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RECENT DEVELOPMENTS IN THE TRANSPORT OF LIQUID WASTES

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Summary

The national hazardous waste problem and the unavoidable need to transport liquid wastes for off-site disposal are described.

Practical measures for the avoidance of hazards during transportation are given, including:
accurate waste description,
correct vehicle design and selection,
vehicle marking,
effective technical control and emergency procedures.

Practical case studies are presented describing incidents that have arisen and the conclusions to be drawn from them.

1. Introduction

The main aim of the waste disposal industry must be to ensure that wastes of all types are disposed of safely without creating any environmental hazard. In recent years this has led increasingly towards the regionalisation of waste disposal facilities, particularly for hazardous wastes.

These facilities can take the form of specialised incineration or treatment plants or they may be special landfill sites selected specifically for their suitability. At present the number of suitable disposal sites, especially landfill sites for industrial liquid wastes, is extremely limited. In consequence some excessively long transportation distances occur.

In the short term, that is the next 2—3 years, this situation is unlikely to change greatly. But with the progressive implementation of the 1974 Control of Pollution Act it is reasonable to expect that a series of regional disposal facilities will gradually come into being. The objective must be to ensure that each of the main industrial regions of the country has within its area the right combination of waste disposal sites to allow the waste it produces to be disposed of safely.

At present a hiatus exists and little is happening to bring new facilities into operation. This is so both in the private sector waste disposal industry and amongst the public sector authorities involved, namely the county Waste Disposal Authorities (WDAs) and the Regional Water Authorities (RWAs).

The reasons are well known. First there are the delays that have occurred in the implementation of Part 1 of the Control of Pollution Act. At the time of submission of this paper (February 1976) the guideline circulars from the Department of the Environment on disposal site licensing remain unpublished. But by April, when this paper is presented, the site licensing provisions of the Act will have begun to come into effect. Licensing is the single most important provision relating to waste disposal and the way in which it is administered will markedly influence the future patterns of waste management in this country.

The second source of uncertainty is the rapidly changing state of our technical knowledge about waste disposal, in particular the disposal of wastes on land. The main thrust of research and technical development in the past 5 years has been directed towards an improved understanding of ways of avoiding risk of pollution or contamination to water resources (both on the surface and underground). The subject is outside the scope of this paper but the conclusions that are being reached are of fundamental importance. They cast a new light on the criteria to be used in the selection of landfill sites. In particular they allow us to predict confidently that environmentally-sound landfill sites for industrial wastes can be located in the main industrial regions of Britain. This was by no means the view as recently as two years ago.

The conclusions of relevance to UKHIS 76 that can be drawn from this very brief and necessarily incomplete overview of developments in industrial waste disposal are therefore:

1. Long distance transportation of hazardous wastes by road will continue to be a feature of waste management in this country.
2. The more excessive distances over which waste now travels can be expected to diminish as new regional waste disposal facilities (landfill sites and treatment/incineration plants) are commissioned. But these will still service regions typically 100 miles across.
3. Bulk movement of wastes will therefore remain a permanent feature of our industrial society and the need to avoid transport hazards will continue to be of major importance.

2. Hazardous wastes

The 1972 Deposit of Poisonous Wastes Act was the first British legislation concerned specifically with the problems of industrial waste disposal. It did two things: it made it an offence to deposit waste where its presence could give rise to an environmental hazard, and it introduced a control procedure requiring advance notification of the movement and disposal of certain waste types.

The definition of 'hazardous' given by the DPWA was the following:

"A quantity or concentration of any substance contained in any waste is to be regarded as hazardous if that substance is present in that waste in such a quantity or concentration as to subject persons or animals to material

risk of death, injury or impairment of health, or as to threaten the pollution or contamination (whether on the surface or underground) of any water supply".

(Note that the quantity or concentration of a potentially hazardous substance are of critical importance.)

The DPWA notification provisions defined the waste types to be notified on an *exclusion* basis: a Schedule under the Act (See Appendix A) defined those wastes *not* subject to notification. Any other waste was by definition notifiable. *But this does not necessarily mean that it is hazardous or even potentially hazardous.*

It is presumed by many, including many regulatory authorities, that a direct equivalence exists between a notifiable waste and a hazardous waste. This is not so, although it has become a source of considerable confusion and has undoubtedly contributed directly to the increased bulk movement of wastes often over considerable distances.

Many situations exist where wastes no more hazardous than dirty pond water and certainly less polluting than domestic refuse are hauled vast distances at considerable expense to the waste producer. Simply because the waste falls outside the categories listed in Appendix A and is therefore mistakenly thought to be hazardous.

Two examples:

(a) A machine shop effluent

		(%)
Free oil		7.5
Emulsified oil		3.5
Organic emulsifiers	less than	1.0
Debris (finely divided iron and aluminium silt)		6.0
Trichlorethylene	less than	1.0

(b) Effluent treatment plant sludge

pH		6.3
Suspended solids (calcium hydroxide, calcium sulphate)		15.0% v/v
		parts per million
Cyanide	less than	0.1
Phenol	less than	0.1
Copper	less than	15
Chromium	less than	10
Nickel	less than	1.1
Zinc	less than	2.7
Iron	less than	1.35

(It is worth noting that many wastes transported for disposal offsite are — like this one — the residues from waste treatment plants installed by manufacturing industry. These residues are generally incapable of being treated further and the concentrations of potentially recoverable materials so low that recovery for reuse is impractical or uneconomic.)

Despite these qualifying remarks there can be no question that many notifiable wastes are or can be hazardous. Their disposal incorrectly or in the wrong place can give rise to environmental hazard. Similarly in the event of emergency or a traffic accident during transportation they can present a serious potential hazard to the emergency services, confronted with the task of dealing with them.

While in any such emergency the minimisation and avoidance if possible, of environmental damage is of great importance, there are a number of specific factors of particular importance to the emergency services. Specifically:

(*a*) is the waste inflammable (i.e. flashpoint less than 150°C)?
(*b*) is the waste likely to produce hazardous vapours?
(*c*) will contact with the waste affect the skin?
(*d*) will contact with the waste damage clothing?
(*e*) if accidentally swallowed will the waste cause severe harm?
(*f*) will the waste damage other road vehicles — tyres, paintwork, etc.?

The results of a traffic survey commissioned by our company and using these criteria to identify potentially hazardous loads on the highway will be of interest. The survey was conducted in April 1975 by independent traffic consultants on the main road network serving a major industrial waste disposal site.

During the one month period 2000 waste deliveries were recorded. 1600 were bulk liquid wastes carried in tankers. 520 — or 26% — were potentially hazardous in that they satisfied at least one of the criteria given above. Of the potentially hazardous loads 10% travelled a distance of more than 100 miles, and 25% a distance between 50 and 100 miles.

Table 1 records the traffic flow data for the main road in the area which

TABLE 1

Average daily traffic flow 06.00—22.00 hours

Total two-way volume	Number of vehicles	(%)
1. All vehicles	15500	100
2. Heavy goods vehicles	1700	11
3. Tankers carrying apparently hazardous liquid products — chemicals, petroleum spirits etc.	370	2.4
4. Tankers carrying wastes (two-way flow, i.e. full and empty)	64	0.4
5. Full waste tankers with potentially hazardous loads (i.e. one-way flow only)	11.4	0.07

Source: Unpublished Redland Purle survey data.

carries the highest flow of waste tankers with potentially hazardous loads (highest that is when expressed in terms of actual waste tanker movements and as a percentage of total traffic flow). This data should help to place the scale of the hazardous waste problem in its proper perspective. It probably represents no more than 5% of the total movements of all hazardous cargoes. Nevertheless it remains an important 5%.

3. Liquid wastes

This paper concerns itself specifically with bulk liquid wastes transported by road tanker. Our reason for choosing to do so is that 90% or more of the hazardous wastes produced by industry are liquid or sludge-like in their physical form.

Hazardous wastes in solid form or contained in drums have their own distinct handling and disposal problems and their exclusion here should not be interpreted to mean that their importance is not recognised or is underestimated.

The "typical" liquid waste — if we may be permitted to introduce such an idea in an industry that is so much characterised by the atypical and non-uniform nature of the work it does — is a 3-phase mixture. It contains a layer of settled solids or sludge; a layer of aqueous liquid; and a layer of non-aqueous liquid.

The wastes are extremely diverse, they are produced in relatively small quantities at many individual premises, and the frequency of collection can be erratic. It is not unusual for wastes to be removed at 6-monthly, annual or even longer intervals.

Waste by its very nature is not produced to a quality specification and its composition, strength, temperature etc., can display quite wide variations. Some waste disposal methods, for example, high temperature incineration demand a very carefully controlled waste input to ensure uniform combustion conditions. Sampling of individual waste loads and judicious blending of wastes is essential. Landfill on the other hand can accept wastes varying more widely in their composition and the main requirement is to ensure that the composition remains within specified limits — the range of which can sometimes be quite wide.

The waste disposal industry must accept as one of its operating parameters that these variations will exist. His aim however must be to ensure that the variations remain within previously specified limits. As we shall see in the case studies described below it is when a waste falls outside the specified tolerances that the difficulties and dangers begin to occur.

4. Safety in the transportation of hazardous liquid wastes

If hazards are to be avoided in the transport of potentially hazardous liquid wastes several precautionary measures are needed. Most important are:

(*i*) an accurate description of the waste;

(*ii*) carriage in the right kind of vehicle;
(*iii*) adequate information on the vehicle identifying the load and its possible hazards.

The following sections describe the approach that has been developed and applied in Redland Purle to meet each of these safeguards.

A main objective of our technical control procedures is to establish sufficient information about a waste in order to decide:

(*i*) how to collect it;
(*ii*) how to transport it;
(*iii*) which disposal method to use;
(*iv*) which specific disposal facility to use;
(*v*) what handling precautions to observe (in collection and disposal);
(*vi*) what information to carry on the vehicle about the load and the procedures to follow in an emergency.

The location of the waste at the factory and its method of storage are therefore important: perhaps access is restricted requiring small vehicles or long hose runs.

The physical properties of the waste, for example its temperature of its viscosity are important. Some wastes may not remain pumpable after collection. Other wastes which are not highly reactive at normal ambient temperatures can be highly corrosive at higher temperatures.

The chemical composition of the waste and its principal components and their concentrations are naturally of very greatest significance.

All of this information forms an essential part of the waste specification. It can be obtained in a number of ways. The statutory responsibility for accurate description of waste rests, under the 1972 DPWA, with the waste producer — not the waste contractor. The major companies, particularly those in the chemical industry, are perfectly capable of describing their wastes in great detail, and do so. They understand their own manufacturing processes better than anyone else and it would be presumptuous of an outside organisation to seek to improve on their analysis of their own waste arisings.

Even so much fruitful dialogue does take place between the major chemical waste producers and organisations such as ours aimed at ensuring that wastes are stored, blended, segregated or otherwise presented to the contractor in the most suitable form for transport and subsequent disposal.

The smaller manufacturer who does not always have the technical staff or facilities needed to define his waste accurately is in a wholly different situation. Much of the raw material he buys, or the manufacturing aids he uses, may be known to him by their brand names only. He knows how to use them but may have no idea what they are, and neither will he have much idea what his waste composition is.

In such cases the waste disposal contractor provides a definite technical service by visiting the plants taking representative samples of the wastes, and analysing these at his own laboratories to determine what the waste is and how it should be handled.

Once the principal physical and chemical characteristics of the waste and its precise location and method of storage are known or have been found out, the other decisions readily follow.

An illustrative example is given in Appendix B. The waste described there is to be disposed of at the Pitsea disposal facility. In other words our technical control staff acting on the basis of information supplied by the waste producer and our own analysis of his waste have decided that landfill at Pitsea is the preferred method of disposal.

Had the waste specification been different they might equally well have decided in favour of landfill at another site, or possibly incineration at one of the company's incinerators, or detoxification by chemical treatment, or marine disposal.

The control document illustrated is the key to much of the company's control and management of its hazardous waste operations, and it performs a large number of quite distinct functions. The more important of these are:

(*i*) It is a formal statutory application under the Essex County Council (Canvey Island Approaches, etc) Act of 1967 seeking the approval of the controlling authority for the disposal of the particular waste.

(*ii*) On approval it becomes the actual consent for the disposal of the waste.

(*iii*) It summarises our knowledge about the waste giving it a unique reference number which allows us to trace readily all other information we have about the waste.

(*iv*) It provides in coded form a detailed classification of the waste, its physical form, chemical composition, and — most important — the material of construction for the collection vehicle, and the Tremcard to be displayed on the vehicle (see Section 5). Thus in the example given:

1	1	A	A	5	7	E	1

1 = Physical Form	= Liquid
1 = Method of containment	= Bulk
A = Waste category	= Acidic waste
A = Main component	= Sulphuric acid
5 = Concentration	= 10—20%
7 = Contaminants	= Hazardous inorganics
E = Tanker group	= Mild steel lined *or* Stainless steel *or* GRP
1 = Tremcard	= Acid liquid in bulk

(*v*) It is a management document used by the company's disposal division to specify the precise method of disposal to be employed at the disposal site.

(*vi*) It is an essential part of the driver's documentation carried by him on the vehicle with each load, and without which he is unable to enter the disposal site.

(*vii*) It specifies any special safety equipment required or precautions to be observed in handling the waste.
(*viii*) It acts as an information document for other statutory authorities who receive copies of it.

5. Road tanker specifications

The only regulations governing the carriage of waste, irrespective of the degree of potential hazard, relate to the labelling of the vehicle and not to the vessel in which it is being carried. It has been said that there is nothing to prevent the waste being carried in a plastic bag, provided it does not leak and is correctly labelled.

The prescribed labelling, namely the words "Disposable Waste", cannot really be regarded as being particularly illuminating. The very fact that this form of words should have been adopted, no doubt after the most careful deliberation, is further evidence of the difficulty in defining wastes adequately. One is also left with the philosophically stimulating, but operationally unhelpful concept of the "Non-Disposable Waste".

Draft regulations relating to the carriage of inflammable liquids and corrosive substances have of course been in existence since 1974 but progress since has been slow. Like other organisations we have been forced to make our own interpretation of these regulations (for Type II tanks) and now have in service a fleet of some 70 tankers incorporating:

— ¼″ mild steel tank shell
— double valves separated by a shear section on discharge pipe
— automatic shut-off valve on pressure/vaccuum line
— 6-point fastening man lids
— ¼″ mild steel coaming for over-turn protection
— sight-glass valved top and bottom
— fire extinguisher
— earthing reel and spike
— the whole tested to 56 psi and 25 in. Hg (to achieve this 17 clamps are fitted to the rear door capable of resisting a thrust of 130 tons).

The materials of construction of internal lining of tanks are:

— untreated mild steel tank
— PVC liner bonded to steel tank
— GRP (fibreglass) liner bonded to steel tank
— stainless steel tank
— Celmar polypropylene liner bonded to GRP tank

Previously we showed how the lining material to be used is specified as part of the control data which is derived from the specification of the waste.

6. Vehicle labelling

The average road tanker involved in the collection and transportation of

wastes will carry several different loads in the course of each working day. Even though some of the wastes removed may be regularly occurring we have already seen that fluctuations in the composition of the waste will be inevitable.

The operational circumstances therefore differ considerably from those involving product tankers transporting a chemical product whose precise composition is known.

The driver of a waste tanker may need to re-label his vehicle five or six times each day. Yet he is not, nor is he expected to be, a trained and qualified chemist. It is essential therefore to have an information system which will enable him to select for each load he carries the right label.

When we began to tackle this problem in 1973 it was rapidly apparent that a vehicle labelling system for each individual waste (there are many thousands that we handle) was quite infeasible. The solution seemed to lie in a system of waste classification which would enable each individual waste to be assigned to one of a number of hazard categories.

Working with the Hazardous Materials Service at Harwell we developed a system based on the 13 generic categories given in Table 2. For each of the categories a Tremcard was produced (see Appendix C). (Category 13 was introduced for two separate reasons. When a waste tanker is carrying a non-hazardous load it is clearly desirable that it should display a label stating positively that it is non-hazardous. Also it removes any need for discretion by the driver who will become accustomed to displaying a Tremcard on all occasions.)

The Health and Safety Executive has formed a working group on the marking of tankers carrying hazardous waste products. It has recommended,

TABLE 2

Redland Purle hazwaste Tremcard system

Tremcard	Cargo
1	Acid liquid in bulk
2	Acid sludge/solid in bulk
3	Alkali liquid in bulk
4	Alkali sludge/solid in bulk
5	Process waste sludge/solid
6	Bulk organic liquids (flashpoint less than 23°C)
7	Bulk organic liquids (flashpoint greater than 23°C)
8	Bulk organic solids/sludge
9	Miscellaneous inorganic/organic chemicals (in containers less than 10 gallons)
10	Contaminated material
11	Sodium cyanide
12	Cyanide solution
13	Non hazardous

with some amendments, the adoption of this system of Tremcards — or Hazardous Waste Cards.

The proposed amendments include the introduction of additional cards for:

— isocyanate waste
— agrochemical wastes
— organo-lead

as well as some supplementary cards for mixed wastes not otherwise covered.

The working group has also considered the design of a modified HAZCHEM label for the waste industry (see Fig. 1). The proposed label employs a distinctive range of United Nations numbers, one corresponding to each Hazardous Waste category and an "exclamation mark" diamond-shaped insignia as a universal hazard warning symbol. Each vehicle will carry three HAZCHEM plates, one on the rear and one on each side of the vehicle.

Fig. 1. HAZCHEM waste label (proposed).

7. Some case studies

In 1975 Redland Purle carried over 120,000 loads in its road tankers and during the year it had seven incidents which were attended by the emergency services (Table 3).

The common factor in the first six incidents was pressure build-up in the tank, with consequential spillage of some of the tanker's contents in five of the six cases. Three of the spillages were minor; two major.

The seventh incident was a vehicle accident involving an older tank not built to the higher vehicle specification described in Section 5. Some spillage occurred, but it again was minor.

In four of the six cases involving pressure build-up claims have been made or are being made against the customer on the grounds of wrongly-described waste loads. In both the other two cases the principal cause was the partial

TABLE 3

Vehicle incidents 1975

No.	Pressure rise	Chemical attack	Injury	Vehicle accident	Spillage	Tanker spec.
1	X				X	old
2	X		X		X	old
3	X	X				new
4	X	X			X	new
5	X	X			X	new
6	X				X	old
7			X	X	X	old

failure of items of equipment, viz. damaged door-seal and faulty pressure vacuum valve, on vehicles not designed to the new higher specification described earlier.

The three incidents involving tankers to the new design specification were similar in nature, and we describe one as a typical example. The waste to be removed was described by the waste producer as sulphuric dichromate pickle solution. But the waste which our driver was instructed to load was found subsequently to be an *unneutralised* strong mixture of nitric and sulphuric acids.

Both wastes are regular arisings that our company has serviced for many years without incident using conventional mild steel tankers.

On this particular occasion not only was the driver directed to collect the wrong waste, but the acid that was collected had not been neutralised. Normal procedure on the part of the waste producer is to produce a "killed" acid, treated with soda ash to give an approximately neutral condition.

Loading was carried out normally using the hoses permanently left by us on site and no unusual behaviour was observed.

The vehicle left the site and after travelling 25 miles the driver was aware that fumes were escaping from the pressure relief valve. The tank pressure gauge was reading 35—40 psi. The driver radioed his depot who alerted the emergency services. The driver then stopped his vehicle making certain that it was away from residential property and opened the manual blow-down valve to reduce the pressure within the tank.

The fire service arrived within 3 minutes of the vehicle stopping at which time the tank was too hot to touch. The fire brigade sprayed the tank with water to reduce the temperature.

Two back-up tankers and members of our own technical staff reached the incident within 35 minutes. The tank was now sufficiently cool to be touched and it was decided not to transfer the load to the stand-by vehicles. The journey to the disposal site was completed without further incident, and no loss of tank contents, under police and fire service escort, the additional vehicles

and technical staff remaining in attendance.

Chemical analysis of the tank contents showed that the acid strength on collection could not have been less than 14%. In the course of the journey 440 lbs. of iron were dissolved from the fabric of the tank, resulting in almost complete disappearance of the baffle plates and a significant reduction in tank wall thickness. Had the tank not been to the higher specification it is certain that the load would not have been contained and a serious incident caused.

Conclusions

In this paper we have tried to set out some of the developments taking place in the general field of hazardous waste management, and specifically in the field of hazardous waste transport.

Our principal conclusions may be summarised:

1. The disposal of hazardous waste inevitably involves the transport of hazardous substances on the highway.
2. Waste transport is a small but nevertheless important part of the wider problem of carriage of hazardous substances.
3. Significant progress is being made in the design and labelling of hazardous waste loads to minimise the occurrence of hazardous incidents and to ensure that any that might recur are handled promptly and in a well-informed manner.
4. A small number of incidents will inevitably occur, even with the most extensive precautions. The single most important cause at present is pressure build-up in tanks arising from the collection of wastes that are wrongly described or at variance with an agreed specification.

(See Appendices pp. 211—214)

APPENDIX A

SCHEDULE

Regulation 3

DESCRIPTIONS OF WASTE WHICH NEED NOT BE SUBJECT TO SECTION 3 OF THE DEPOSIT OF POISONOUS WASTE ACT 1972 IF IT DOES NOT CONTAIN ANY HAZARDOUS QUANTITY OR HAZARDOUS CONCENTRATION OF ANY POISONOUS, NOXIOUS OR POLLUTING SUBSTANCE.

Class 1 Any waste normally arising in the use of premises for domestic purposes.

Class 2 Any waste normally arising in the use of premises as an office for any purpose, or as a retail shop (that is to say, a building used for the carrying on of any retail trade or retail business wherein the primary purpose is the selling of goods or services by retail).

Class 3 Any other waste, however arising, of which the nature and composition are such that

(*a*) if it arose in the use of premises for domestic purposes, it would fall within Class 1;

(*b*) if it arose in the use of premises as an office or retail shop, it would fall within Class 2.

Class 4 Any waste produced in the course of—

(i) the construction, repair, maintenance or demolition of plant or or buildings;

(ii) the laundering or dry cleaning of articles;

(iii) working mines and quarries, or washing mined or quarried material;

(iv) the construction or maintenance of highways, whether or not repairable at the public expense;

(v) the dry cutting, grinding or shaping of metals, or the subjection thereof to other physical or mechanical process;

(vi) the softening, treatment or other processing of water for the purpose of rendering it suitable for (a) human consumption, (b) the preparation of foods or drinks, (c) any manufacturing or cooling process, or (d) boiler feed;

(vii) the treatment of sewage;

(viii) the breeding, rearing or keeping of livestock;

(ix) brewing;

(x) any other fermentation process; or

(xi) the cleansing of intercepting devices designed to prevent the release of oil or grease.

Class 5 Any waste (not being waste in any of the foregoing classes) consisting of one or more of the following items whether mixed with water or not:—

(i) Paper, cellulose, wood (including sawdust and sanderdust), oiled paper, tarred paper, plasterboard;

(ii) Plastics, including thermoplastics in both the finished and raw states, and thermosetting plastics in the finished state;

(iii) Clays, pottery, china, glass, enamels, ceramics, mica, abrasives;

(iv) Iron, steel, aluminium, brass, copper, tin, zinc;

(v) Coal, coke, carbon, graphite, ash, clinker;

(vi) Slags produced in the manufacture of iron, steel, copper or tin or of mixtures of any of those metals;

(vii) Rubber (whether natural or synthetic);

(viii) Electrical fittings, fixtures and appliances;

(ix) Cosmetics;

(x) Sands (including foundry and moulding sands), silica;

(xi) Shot blasting residues, boiler scale, iron oxides, iron hydroxides;

(xii) Cement, concrete, calcium hydroxide, calcium carbonate, calcium sulphate, calcium chloride, magnesium carbonate, magnesium oxide, zinc oxide, aluminium oxide, titanium oxide, copper oxide, sodium chloride;

(xiii) Cork, ebonite, kapok, kieselguhr, diatomaceous earth;

(xiv) Wool, cotton, linen, hemp, sisal, any other natural fibre, hessian, leather, any man-made fibre, string, rope;

(xv) Soap and other stearates;

(xvi) Food, or any waste produced in the course of the preparation, processing or distribution of food;

(xvii) Vegetable matter;

(xviii) Animal carcases, or parts thereof;

(xix) Excavated material in its natural state;

(xx) Any other substance which is a hard solid and is insoluble in water and in any acid.

APPENDIX B

PITSEA DISPOSAL APPLICATION

R.P.D.S. No. / / /

T.W. No.

To ESSEX COUNTY COUNCIL,
CONSUMER & PUBLIC PROTECTION DEPARTMENT,
BEEHIVE LANE, CHELMSFORD. CM2 9SY

ESSEX COUNTY COUNCIL (CANVEY ISLAND APPROACHES, ETC.) ACT, 1967

LAND RECLAMATION CO. LTD. makes application for prior approval under Condition 1 of the Consent granted to it under Section 45 of the above Act and the supplementary conditions agreed with the Essex County Council to deposit the following toxic wastes hazardous materials at Bowers Gifford Marshes, Pitsea, Essex.

Signature _____ Position _____

WASTE PRODUCER

Name

Address

+
County

SPECIMEN

Contact

Tel. No.

Location of waste *(Bldg/Dept.)*

Redland Purle Service Depot
COVENTRY
Date to Essex C.C.

Vehicle Reg. No.

WASTE

(1) Nature—general description

Pickle acid and plating shop drainage.

(2) Principal Components
Sulphuric acid,
Chromium, Nickel, Zinc & Iron as Sulphates.

(3) Quantity/Packaging

(4) Season ticket period

CHEMICAL ANALYSIS/PHYSICAL CHARACTERISTICS

NOTICE. Undertaken solely for internal control purposes by Redland Purle Limited and in no way to be relied upon by the waste producer for his own operations or descriptions

Sulphuric acid - 18.9%
Contaminated with the following metals;

Cr	-	13,200 ppm
Ni	-	670 ppm
Zn	-	10,000 ppm
Fe	-	19,250 ppm

DISPOSAL METHOD

1. Common Reception
2. Area D—Sludges and Tars
3. Area E—Selected Dilute Acids — 3
4. Tip Face—Solids and Drums
5. Separate Excavations

A	B	C	Tip Face

6. Special Conditions SC/

NOTES:

HANDLING AND SAFETY NOTES

Avoid contact to skin.
Acid suit and face protection to be worn during collection and disposal.
Lined tanker to be employed.

Lab. Signature | Date

TRANSPORTATION AND EMERGENCY CODE

						V	TC	
1	1	A	A	5	7	E	1	

FOR ESSEX COUNTY COUNCIL USE:

Driver's Signature

L.R.C. Initials

Land Rec. approved copy

Form 6

APPENDIX C

Transport emergency card (road)

Cargo

CHEMICAL WASTE—
BULK ORGANIC LIQUIDS
FLASH POINT LESS THAN 21°C

Nature of Hazard

- Highly inflammable, flash point less than 21 C.
- Highly volatile.
- Heating will cause pressure rise, severe risk of bursting and explosion.
- Spilled liquid has low temperature, and unless contained evaporates quickly.
- Vapour may be heavier than air, invisible, spreads along the ground.
- May form explosive mixture with air, particularly in empty uncleaned receptacles.
- Substance may poison by absorption through skin and inhalation.
- Gas or vapour may have effect resembling alcoholic intoxication.
- Gas or vapour may have narcotic effect causing giddiness.
- Severe poisoning, perhaps fatal if swallowed.
- In high concentrations vapour can cause unconsciousness.

Protective Devices

- Suitable respiratory protective device
- Goggles giving complete protection to eyes.
- Plastic or synthetic rubber gloves, boots, suit and hood giving complete protection to hands, face and neck.
- Eyewash bottle with clean water

EMERGENCY ACTION — Notify Police and Fire Brigade immediately

- If possible move vehicle to open ground.
- Stop engine.
- Mark roads and warn other road users.
- Keep public away from danger area.
- Keep upwind.
- No naked lights — no smoking, switch off vehicles in vicinity.
- Use explosion proof electrical equipment and/or non-sparking hand tools.

Spillage

- If vapour cloud drifts towards populated area, warn inhabitants.
- Contain liquid with sand or earth, allow to evaporate — call an expert.
- Prevent liquids entering sewers, basements, and work pits — vapour may create toxic or explosive atmosphere.
- Cover sewers — ensure that basements are evacuated.
- Warn inhabitants of explosive and/or toxic hazard.
- Shut off leaks without risk.

Fire

- Keep container cool with water spray if exposed to fire.
- Extinguish with dry chemical, foam or water spray.
- Do not use water jet.
- Keep upwind.
- Do not extinguish leak gas flame unless absolutely necessary — consult an expert.

First aid

- If substance in eyes, immediately wash out with plenty of water for at least 15 minutes.
- Remove contaminated clothing immediately, and wash affected skin with plenty of water.
- Seek medical treatment when anyone has symptoms apparently due to inhalation, swallowing, or contact with skin or eyes. Applies to fumes produced in a fire.
- Persons who have inhaled vapour must lie down and keep quite still. Effect may be delayed, keep under observation for at least 48 hours.
- Keep patient warm.

TELEPHONE: **REDLAND PURLE LIMITED,**
Telephone No:
AND QUOTE RPDS No. ON DRIVER'S WORK TICKET.
