Associates Pty Ltd (Golder) has prepared this technical memorandum for Manidis Roberts to provide an outline of the Materials Compatibility Assessment (MCA) being prepared as a component of the containment cell detailed design process for the Incitec Cockle Creek facility in Boolaroo, NSW (the site). It is our understanding that this information was specifically requested by the NSW Department of Planning (DoP) following the test of adequacy of the Environmental Assessment (EA) recently submitted for this site.

The MCA will include the following technical components:

- A general description and characterisation of the material intended to be emplaced within the containment cell, based on the results of the environmental assessments performed across the site and published information on typical slag properties;
- An evaluation of potential physical and chemical reactions or reaction by-products generated by storage of the contaminated fill material within the cell, including a compatibility assessment of the proposed liner materials with the reaction by-products; and
- An evaluation of the potential for contaminant flux across the proposed composite liner system due to chemical diffusion from leachate (and possible related changes to the geosynthetic clay liner [GCL]).

The environmental assessments performed across the Incitec property have concluded that the vast majority of material to be excavated and emplaced within the containment cell comprises relatively undifferentiated slag material, which appears to have been mixed with soil prior to emplacement as fill across the site. The slag material is a metalliferous by-product of sulfidic ore from the former smelting process, and has been characterised as having slightly varying chemical properties (principally pH and metals) across the site. Local areas of impact associated with fertilizer production activities have also been identified (marginally elevated nitrate and phosphate concentrations). On balance however, none of the physical or chemical properties of the slag fill have resulted in the material being classified into distinct waste types requiring separate handling or storage procedures. In addition to slag fill material, asbestos containing roofing sheets will also be contained within the cell, and potentially some minor debris within the fill and from demolition activities. Significantly, no strong acids, bases, oxidisers or flammable or organic materials are intended to be stored within the cell.

The evaluation of potential reactions and by-products within the cell will be completed using a combination of available site data, and published literature regarding the composition and potential behaviour of the slag fill material. Data will be considered in the context of assessment criteria for hazardous materials to evaluate the potential for reactions occurring or reaction by-products being generated that are either physically or chemically incompatible with the containment cell design.

The contaminant flux evaluation will be completed in response to a request from the Site Auditor. The performance of the composite lining system will be evaluated taking into account published information on the physical and chemical properties of both geomembranes and GCLs, and a simulated leachate quality within the cell. The contaminant flux will be estimated using an analytical diffusion calculation for the

geomembrane, and geochemical reactive transport modelling (using the geochemical modelling code PHREEQC) to simulate diffusion and attenuation of inorganic leachate constituents within the GCL. The potential implications of exchange reactions within the GCL will be considered with respect to the performance of this liner component.

The table of contents for the draft MCA is provided below for reference. Whilst the MCA is nearly completed, it is still in draft form and there may be some minor modifications to the outline below once the document is finalised.

We trust that this outline is sufficient for the current information request. Please don't hesitate to contact the undersigned if you need any further information in this regard.

Sincerely,

Lange Jorstad
Senior Hydrogeologist

Gary Schmertmann
Associate

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