

Leicestershire  
Waste  
Minimisation  
Initiative



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Front cover  
photographs:

1. CarnaudMetalBox
2. Everards Brewery
3. R F Brookes
4. Smallshaws
5. Wigston Dyers

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on behalf of the LWMI partnership

# Leicestershire Waste Minimisation Initiative *Progress Report*

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# 1. Introduction and summary

The purpose of this document is to report on the progress of 10 companies who have been involved in the Leicestershire Waste Minimisation Initiative (LWMI) since 1994. In the first year of implementing waste minimisation projects the companies made a total saving of £0.75 million. The savings were made through the reduction of waste costs. Now after a further year of implementation, the savings are £1.3 million. This Report details how the companies achieved those savings.

The Report gives a realistic view of a sample of small and medium sized companies over 2 years. The participants have made progress at different rates. Some companies have made rapid progress. For others, most of the benefit was realised in the first twelve months.

The participants reflect many common business pressures such as organisational changes or transfer of product to or from other sites. In some of the project companies these changes have interfered with ongoing projects. Notwithstanding this, continued progress overall is reported and in some cases new waste minimisation opportunities have been identified.



ENVIRONMENT AGENCY

THE BOC  
FOUNDATION



FOR THE ENVIRONMENT



GOVERNMENT OFFICE  
FOR THE EAST MIDLANDS

## Background to LWMI

In 1994, a team of Project Partners appointed technical consultants Orr & Boss to carry out waste audits in each of the companies. The audits concluded that if all 10 companies implemented waste minimisation projects, the potential financial savings could total £3 million. The environmental savings from the projects so far include a 10% reduction in water use and effluent; 50% reduction in air emissions and solid waste to landfill; and reduced resource consumption. The full details of how the companies achieved these savings in the first year are given in the March 1995 Project Report.

The LWMI partnership team is made up of the Environment Agency, the BOC Foundation for the Environment, the DTI, Severn Trent Water, Leicestershire Training and Enterprise Council and East Midlands Electricity Plc. The Project Partners each committed funds to the Initiative. They directly manage the project through a steering group.

The Environment Agency replaced the waste regulation function of Leicestershire County Council and the NRA, who were originally separate project partners in the LWMI. They both merged into the Environment Agency in April 1996.



## Recent projects

A dissemination programme was launched in July 1995 to show to other SME's in the East Midlands, the benefits of adopting waste minimisation techniques through the results achieved by the 10 companies. The programme consisted of a series of informative seminars and training workshops.

In October and November 1995, seminars were held at venues around the East Midlands. Over a hundred local companies and business support organisations from the region attended the seminars. The companies were from a wide cross section of industry, including engineering, textiles manufacture and food production. Representatives from the project companies shared their experiences of implementing waste minimisation and the results they achieved. Project consultants Orr & Boss explained how to initiate a waste minimisation project in a company.

These seminars were followed by six one-day training workshops in January and February 1996. The workshops were attended by 53 companies. The companies took part in group tasks and received individual advice on waste minimisation techniques. A range of case studies from the companies' experience has now been published.

The Leicestershire Waste Minimisation Initiative has shown that waste minimisation certainly pays dividends both financially and environmentally. Active consideration is now being given to developing the Initiative. There will be future projects to continue the promotion of the significant benefits of waste minimisation to the wider business community.

## 2. The objectives of LWMI

- To demonstrate the cost and environmental benefits of waste minimisation.
- To illustrate this by reference to the 10 participating companies in Leicestershire.
- To encourage a systematic approach to waste minimisation.
- To disseminate the results to local businesses, to raise awareness and encourage more companies to adopt waste minimisation as an important element in business strategy.
- To prioritise waste minimisation over waste management.

Table 1 Participating Companies

Company	Business area	Location	No. of employees
R F Brookes	Food	Wigston	650
CAMAS Aggregates	Building Materials	Croft	120
CAMAS Building Materials	Building Materials	Croft	60
CarnaudMetalBox	Engineering	Braunstone	245
Caterpillar (UK) Ltd	Engineering	Desford	1,100
Dust Control Equipment Ltd (DCE)	Engineering	Leicester	284
Everards Brewery Ltd	Brewing	Leicester	120
KP Foods Group	Food	Ashby de la Zouch	900
R Smallshaw (Knitwear) Ltd	Textiles	Hinckley	450
Wigston Dyers Ltd	Textiles	Wigston	50

This Report should be read in conjunction with the full Project Report issued in March 1995. However there should be sufficient information in the document to give the reader a good impression of the companies' achievements.

# 3. Views from the project partners on LWMI

Paul Charlesworth, Director of the BOC Foundation

“ We supported the Leicestershire Waste Minimisation Initiative because it set out to demonstrate that minimising waste at source would result in improved business performance as well as reduced discharges of pollutants to the environment. It is very gratifying to see that some of the participating companies achieved further reductions in operating costs and waste discharges in the period after the end of the project. ”

Vanessa Baguley, Leicestershire Training and Enterprise Council Ltd

“ The Leicestershire Waste Minimisation Initiative clearly demonstrates the tangible benefits which arise from minimising waste. Leicestershire TEC are keen for other companies to appreciate these effects and so adopt waste minimising measures within their own organisations, reaping the financial benefits for themselves. ”

Ian Micklewright, Severn Trent Water

“ As a company, Severn Trent Water has a strong commitment to the environment and, through our sponsorship of the Leicestershire Waste Minimisation Initiative, we have worked in partnership to achieve a real reduction in waste and pollution. We are pleased with the benefits that this approach has had for both industry and the environment. ”

Barry Hidson, East Midlands Electricity plc

“ East Midlands Electricity is very keen to support the wise use of energy. The Leicestershire Waste Minimisation Initiative has played a key part in making local businesses aware that reducing waste not only reduces the impact on the environment but can also provide financial benefits to their business. We are pleased to have been involved in the LWMI project and hope its success will encourage others to follow this example. ”

Jon Foreman, Environment Agency

“ Waste minimisation is a positive way to prevent the pollution of the environment. The Leicestershire Waste Minimisation Initiative succeeds in highlighting to local industry the benefits of reducing waste. The Initiative shows how public and private organisations can effectively work in partnership to protect the environment and to promote good business practice. ”

# 4. The project companies' progress

## 4.1 Progress of financial savings since the start of the waste minimisation projects

Table 2 Financial Cost of Waste Summary

Company	Approx turnover	Pre-start perception	Audit	Potential	No. of projects planned	No. of projects started	Rate of saving	
	£'m	£'000s	£'000s	£'000s			After 1yr £'000s pa	After 2yrs £'000s pa
R F Brookes	38	?	1,806	470	34	6	50	248
CAMAS Aggregates	9	80	113	66	6	4	78	78
CAMAS Building	7	30	181	95	22	12	90	100
CMB	83	71+	8,000	1,484	27	17	270	390
Caterpillar UK	160	?	699	175	11	4	57	230
DCE	18	?	330	66	14	7	26	26
Everards Brewery	35	60	154	70	14	10	19	34
KP Foods	65	Low	800	272	3	2	100	100
R Smallshaw	14	260	637	151	13	1	5	8
Wigston Dyers	2	?	151	57	7	7	52	52
<b>Total</b>	<b>271*</b>	<b>501+</b>	<b>12,871</b>	<b>2,906</b>	<b>151</b>	<b>70</b>	<b>747</b>	<b>1266</b>
<b>Proportion of Turnover</b>		<b>0.3%*</b>	<b>4.5%*</b>	<b>1.1%</b>	-	-	<b>0.26%</b>	<b>0.47%</b>

Note: \* Percentage based on the five companies providing pre-start figures.

It is significant that some of the companies were not able to provide a pre-start figure for the costs of their waste. One of the main tasks of the waste minimisation programme was to make companies aware of the actual costs of their waste. The total cost of waste includes not only the costs of disposal but also the cost of unused raw materials and additions that do not become finished product.

The audit carried out by Orr & Boss in 1994 identified the actual costs of waste to the companies. The potential savings are based on the possible improvements that can be introduced in each of the companies.



## 4.2 Progress in the reduction of waste output

Table 3 Environmental Emission Reductions (Annual)

Company	Liquid waste		Emissions (Exc. water vapour)	Solid waste			Waste reused	
	Effluent	Tankered		Landfill	Special waste	Incinerated	Animal feed	Other
	m3	m3		tonnes	tonnes	tonnes	tonnes	tonnes
R F Brookes								
Start	117,000	-	-	150	-	-	2,031	-
Reduction	-	-	-	-	-	-	280	-
CAMAS Aggregates								
Start	705,000	-	-	14,800	-	-	-	5,800
Reduction	-	-	-	6,400	-	-	-	1,500
CAMAS Building								
Start	5,000	-	-	10,000 <sup>(1)</sup>	-	-	-	-
Reduction	5,000 <sup>(2)</sup>	-	-	7,000	-	-	-	-
CMB								
Start	305,000	122	1,042	1,078	-	-	-	15,543
Reduction	57,000	112	600	158	-	-	-	7,700
Caterpillar UK								
Start	19,000	200	9	1,370	-	-	-	-
Reduction	3,000	100	-	105	-	-	-	-
DCE								
Start	6,000	113	-	468 <sup>(2)</sup>	49	-	-	768
Reduction	-	-	-	-	49	-	-	-
Everards Brewery								
Start	56,000	-	-	1,000	-	-	200	50
Reduction	14,000	-	-	-	-	-	-	-
KP Foods								
Start	1,730	-	-	470	-	-	650	-
Reduction	-	-	-	256	-	-	-	-
R Smallshaw								
Start	-	-	-	5	-	-	-	68
Reduction	-	-	-	-	-	-	-	-
Wigston Dyers								
Start	117,000	-	-	-	-	-	-	-
Reduction	35,000	-	-	-	-	-	-	-
<b>Total</b>								
Start	1,331,730	435	1,051	29,341	49	-	2,881	22,229
Reduction	114,000	212	600	13,919	49	-	280	9,200

Note: (1) Recycling now in place to eliminate 100 Kg pa chromium discharge to River Soar.

(2) Volume reduced by half, thus reducing number of trips.

By focusing waste minimisation projects on specific waste streams, some companies were able to make significant reductions to their environmental emissions

## 4.3 The waste minimisation projects implemented

Table 4 Split of Projects Actioned to Date

Company	Non capital projects			Capital projects				
	Housekeeping maintenance & monitoring	Process control & improvement	Reprocessing	Monitoring	Process	Reprocess	Material substitution	Treatment
R F Brookes	2	4	2					
CAMAS Aggregates	3				1			
CAMAS Building	6	4	1		1			
CMB	10		2			4	3	
Caterpillar UK	1				3			
DCE		2	1			2		2
Everards Brewery	7	1	1	1		1		
KP Foods		3						
R Smallshaw	1	1	1					
Wigston Dyers	1				6			
Totals	31	15	8	1	11	7	3	2
		54				24		

## 4.4 Waste minimisation project payback rates

Table 5 Paybacks – the Relative Sub-Project Returns

Company	Project categories							
	No. of projects			Capital expenditure				
	Identified	Actioned	Planned for 1996/7	Nil	<3 mths	3 mths – 12 mths	12 mths - 36 mths	>36 mths
R F Brookes	34	8	10	9				
CAMAS Aggregates	6	4	2	3		1		
CAMAS Building	22	12	2	11		1		
CMB	27	19	4	10		9		
Caterpillar UK	11	4	3	1		3		
DCE	14	7	1	3		2	2	
Everards Brewery	14	11	4	8	2			
KP Foods	3	3	Ongoing	3				
R Smallshaw	13	3	11	2				
Wigston Dyers	7	7	Ongoing	1		6		
	<b>151</b>	<b>78</b>	<b>37+</b>	<b>50</b>	<b>2</b>	<b>24</b>	<b>2</b>	<b>0</b>

# 5. Overviews of the Projects

## 5.1 R F Brookes

R F Brookes employs 650 people and has a turnover of £38m pa producing chilled and frozen convenience foods for distribution via two major distributors.

Following the relaunch of the project at Wigston in 1995, substantial progress has been made in reducing waste following the organisational changes in 1994.

Table 6 Achievements Relative to Target

Action Plan	Target improvement	Achieved improvement after 2 years £'000s pa
Water reduction	50	-
Shelf life (shortages)	100	130
Preparation	50	60
Process Waste	20	58
Overweight	200	-
Packaging	50	-
	470	248

Considering the relatively slow start at Wigston, a great deal of progress has now been made. Management commitment, measurement, monitoring and training have been the key factors. All the supervising staff and many of the operators have been through training courses which covered basic manufacturing practice, problem solving skills and information systems. This will help support the waste reduction activities as more projects are planned.

As Table 6 shows, further improvement potential remains. Most of the benefit thus far has been achieved by attention to detail. Little or no capital expenditure has been involved. It is now felt the waste reduction process needs a further "push" and two engineers are being tasked with achieving further improvements and addressing areas where there has been some slippage from the best performance obtained.

## 5.2 CAMAS Aggregates

CAMAS Aggregates at Croft is one of the largest granite quarries in the UK producing over 2.25m tonnes pa of aggregates and 300,000 tonnes pa of coated stone products. With annual sales of over £9m, the site employs 120 workers and staff.

### 1. Quarry

The new water treatment system is now under construction and forms part of the £3m development plan for the site. Once this work is completed a cleaner discharge to the River Soar will result in an environmental improvement. The plan also includes a new access road replacing the current access through the village of Croft which will significantly enhance the amenity of the village.

Spoil from construction will form part of a new screening hill improving the visual appearance of the area. The hill will replace areas currently used for storing some of the quarry waste. Once the development is complete, the quarry and coated stone waste will have to be tipped off-site. The implications of this are stimulating waste minimisation activities.

### 2. Coated Stone Plant

Production volumes have continued to be weak and there seems to be little immediate prospect of recovery. The coated stone manager continues to pay attention to waste and to maintain the monthly material reconciliation.

Quality problems in the quarry have necessitated a change in the method of operating the Coated Stone Plant, which has increased the amount of recycling of dry stone and the number of clean-downs in the last three months. The Quarry Manager is working on improving the screening of the stone and once this is completed it should be possible to improve efficiency again.

Quality rejects have increased a little due to the quality of the stone. However, rejects are still low compared with 1993 and are expected to return to previous low levels when the problems with the stone are resolved.

All the customer surplus is being sold as before. In addition, rejects and clean-down is sold in the same way. The revenue from sale of tar plant waste has increased to £15,000 pa.

There has been a very positive development in the use of extracted filler material, that was previously dumped and was causing a dust nuisance on site. A trial of the used filler as a replacement for another raw material proved to be successful at the adjacent Block Plant. The Coated Stone Plant supplies the filler free of charge to the Block Plant, which saves money on raw materials and removes an environmental nuisance. There are still a few logistical problems to be ironed out but it is expected that within months, the need to tip extracted filler at Croft can be practically eliminated.

Considerable attention has been paid to energy, including the implementation of an energy tracking system. Energy consumption in Kwh/tonne is charted monthly and targets have consistently been beaten.

The details of the costs of waste, the improvements in savings and reductions in waste emissions are shown in Tables 7 to 11.

Table 7 Cost of Waste from the Coated Stone Plant at CAMAS Aggregates

	Proportion of total input %	Quantity tonnes pa	Cost £'000s pa
Purchases excluding sand		25,000	1,815
Purchases of sand		32,000	180
Energy (gas & gas fuel)			408
Materials from quarry		252,000	1,300
Recycled stone	1.2	3,700	5
Reclaimed filler	1.0	3,000	
<b>Total Inputs</b>		<b>315,700</b>	<b>3,708</b>

Table 8 Material Waste – Coated Stone Plant

	Proportion of total input %	Quantity tonnes pa	Cost £'000s pa
Clean-down	1.5	4,600	28
Quality rejects	1.1	3,500	5
Dumped filler	0.8	2,500	
Energy wasted (estimate)			41
Other losses	1.5	5,100	
<b>Sold to Customers</b>	<b>95.1</b>	<b>300,000</b>	<b>3,200</b>
Surplus (returns)	0.9	2,700	34
<b>Total Waste</b>	<b>5.8</b>	<b>18,400</b>	<b>108</b>
Recycled filler	1.0	3,000	
Recycled stone	1.2	3,700	

Table 9 Improvement Summary – Coated Stone Plant – Full Year 1995

Project	Baseline performance		Target savings		Achieved savings 1 year	Achieved savings 2 year		Reduction
	tonnes pa	£'000s pa	tonnes pa	£'000s pa	£'000s pa	tonnes pa	£'000s pa	%
Recycling	3,700	5	2,500	3	2	1,192	2	32
Clean-down	4,600	28	3,700	23	8	1,100	7	24
Quality	3,500	5	2,800	4			0	0
Surplus (sales)	2,700	34	0	0	46	2,700	46	100
Energy		41		37	22		22	
Balance	7,600							
Waste	22,100	113	9,000	67	78	4,992	77	23

Expected further savings in 1996/7

Filler use by CAMAS Building Materials			2,500	4				
Current position				71			77	

The savings in recycling and clean-down achieved at the start of 1995 were reduced by the change in production method in November. Other savings continue to be achieved.

A new target saving is expected in 1996/7 through use of extracted filler by the nearby Block Plant.

Overall target savings increased by £71,000 and achieved savings were £76,000 per annum.

Table 10 Waste Emissions – Quarry

	Inputs	Air emissions	To water tonnes pa	Waste disposal (on-site) tonnes pa	Recycling tonnes pa
Sludge from Hydrasanders	-			-	
Extracted dust	150,000	-			150,000
Dust emissions	-	-			-
Sludge from settling ponds	-				-
Water extraction from sinking hole	640,000		640,000		
Water extraction from river	64,800		64,800		
<b>Total</b>	<b>854,800</b>		<b>704,800</b>	<b>-</b>	<b>150,000</b>

Table 11 Waste Emissions – Coated Stone Plant

	Inputs tonnes pa	Air emissions tonnes pa	To water tonnes pa	Waste disposal (landfill) tonnes pa	Recycling (on-site) tonnes pa
Materials input	425,800				
Water vapour	6,530				
Clean out	6,200			6,200	
Quality reject	4,700			4,700	
Extracted filler	7,400			3,400 (on-site)	4,000
Stone bins	5,000				5,000
Surplus	3,700			3,700	
<b>Total</b>	<b>33,530</b>			<b>18,000</b>	<b>9,000</b>



## 5.3 CAMAS Building Materials

CAMAS Building Materials on the adjacent site to CAMAS Aggregates at Croft, manufactures a range of moulded concrete building blocks, paving stones, highway kerb and drainage channels. Turnover is approximately £7m.

### 1. Slab and Kerb (Croft A)

In September 1995 the decision was taken to transfer production of slab to the nearby Bardon Hill quarry.

During 1994/5 considerable steps were taken to improve recycling of water within the process, eliminating a discharge of 100 Kg of Cadmium per year into the River Soar.

The paper interleave needed for slab production was being investigated to see if re-usable cloth could be used in its place. In the meantime, disposal charges were eliminated by giving the waste free of charge to a paper recycler.

Improvements were also made in the use of statistical process control to regulate slab thickness, material reconciliation and reduction of reject levels.

All these new ideas have been transferred to Bardon Hill by Chris Jennings who is now responsible for both sites. Savings at Bardon Hill are about £5,000 pa from recycling water and about £17,000 pa in disposal charges on paper. The details of these savings are shown in Tables 12 and 13.

Table 12 Quantity and Cost of Waste

		£'000s pa
Croft A – Moulded cement Products (Slab and kerb)	Paper interleaving (protection before pressing)	36
	Material losses	15
	Effluent	3
	Thickness/weight	21
Sub-total		75
Croft B – Block products	Surplus, reject stocks	81
	Dropper box losses	25
Sub-total		106
Total		181

Table 13 Action Plan in CAMAS Building Materials

	Item	Target £'000s pa	Achieved £'000s pa	New Target £'000s pa
Croft A	Total	40	9	0
Bardon Hill	Water Recycling Sales of Paper		6	22
	Total	55	86	107
<b>Totals</b>		<b>95</b>	<b>101</b>	<b>129</b>

The savings achieved at Croft A were reduced after the transfer of production to Bardon Hill in 1995. New savings were made at Bardon Hill by adopting some of the lessons from Croft. In a full year the target saving for Bardon Hill is £22,000.

Croft B performance improved further, with rejects down to 1% and an additional saving made of hydraulic oil changes. The new target reflects the expected further reduction in rejects (new finger car sensor) and the use of filler from the quarry as raw material.

Overall the target annual savings increased to £129,000 and achieved savings reached £100,000.

## 2. Block Plant

The Block Plant has continued to benefit from the attention paid to maintenance in 1994/95. Last year the recorded performance against the target output was 100%. Rejects continue at much lower levels than before and have averaged 1% over the last three months, though levels of 0.3% have been achieved and the target continues to be under 0.5%. This will be realised when a new positive count wheel is installed to eliminate finger-car damage.

A further benefit of increased accuracy in recording production and rejects has been improved stock control. At the last stock count the error was less than 0.1%.

The use of the filler material as a substitute for another raw material is a new project and the savings from this are estimated at £15-20,000 pa.

The company is continually looking at waste minimisation. New initiatives include:

- Resiting a hydraulic power pack in a clean area to reduce contamination and improve reliability saving £5,000 pa in oil changes.
- A new strapping machine giving greater reliability and less downtime.
- Sealing storage bins and transfer points to reduce losses.

## 5.4 CarnaudMetalBox (CMB)

CarnaudMetalBox plc (CMB) manufactures very high volumes of can bodies for the food and beverage market, approximately 2.5 billion cans per annum at the Braunstone site. There is a range of well-known customers for these products and the beverage cans are usually decorated. The main processes are the forming of aluminium and tinplate coils into can bodies, metal cleaning and metal coating for protection and for decoration. The capital intensive plant now produces at 5 or 6 times its original capacity.

### General

The business is still buoyant, but very competitive. They have recently converted an aluminium can-making line into a line that can take both steel and aluminium. However, due to the price of aluminium (and the customers' reluctance to accept any of the price increase in the metal), they have stopped making aluminium cans and have no short-medium term plans to get back into that market.

Interestingly, they feel that their World Class Manufacturing and Team Working initiatives are not producing the results for which they had hoped. There is a lack of focus and co-ordination through operating too many projects, some of which have overstated potential benefits.

### Waste Minimisation Progress

1. Any projects to do with aluminium (such as segregation) are no longer relevant due to the change mentioned above.
2. The anticipated change to all water based coatings has been put on hold until an odour problem is fully investigated. Since the project started, there has been a 50% reduction in solvent usage which has resulted in a 47% reduction in emissions (over 600 tonnes pa). The savings made through these reductions continue to be maintained.

The coolant recovery project is doing very well. Prior to the changes, 100,000 litres per week were lost. This had the effect of doubling the effluent stream chemical oxygen demand from 600 to 1200 mg/l (still within consent) and increasing the cost from around £45,000 to £90,000 pa. Through fairly detailed but simple techniques the following savings are being made. Fitting drip trays reduced volumes by 14,000 litres per week. Optimisation techniques, using a detailed "Model Machine" approach, reduced volumes by 11,000 litres per week. Overall the 25% loss reduction saved £25,000 pa including the raw materials saving.

### Further/Additional Projects

1. They have tried sending lacquers and coating to a solvent recovery company but the workforce have complained about reactions to using this solvent (headaches and sickness). Orr and Boss have mentioned the possibility that their material is being contaminated with solvents from another company.
2. CMB have found an outlet for cardboard cores from the metal coils. This is saving £6,000 pa on disposal costs and keeping 53 tonnes pa out of the landfill stream.
3. They are now recycling around 5 tonnes pa of office paper.
4. They save vending machine cups and have recovered £114,000 in 6 months.

## 5.5 Caterpillar UK Ltd

Caterpillar's UK site at Desford comprises two main operations, assembly and spares logistics. Building D, a modern facility, features self guided vehicles for moving chassis around the assembly area. The logistics department is based mainly in Building C and supplies spare parts world-wide for Land Rover and Massey Ferguson, as well as Caterpillar. At the time of the initial report Caterpillar had not made a great deal of progress with the planned projects, partly because some of them depended on other planned changes. Production increased by around one third. The improvements numbers have been adjusted back to a "like for like" basis and then shown separately allowing for the volume increase in the assembly plant.

Table 14 Summary of projects and savings made in Caterpillar

	Quantity		Volume	Achieved	Savings made after volume increase
	Vol. m <sup>3</sup> pa	Weight tonnes pa	m <sup>3</sup> pa	£'000s pa	£'000s
Paint plant purging procedure	22		50	50	67
Fluid in damaged packs	5		5	-	
Pallets					
Small cardboard boxes					
Contaminated fluids					
Scrap reduction			39	Ongoing project – difficult to isolate from other initiatives.	
Water consumption reduction					
P36s (large cardboard boxes)			15	20 Active project with De Montfort University – should yield better savings than target estimated.	
Waste segregation				Some success.	
Avoidance of repacking		38	51	No attempts yet but still planned.	
Extra project energy management system				160	
				230	247

## 5.6 Dust Control Engineering (DCE)

DCE Ltd is an engineering company which designs and manufactures dust control equipment for sale throughout the world. The company employs 284 people and has an annual turnover of £18 million. The main manufacturing processes are metal cutting and forming, metal finishing including painting, filter production from various types of cloth and plastic, and assembly and packing for despatch.

Turnover has now increased to £20m with the same number of people. The company have recently taken over a French dust control equipment manufacturer and have just started to make components for them to assemble.

The original 6 waste minimisation projects are still the only ones currently implemented:

1. Waste monitoring systems still in operation.
2. Alkali oil separation – results as already reported in the March 95 Report.
3. Nesting improvements (Mild Steel) – results as already reported.
4. Optimise cloth widths – results as already reported.
5. General rubbish (skips and use of baler) – results as already reported.
6. Reuse of solvent (using a still) – results as already reported.

The company is generally happy with the overall project and expect full year results on these projects to be around £25,000 pa. The costs have been:

£3,000 Leicestershire Waste Minimisation Initiative fee.

£17,499 Capex on baler, solvent still, oil separator and can crusher.

### Future Plans

1. Recycle cardboard and paper.  
Plans are being made for segregation and collection around the site and discussions are taking place now with a local company who will buy the waste. Cost will be zero and the benefit has not yet been quantified. There will be some (small) financial benefit and a reduction in landfill material.
2. Continue to investigate disposal of waste wood.  
This still costs £4,000 pa to landfill and will rise. Biffa have been involved and possibly will take it at zero cost (saving the £4,000), once the problem of nails in the wood has been overcome.
3. Re-assess use of skips in view of the new Landfill Tax.
4. Continue to look for new projects.

## 5.7 Everards Brewery

Everards is a small/medium sized privately owned brewery with a very modern facility, having been built on a greenfield site ten years ago with more recent extensions. The company employs 120 people on site. Turnover is £35m including the other distribution facilities.

Everards made rapid progress at the start of the project. The combination of the involvement of the operators plus the water process flow model helped pinpoint a number of opportunities for reducing water consumption.

This has now been improved by the addition of further metering which has focused attention on a number of specific problem areas. There was always a debate about the excess quantity of rinse water used in certain cleaning operations. Excess water obviously had the effect of diluting the cleaning fluid and this could result in less effective cleaning with consequent microbiological problems.

Detailed examination revealed a great deal of scavenging caused by a combination of undersized non-return valves and the need for more effective air breathers. It was also found that the main supply was flooding back and overflowing to drains, although the significance of this was only fully realised during cold weather when the overflow froze during last winter's cold snaps.

After a great deal of diagnostic work the end result has been a significant reduction of water consumption which is now starting to show through in the results. Additionally, the cleaning cycles are now improving hygiene standards considerably.

Trials are under way to test the cleaning efficiency of small bore (0.5 inch diameter) hoses compared to the normal 1 inch diameter hoses. Operators tended to find that the guns on the large hoses were unwieldy. This problem should not exist with the small hoses and this means the guns are more likely not to get "damaged". It is also hoped that the smaller bore nozzles will give better cleaning performance.

The next project is to address cask line filling, washing and metering where the experience of the Carlsberg-Tetley brewery at Burton has been studied. After that consideration will be given to a combined heat and power option as the boilers become due for renewal. It is still seen as a "long shot" but it would be much easier to justify at the time, when some capital expenditure will be needed in any case.

Savings after 2 years are summarised in Table 15.

Table 15 Summary of Achieved Savings at Everards Brewery

Summary of Visit		
	Target Savings £'000s pa	Savings Achieved £'000s pa
Yield improvement	29	15
Water consumption	8	10
Effluent	20	4
CO <sub>2</sub>	13	1
General	-	-
<b>Overall</b>	<b>70</b>	<b>30</b>

## 5.8 KP Foods

Since the LWMI project at KP in 1994 there has been a considerable expansion of the Ashby factory. The expansion has entailed the building of a completely new three-line Hula-Hoops factory in the former warehouse area. Production volume has increased by 68% and the new product range involves different production processes, so performance comparisons are difficult. In order to make comparisons the base line figures have been adjusted upwards towards the current production volumes.

The annual cost of waste for the site as a whole has increased to £2,518,000. The real increase after adjustment is £342,000, which reflects the higher waste levels inherent in the new processes.

The main increase is in the waste from production processes and unaccounted losses. This has been partly offset by a substantial increase in revenue from waste sales. The net increase in material waste (after sales) is £462,000.

There has been a reduction in packaging waste which has saved £176,000 per annum. The improved 'right first time' performance has reduced recycling costs by £98,000 per annum.

Food waste and packaging waste to landfill have been reduced by a total of 256 tonnes, while food waste sales have increased by 301 tonnes.

See Tables 16 and 17 on the cost of waste and a summary on emissions reduction in KP Foods.

Table 16 Cost of Waste Summary

Quantity and value per annum	Baseline performance		Adjusted baseline		Current performance		Saving/ (Cost)	
	tonnes pa	£'000s pa	tonnes pa	£'000s pa	tonnes pa	£'000s pa	tonnes pa	£'000s pa
Purchased materials	12,580	7,553	21,096	12,666	21,631	13,988		
Recycled input	480	144	805	241	374	143	431	98
<b>Total RM inputs</b>	<b>13,060</b>	<b>7,697</b>	<b>21,901</b>	<b>12,907</b>	<b>22,005</b>	<b>14,131</b>		
Waste in production processes	400	237	671	397	910	584	(239)	(187)
Other losses (unaccounted)	580	298	973	500	1,271	816	(298)	(316)
Recycled	480	144	805	241	374	143		
Product give-away	50	25	84	42	81	52	3	(10)
<b>Sold to customers</b>	<b>11,550</b>	<b>6,993</b>	<b>19,368</b>	<b>11,727</b>	<b>19,369</b>	<b>12,536</b>		
Waste of raw materials	1,030	560	1,727	939	2,262	1,452	(538)	(503)
Waste packaging	269	242	451	406	256	230	195	176
Waste disposal		(6)	0	(10)		(51)		41
<b>Unrecycled waste</b>	<b>1,299</b>	<b>940</b>	<b>2,178</b>	<b>1,576</b>	<b>2,518</b>	<b>1,631</b>	<b>(343)</b>	<b>(286)</b>
<b>Cost of recycling</b>	<b>480</b>	<b>144</b>	<b>805</b>	<b>241</b>	<b>374</b>	<b>143</b>	<b>431</b>	<b>98</b>

Table 17 Emissions Summary

Tonnes per annum	Baseline performance	Adjusted baseline	Current performance	Saving/ (Increase)
	tonnes pa	tonnes pa	tonnes pa	tonnes pa
Food waste to landfill	200	335	274	61
Food waste sales	200	335	636	(301)
Packaging waste to landfill	270	453	258	195
Water to sewer	1,730	2,901	3,150	(249)
<b>Total landfill</b>	<b>470</b>	<b>788</b>	<b>532</b>	<b>256</b>



## 5.9 Smallshaws – Mill Hill Knitwear

This company turns over £14m pa and produces fully fashioned knitwear over four sites, employing 450 people. The main waste streams are yarn, cut pieces, and excess components. Prior to the audit they carried out a mass balance on the production and concluded that around 5% of the production did not reach sales. The material loss was calculated against an absolute of zero waste base and the waste streams were analysed to identify the source of the losses.

There have been a number of staff changes since the first visits by Orr & Boss in 1994.

However, the new standards for the monitoring system installed since then have remained. The new manager is continuing to tighten up on yarn issues and improve the monitoring system.

Segregation has improved and more revenue was gained from scrap yarn. This rose from £4,920 in 1994 to £7,000 in 1995.

The weight of yarn bought in during 1995 was 505.6 tonnes with 132,016 dozen knitted garments completed. Customer returns for 1995 was 3,043 dozens. The weight of waste going to Wills-Haines was 56.8 tonnes.

Druid Street waste for 1995 was 396 cubic yards, a reduction on the 1994 figure of 576 cubic yards, giving a saving of 30 skips of waste at £11 per skip – a total of £330.

The cardboard is now segregated for collection by a merchant. As a result, skip sizes have been reduced from 14m<sup>3</sup> to 12m<sup>3</sup> and the collection frequency has also been reduced.

The knitting part of the business has been greatly improved with all knitting of both ribs and panels concentrated in one department. Many of the rib machines have been modernised and all rib knitting is now on the floor above the panel knitting. Transport and waste is reduced.

Despite a period of considerable organisational change, the project is still continuing and the full benefit starting to be realised.

## 5.10 Wigston Dyers

It was not possible for the consultants to revisit this project but the results set out in the original project are being maintained.

In addition, since the audit, some new dyeing machines have been installed that are more water efficient.

# 6. Conclusion

The participants are continuing to reap significant benefits from adopting good waste minimisation principles and turning these into good practice. Savings of 0.5% – 1.0% of turnover look very achievable for a range of industries and company sizes.

Since this is equivalent to a straight profit increase, people reading this report should consider what options they have to increase profits by 20% assuming a 5% profit on turnover – without major capital spending.

Waste minimisation definitely helps the environment and business competitiveness. Our thanks are due to the participants for their co-operation with this interesting demonstration of what can really be achieved.