

Mandara Estates

hazardous waste dumping
a case study

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What was dumped?

Industrial waste, mainly residues from the paint plant at a well-known motor vehicle manufacturer

organic solvents and heavy metals

Group II Hazardous Substances which are typically found in paint thinners:

Ethylbenzene, Xylene, Butoxy-ethanol, Ethyltoluene, Trimethylbenzene, Butanol, Propanol, Isobutyl alcohol, Toluene, Butylacetate, Propanone, Heptane, Methylcyclohexane

Heavy metals which are used in paint pigments

Cu
Pb
Zn
Ba

Planning

Intelligence on what is suspected to have happened, cooperation with other agencies (local authorities, SAPS, DEAT, DWAF, DOH, DOL, DPP, etc.) – to avoid duplication and possible compromising of the scene and investigation and also preliminary charge sheet. The nature of the incident will determine who will be involved.

Site investigation.

Aspects which have to be considered are:

topography
geology
water
vegetation
weather records
activities on site

Sampling

This is the culmination of all the preparatory activities and although the most important, is the least demanding and easiest of all the activities

suspect samples & control samples

sampling methods

chain of custody (most important aspect of sampling)

Laboratory analysis

Identification – determination of type of waste and substances present to identify listed compounds and determine potential hazards.

Profiling - comparison with known source or producer of similar waste products to determine origin.

Interpretation of results

required for

Compiling charge sheets and directives
Making results understandable to the court

This is done by presenting a meaningful and understandable scenario of events with the extent of the pollution and the potential for further damage to the environment.



Aerial view of Mandara Estates. Site 1 is on the hill to the left and Site 2 is the complex on the right.

Aerial view showing the sites where control samples were taken on 2003-12-12.



Aerial view of the site next to bridge where it was noted that a waste material dump (Site 3) had been removed, when visited on 2003-12-12.



Site 1 on top of the hill at Mandara Estates showing individual areas where samples were taken



Aerial view showing Site 1 at left and Site 2 at right.



Due to the large quantities of scrap metal lying around on the surface on the hill and often hidden by the long grass, EM detection was severely compromised.



The site has been in use for many years and there are old water pipes and other metal objects long buried. The soil appeared fairly undisturbed but contained pieces of brick, possibly old rubble buried many years ago and not related to the present investigation.



Site 1a¹ - Excavation site on hill next to building complex with pools of liquid and drums of presumed waste.



Supt. Vermeulen sampling at Site 1a¹



Previous investigations on the site by other agencies caused further pollution and was uncontrolled, giving rise to potential problems.



Site 1a² - Excavation site on hill next to building complex where waste was emptied out to drain into the soil.



Site 1a² showing where paint wastes have been poured out into a drainage pond. A polymer film has developed on the surface of the pond.

Site 1a² - A close up of the polymer film on the drainage pond. Note also that all the vegetation is dead.



Site 1b - Drums in the roofless room of the building complex.



Site 1b - Drums just outside the roofless room of the building complex, in the courtyard.



Site 1c - Excavation in courtyard of building complex next to a waste heap. In the excavation are mainly empty flattened drums.



The waste heap in the courtyard at Site 1. It is 25 m long, 5 m wide (average) and approximately 1.5 m high in the middle.



The waste heap consists predominantly of what appears to be factory waste (cloth, etc.), plastic straps and waste, leather waste, carpeting offcuts and drying agent (bags of dessicant).

Site 1f - In the clear patch is blue paint sludge and ash on top of old brick paving, next to the waste heap.



Here and in other areas nearby it appeared as if the layer of paint sludge accumulated due to paint wastes having been poured onto the surface and the sludge was left after drainage and evaporation.



A test pit was dug in the courtyard to determine if the soil had been disturbed. This revealed that the area had been paved with bricks placed on top of soil which appeared to be undisturbed in recent time. From this test pit and other observations, it appears as if the entire courtyard had been paved with bricks, and the only site at which material had been buried was that which had been previously excavated (Site 1c) by DEAT in September 2003.



Site 1g - Behind building complex next to the LTA Grinaker yard. There were piles of burnt material, mainly cotton waste and rubbish, and lots of drums.



Drums 1 to 4 were full of what appeared to be paint sludge, mixed with plastic and soil. It was evident that this material was the result of paint waste which had been poured out onto the soil, and once the volatile and fluid component had drained or evaporated away, the sludge residues were dug up and placed in drums.



Drainage from the burial site is directly downhill in the direction of the reed beds at Site 2. Vegetation below the drum burial (Site 1a¹) and the drainage pit (Site 1a²), about 20 metres downhill, is dead in places from groundwater pollution (Site 1d).



Site 1e - Further down the hill slope is a seep in the power line cutting.



The water table is near the surface and this, combined with a high clay content in the soil, mitigated against the use of ground-penetrating radar.



Aerial photograph showing Site 2. The light area to the extreme left (arrowed) is a waste dump which does not appear in photographs taken by DEAT in September 2003.



A dump with waste similar to that found at Site 1 near the plastic recycling plant (Site 2a) and Site 3. In aerial photos taken in Sept 2003 this dump is not present. This dump had been recently deposited as fresh vehicle tracks could be identified, most probably from earthmoving equipment.



Site 2a - Inside the shed housing a plastic recycling works, drums were stacked 5 high on pallets against the back wall, and three drums were sampled.



Site 2b - Drums in front of the plastic recycling works. 4 drums were sampled.



Site 2c - Drums at the rear of the plastic recycling works. 4 drums were sampled.



Site 2c showing how the stacked drums have fallen over and some have leaked into the surrounding soil.



Site 2c. Additional views showing the collapsing stacks of drums containing paint wastes

Between Site 2b and Site 2c was this electrical installation. The condition of the wiring poses a potential fire hazard with all the plastic waste and paint wastes in the near vicinity.



At Site 2d there were 26 blue plastic drums which contained a white scented powder. These drums were labelled as being EMPICOL and containing either ammonium lauryl sulphate or a blend of sodium lauryl ether sulphate and glycol stearate. However, a sample from the drum marked "82" was identified as talcum powder.



At Site 3, next to the bridge, evidence of recent activity was found when visited on 2003-12-12, in the form of very fresh earthmoving equipment tracks. The remains of a large dump of waste, mainly the same type of material as found at Site 1 and Site 2, as well as a variety of empty alcohol bottles, typical of a bar waste, was visible.

