



APPENDIX J

Waste Inventory



DRAFT BAR DELTA (E.M.D.) (PTY) LTD

Full Waste Inventory

Waste Type	Source	Assumptions	Phase	GHS			SAWIC code			Residual Volume	Management measures
				Physical Hazards	Health Hazards	Environmental Hazards	General	Hazardous	Waste Management Methods Code		
Transformer oils (PCBs >50mg/kg)	Draining oil from 30 Transformers before sell-off	Average of 100l oil per transformer	Sell-Off	H226, H272	H301, H320, H332	H401		HW07-01	D1	3000L	Recycling through Oilkol, or disposal at Holfontein
Used oils and greases	From storage areas of new and used oils and chemicals	During a site visit, 6, 200L drums were noted at the designated storage area. It is assumed that this will be the extent of remaining used oil and grease	Sell-Off	H226, H272	H301, H320, H332	H401		HW07-01	R 3	1200L	Delta should manage all remaining oil and grease through the existing agreement with Oilkol. i.e. Recycling
Redundant laboratory chemicals / glassware	From the clearing out of Lab Stores and Equipment	Assumed that 1 years' worth of Lab Chemicals and samples will be cleared out	Sell-Off	H290	H301, H312, H318, H332, H371	H402		HW19-03	D1	10kg	Holfontein
Fuel Residual	Diesel storage facility (East plant = 3500L)	5% of storage capacity will remain as residual	Sell-Off	H203, H224, H227, H241, H270	H301, H319, H332	H401			R 2	175L	Any remaining fuel will be resold to the supplier



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Boiler ash	Residual ash from 11 Boilers and 5 dedicated boiler ash skips (East Plant) and a boiler ash yard (west plant) before sell-off	Assumed Hazardous, Estimated 5% of annual ash generation (4315t) will be a residual	Sell-Off		H305, H320, H333	H402		HW15-01	R 6	216 tonnes	Send to Spanslab for use in the manufacture of concrete products, or disposal to Holfontein
Hazardous Sludge including Tank Residues	Removed during the clean out and decontamination of the following tanks; Caustic Tanks (x10=5600L), Acid Tanks (x3=170000L), Leach Tanks (x12=510000L), Spent Electrolyte Tanks (x7=101666L)	Sludge is roughly 1% of Tank Capacities	Sell-Off		H301, H313, H319, H333	H401		HW05-01	D1	73977 L	Treated at the inerting plant to meet the specifications of the Exemption (through assessment in terms of GN R.635), followed by disposal at Tekwane. If not able to meet specifications of the Exemption, disposal at Holfontein



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Miscellaneous Sludge	Removed during the clean out and decontamination of the following tanks; Settling Tanks (7), Flocculent and Filtrate Tanks (3) and Miscellaneous Tanks (71)	Sludge is roughly 5% of Tank Capacities	Sell-Off		H305, H320, H333	H402		HW05-01	D1	2430L	Treated at the inerting plant to meet the specifications of the Exemption (through assessment in terms of GN R.635), followed by disposal at Tekwane. If not able to meet specifications of the Exemption, disposal at Holfontein
Cyclone dust	Scraped from 8 Cyclone Dust Bins (960 Tonnes)	5% of Tank volume is present	Sell-Off		H302, H320, H332, H371	H402		HW05-02	D1	48tonnes	Disposal to Holfontein



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Funda socks	Generated by clearing out of Funda Filter Equipment for sell-off.	Used Fileter Socks will not be sold with the Filter Equipment, Assumed 5% of Annual Generation under normal operating conditions (736 Socks) will remain	Sell-Off		H317, H320, H333	H402		HW05-02, HW99-01	D1	37 Socks	Holfontein
Contaminated PPE	PPE contaminated by hydrocarbons and other on-site sources during all phases of the closure process	Assume 5kg/person/month, with roughly 60 personnel on-site during each phase	All	H228	H305, H332	H402		HW11-02	D1	300kg/month	Holfontein
Medical waste	Generated by ad-hoc treatment of minor injuries on-site at first-aid station	100g/person/month. Roughly 60 personnel on-site during each phase	All		H302, H312	H402		HW19-02	T4	6kg/month	Maintain contract with Compass Waste for Collection, Treatment and Disposal
eWaste											



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<i>Electrical parts</i>	Wiring, switches and electrical fitting from gutted buildings	Wiring can be separated from fittings and sold. Fittings can be sold or disposed as scrap to recyclers.	Sell-Off							This information is incalculable.	Sell as electrical assets, the remainder will be managed through the eWaste contractor: Desco
<i>Electronic parts</i>	Computers, printers, lab electronics, scales and monitoring data capturing electronics		Sell-Off							This information is incalculable, as all electronic parts listed in the asset register are working assets which will be sold	Sell as electronic assets, the remainder will be managed through the eWaste contractor: Desco
<i>Hazardous Components of eWaste</i>	Hazardous components of broken or damaged eWaste generated during sell-off	Any e-Waste which has Hazardous components is classified as Hazardous until it is separated from those	Sell-Off	H204, H241	H301, H312, H318, H332, H371	H401		HW18-06	R 5	This information is incalculable.	Recycled as far as possible via Desco, the remainder disposed to G:L:B



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		components. Delta has previously used Desco to Collect, Sort and Recycle its e-Waste									
<i>General Components of eWaste</i>	Non-hazardous components of broken or damaged eWaste generated during sell-off	Ratio of safe to Hazardous components is 10:1	Sell-Off		H313		GW18-06		R 5	This information is incalculable.	Recycled as far as possible via Desco, the remainder disposed to G:L:B
Fluorescent Tubes	From the dismantling of lighting fittings while gutting buildings for sell-off	1 fluorescent tube per 10m ² of building area (9415m ²). All fluorescent tubes will become waste. 100 crushed tubes stored per drum, therefore 10 drums	Sell-Off		H301, H304, H317, H340, H370, H351	H411		HW02-02	T3 & D5	10 drums of crushed fluorescent tubes	Dispose of sealed drums (encapsulated) at Holfontein
Contaminated Pallets	Residual of Contaminated Pallets from the operation of Delta facilities, still	Assume 5% of the Annual Generation Rate (5918 pallets) during operation remains	Sell-Off	H228	H305, H332	H402		HW11-02	T4	296 pallets	Incinerate at Richards Bay Smelter as far as possible, Dispose the remainder to Holfontein



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	to be removed.										
Bulk bags	Bulk bags were used to carry raw materials and product during production.	Assume 5% of the Annual Generation Rate (5918 bags) during operation remains	Sell-Off	H229	H305, H333	H403		HW05-02	T4	296 bags	Reuse in demolition phase. Incinerate remainder at Richards Bay Smelter. Dispose the remainder to Holfontein
NaHS bags	Sodium Hydrosulfide is used in the process and bags are left over	It is assumed that 5% of the annual amount (24m3) will remain on-site as the residual	Sell-Off	H290	H300, H313, H318, H331, H351, H370	H400		HW05-02	D1	1.2m3	Incinerate remainder at Richards Bay Smelter; failing this, dispose to Holfontein
Fibreglass	Fiberglass tanks and cooling towers to be dismantled during sell-off. Some of these instalments will be	5% of all Fiberglass instalments (53) will become waste. Average weight per fiberglass tank is 1.5 tonnes	Sell-Off		H302, H313, H318, H332, H371			HW05-02	D1	3.975 tonnes	Store in sealed containers and send to Holfontein for disposal via Interwaste



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	damaged during dismantling										
Sand blasting grit	There is a pile (4m3) and 5, 1m3 bags of residual sand blasting grit outside the silica sand blasting shed, while a 5m3 pile was found in a broken bunker along the eastern site boundary	Hazardous, it is assumed that all sandblasting grit that was found on the site will have to be removed	Sell-Off		H301, H313, H319, H331	H401		HW05-02	D1	14m3	Disposal to Holfontein
Contaminated soil	Soil contamination hotspots have been identified (in the Golder Contaminate Land Assessment - 2014)	50% of the exposed soil is contaminated to a depth of 200mm	Remediation		H302, H317, H332	H401		HW11-02	T3	225m3	Treatment with Lime in make shift inerting plant before disposal to Tekwane or disposal of untreated contaminated soil to



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	where exposed soil is found within the process plant area. 65% of the site is covered by buildings, roads or paving.										Holfontein
Cell scale and wax	Residue from the process which has not yet been cleared out. This will be scraped from holding bins and plant floors	5% of the annual volume during production will remain. This waste is hazardous until treated with lime	Sell-Off		H302, H312,	H402			T3	21 tonnes	Disposal to Rietfontein for treatment and disposal
Greenfill	Inerting plant and make shift inerting plant for waste treatment with lime	Only treated/inerted residue (greenfill)	Sell-Off			H413	GW17-03		D1	21 tonnes	Dispose to Tekwane
General waste /	Domestic waste will be produced by	1kg of domestic waste per person per day, with	All	H242, H272		H402				300kg per week	Retain weekly waste collection



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<i>Plastic</i>	on-site contractors during all phases, this waste will be collected in existing on-site bins	roughly 60 personnel on-site during each phase					GW51 (1-6)				contractor to manage domestic waste, with the removal of recyclables and disposal of remainder at Tekwane. Retain safe disposal certificates
<i>Cardboard</i>							GW50-02				
<i>Waste paper</i>							GW50-04				
<i>Garden refuse</i>	Alien species growing on-site will be removed during site remediation	Category 1, 2, 3 invasives on-site are expected < 30m3 of uncompacted material, invasives in the Northern road reserve are split into East (Arundo donax reeds - 4000m2 with approx 1m3 per 10m2 = 400m3) and West (Tecoma stans & Bauhinia purpurea - 5200m2 of approx 1m3 per 5m2 = 1040m3)	Remediation	H242			GW20-01	R 4	1470m3		Send to a composting facility. Failing this, dispose to Tekwane
<i>Weeds or invasive plants</i>											



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Concrete rubble	Demolition of buildings, this waste will be stored on the concrete foundations of each building before removal	Decontaminated before demolition. Volumes calculated from high level quantities in the Closure Costing Report	Demolition				GW30-01		R 6	5863 m3	Use less than 25 tonnes on-site as fill material for land forming. The remainder should go to Tekwane landfill
Building structural steel							GW53-01		R 5	2503 tonnes	Sell off as scrap metal to recycler
Building cladding											
Scrap metal	During the dismantling of the plant, certain metal parts and fittings will become damaged to a point where they cannot be sold for reuse	At least one average years' worth of scrap metal (500t) will be produced during demolition	Demolition				GW53-01 & GW53-02		R 5	500 tonnes	Sell off as scrap metal to recycler.



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Steel piping	Roughly 4000 meters of steel piping will be dismantled during the sell-off, most of which is expected to be contaminated to a level that cannot be reused, but may still be sold as scrap metal	all of the piping on-site will be contaminated and thus must be milled as scrap metal	Sell-Off				GW53-01 & GW53-03		R 5	40 m3	Sell off as scrap metal to recycler
Conveyor belt	There are a total of 47 conveyors on site, adding up to a total distance of 1246 meters. These conveyors produce damaged conveyor belts when dismantled	The length of conveyor belts will be twice the length of the conveyor systems. 50% of the existing conveyor belts will be damaged and become waste during dismantling. Conveyor belts are on average 600mm wide.	Sell-Off	H242			GW51-06 or GW99-01		R 4	748m2	On-site reuse application, return to conveyor manufacturer for reuse and recycling



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Spent chemicals:											
<i>sulphuric acid</i>	3 elevated tanks in the SSE corner of the site, roughly 4000L capacity storage each	Each tank will have a 1% residual	Sell-Off	H290	H300, H311, H314, H318, H331, H350	H400		HW08-01	R 3	120L	Return to supplier.
<i>lime</i>	There is a 65000L lime storage tank at the inerting plant	5% of the annual volume during production will remain.	Sell-Off		H333	H402	GW99		R 3	650L	Use remaining lime in the remediation of contaminated soils, etc. Remainder to be sent back to supplier
<i>sodium hydroxide (NaOH)</i>	Also known as caustic, is used in the post process washing phase, bags of caustic are stored in a covered area between the east and west plant, there are		Sell-Off	H290	H300, H311, H314, H318, H331, H350	H400		HW08-01	R 3	This information is incomplete pending further detail	May be used to neutralise spent acid. Return to supplier.



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	also spillages of NaOH at the washing process area										
<i>spent acid</i>	Process		Sell-Off		H302, H318	H401		HW99-01	T3	This information is incalculable pending further detail	Return to supplier
<i>Celite (SiO2)</i>	Celite is used in the Funda Filter process	Diatomaceous earth retains its value	Sell-Off		H303, H320, H333	H402		HW99-01	R 3	This information is incalculable pending further detail	Return to supplier.
Reduced Ore	Stockpiled for processing	Assumed that this was completely used up before the process is	Sell-Off		H320, H333	H402		HW11-02	R 5	This information is incalculable	Sold to other manganese ore processing companies



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		shut down								ble pending further detail	
Coal residual	Coal storage bays that feed into the boilers	Only coal fines will be swept from the coal storage bay	Sell-Off	H228	H320, H333	H402		HW11-02	R 1	2m3	Holfontein
Asbestos waste	Further survey required prior to demolition-	Asbestos should be removed ahead of demolition by a registered asbestos contractor	Demolition		H301, H313, H318, H331H350			HW06-01	D5	This information is incalculable pending further detailed survey	Certified asbestos contractor packaging for removal to Holfontein
Treated Wastewater Sludge	Removed from the 3 Waste Water Treatment Dams (x3=2706m ³)	Assumed homogenous thickness of 200mm throughout; Ave tank depth of 3m	Remediation		H302	H402		HW99-01	D1	541m3	Treated at the inerting plant to meet the specifications of the Exemption (through assessment in terms of GN R.635), followed by disposal at Tekwane. If not able to



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											meet specifications of the Exemption, disposal at Holfontein
Industrial Wastewater	Treatment of small quantities of wash water and drainage of tanks ahead of demolition.	Post treatment, tankage can be pumped as treated water to discharge.	All		H303	H402		HW99-01	T1	This information is incalculable pending further detailed survey	Continue to treat and discharge to SembCorp / Silulumanzi
Domestic Wastewater	Existing ablation facilities on the site used by employees and contractors will generate greywater and blackwater	The ablation blocks will not be demolished and shall be used as the only ablation facilities during all decommissioning phases. Assumed 20L/p/d with 60 personnel on-site during each phase	All		H303	H402		HW20-01	T1	1200L/day	This will be managed at the municipal sewage treatment plant



Waste Inventory Summary and Mass Balance

Material	Expected quantity	Classification	Reduction	Reuse options	Recycling options	Remaining Balance for Disposal
IBR cladding (roof and wall), tonnes	139 t		95% + scrap metal	Unknown; potential to 90%	Scrap metal	5%
Structural Steel, tonnes	2503 t		95% + scrap metal	Unknown; potential to 50%	Scrap metal	5%
Allocation for Miscellaneous steel framing, supports and brackets (1 years' worth of scrap metal), tonnes	500 t		95% + scrap metal	Unknown; potential to 50%	Scrap metal	5%
Concrete volume from demolished buildings, cubic meters	3034 m ³		As infill: 95% +	None	Infill; Landfill cover	5%
Concrete volume from retained buildings, cubic meters	2829 m ³		As infill: 95% +	None	Infill; Landfill cover	5%
Estimate of process piping residual (20m x 200 units) average 100mm dia., cubic meters	40 m ³		95% + scrap metal	None	Scrap metal	5%
Conveyor, metres	1246 m			Return to conveyor manufacturer 50%	Rubber recycling companies 50%	0%
Tanks, numbers	110 2-10m Dia; 5 10-15m Dia rubber lined		95% + reuse		5% Scrap metal	0%
Rail line (single steel rail), meters	1080		95% + reuse		5% Scrap metal	0%
Sleepers (650mm c/c), number	16 615		95% + reuse		5% landscaping	0%