

Table S2
Summary of Waste Treatment Technologies

Process Technology	Vendor	Process Description	Reaction Temperature	Treatment Time	Target Wastes	Status	Safety/Risks	Comment
Base Catalysed Dechlorination and variants	BCD Technologies, ADI Limited (STTP process) Technosafe Waste Disposal	Thermal desorption then dehalogenation (or carbonisation for STTP).	200 - 500°C	4 - 6 hrs	Halogenated organic materials in soils, sludges, sediments, liquids, surfaces	Avail Qld and Melb ADI completed trials	Mod/high temp, need to exclude air	Partially open system, regulated air emissions
Incineration (Cement kilns)	Rhone Poulenc/Scori	High temperatures, controlled combustion	800 - 1650°C	1 - 3 hrs	Halogenated organics, PCPs in soils, sludges, sediments, solids, liquids	Not favoured in Australia	Needs baghouse, scrubber	Partially open system, regulated air emissions
Ionic Replacement	SD Myers (PCB Gone) CSIRO Coal & Energy Tech (Lucas Heights)	Ionic replacement of halogens in an alkoxide compound	Ambient	1 - 3 hrs	Halogenated organics, non-aqueous liquids, liquid extract from contaminated material	Trials to be completed	No offgas	Not suitable for soils
Soil Washing/Solvent Extraction	Various	Contaminants dissolved in solvents, solvents reclaimed	Ambient	3 hrs - Week	Halogenated organics, PCPs in soils, sludges, sediments	Limited availability in Australia. Available in USA.	Does not destroy contaminants	Some solvents flammable
Solvated Electron Technology	Solvents Australia	Contaminants dissolved in ammonia then dehalogenated by solvated electrons formed by addition of calcium.	Ambient	3 hrs - Week	Halogenated organics, PCBs in soils, sludges, sediments	Possibly avail NSW 1997	Does not destroy all contaminants	Hazardous solvents.
Thermal Desorption	Soméus & Partners (PCS Technology)	Thermal desorption followed by flash pyrolysis and combustion	450 - 800 °C	1-3 hrs	Solid wastes, PCB, Hg contaminated soil and sludges	Pilot scale in Europe	Low pressure and low gas volume	Off gas treatment required
	Tox Free Systems (TFS)	Desorption followed by combustion	400 - 700 °C	1-3 hrs	Pesticide contaminated soils and semi-solid wastes	Pilot plant scale in Australia	Gaseous emissions	Off gas treatment required.
In Situ Vitrification	Geosafe Australia Pty Ltd	Vitrification of contaminated soils and debris.	1500-2000°C	100-150 tonnes/day	Contaminated soils and debris	Plant under construction. Operations to commence in early 1998	No sealed drums	Widely applicable to all classes of contaminants. High tolerance for debris.
Hydrogenation	ESI (Eco Logic)	Gas phase thermo-chemical dehalogenation	850°C +	1 - 3 hrs	Liquid organic wastes, pesticides	Currently Avail WA	Mod/high temp, hydrogen	Limited capacity for treating solids
Steam Reforming	Environautics (Detoxifier)	High temperature Steam reforming	1100 - 1500°C	1 - 3 hrs	Halogenated organics, PAHs, PCBs in liquids, sludges	Possibly avail Qld 1997	CO converter, halogen adsorber, activated carbon.	Not suitable for soils

Table S2 (Cont'd)
Summary of Applicability of Available Waste Treatment Technologies

Process Technology	Vendor	Process Description	Reaction Temperature	Treatment Time	Target Wastes	Status	Safety/Risks	Comment
Molten Media	ICI/Molten Metal/Dupont (Molten Metal)	Catalytic Extraction Processing	1650°C	1 - 3 hrs	Halogenated organics, liquids	Pilot scale established and commercial scale unit under construction in USA	Potentially explosive gas	Significant volume of off gases Limited inorganic content of wastes permitted.
	Illawarra Technology (Molten Slag)	Catalytic Extraction Processing	1500°C	1 - 3 hrs	For disposal of iron bearing dusts and carbonaceous sludges	Possibly avail NSW 1997	High thermal mass ensures stability	Possible limitations on destruction efficiency Limited inorganic content of wastes permitted
	Rockwell International (Molten Salt Oxidation)	Catalytic Extraction Processing	900 - 1000°C	1 - 3 hrs	Chlorinated organics, heavy metals	Uncertain, R&D Stage	Aqueous wastes can produce steam/fumes	Limited inorganic content of wastes permitted
Gasification	Fostex (Gasification)	Steam reforming/carbon gasification in fluidised spouted bed reactor	1650°C	1 - 3 hrs	Pesticides, scheduled & infectious wastes, tyres, plastics	Uncertain	Potentially explosive gas discharge	Size range restrictions for waste
Plasma Processes	SRL Plasma (PLASCON)	High temperature plasma arc combustion	3000°C +	Instantaneous but low process inventory	Halogenated organics, PAHs, PCPs	Currently available	Air emissions, halide salt waste stream	Mainly treats liquids & gases
	Waste Service (PACT)	High temperature plasma arc combustion	3000°C +	Instantly to 3 hrs	Schedule organic compounds and heavy metals	Possibly avail NSW 1997/98	Limited gas emissions	Slag vitrified so no leaching
Other	ESI (Stopped Counterflow Adsorption)	Contaminants retained in adsorbent, adsorbent reclaimed	Ambient	3 hrs-Week	PCBs in oil	Avail 1997/98	No offgas	Concentrates contaminants
	Queensland Uni of Tech (Supercritical Water Oxidation)	High temperature water at supercritical pressure	supercritical temperature and pressure	3 hrs - week	Contaminated aqueous streams	Uncertain, R&D Stage	Specialised equipment for high temperature	Ash & brine require disposal. Limited to 200µm & organics < 20%
	Various (Solar Detoxification)	Thermal and photochemical destruction	750->2000 °C	All scheduled contaminants		Uncertain, research and demonstration stage.	Limited information Low offgas.	

