



Waitakere Eco-City



**WAITAKERE CITY COUNCIL  
CLEANER PRODUCTION PARTNERSHIP  
PROGRAMME**

**REPORT  
ON  
CLEANER PRODUCTION INVESTIGATION  
AT  
TEGEL FOODS LTD  
HENDERSON**

**JUNE 1996**

**Report prepared by:  
James Andrews**

**INDUSTRY AND  
ENVIRONMENT  
LIMITED**

## TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>2.0</b>	<b>BACKGROUND</b>	
<b>3.0</b>	<b>PURPOSE OF REPORT</b>	
<b>4.0</b>	<b>METHODOLOGY</b>	
<b>5.0</b>	<b>RESULTS</b>	<b>2</b>
<b>5.1</b>	<b>PROCESS DESCRIPTION</b>	
<b>5.2</b>	<b>SITE OBSERVATIONS</b>	<b>3</b>
<b>5.2.1</b>	<b>YARD</b>	
<b>5.3</b>	<b>RESOURCE USE AND WASTE DISPOSAL COSTS</b>	<b>4</b>
<b>5.4</b>	<b>COST REDUCTION PROJECTS</b>	
<b>5.4.1</b>	<b>ENERGY</b>	<b>5</b>
<b>5.4.2</b>	<b>WATER</b>	
<b>5.4.3</b>	<b>WASTE DISPOSAL</b>	
<b>5.5</b>	<b>MONITORING</b>	<b>6</b>
<b>5.6</b>	<b>COMMUNICATION MECHANISMS</b>	
<b>5.7</b>	<b>TRAINING</b>	<b>7</b>
<b>5.8</b>	<b>ENVIRONMENTAL POLICY STATEMENT</b>	
<b>5.9</b>	<b>SUMMARY COMPARISON OF EXISTING SYSTEMS WITH CLEANER PRODUCTION MODEL</b>	<b>8</b>
<b>6.0</b>	<b>DISCUSSION</b>	<b>9</b>
<b>6.1</b>	<b>OPPORTUNITIES FOR CLEANER PRODUCTION</b>	
<b>6.2</b>	<b>EXISTING SYSTEMS AND CLEANER PRODUCTION PROGRAMME</b>	<b>10</b>
<b>6.2.2</b>	<b>CLEANER PRODUCTION PROGRAMME</b>	<b>11</b>

<b>6.3</b>	<b>ENVIRONMENTAL CRITERIA</b>	
<b>6.3.1</b>	<b>MONITORING</b>	<b>12</b>
<b>6.3.2</b>	<b>PROJECT INITIATION</b>	
<b>6.3.3</b>	<b>SETTING OF OBJECTIVES</b>	
<b>6.3.4</b>	<b>FEASIBILITY ANALYSIS</b>	
<b>7.0</b>	<b>CONCLUSIONS</b>	<b>13</b>
<b>7.1</b>	<b>OPPORTUNITIES FOR CLEANER PRODUCTION</b>	
<b>7.2</b>	<b>SUITABILITY OF EXISTING SYSTEMS FOR DEVELOPING CLEANER PRODUCTION</b>	<b>14</b>
<b>8.0</b>	<b>RECOMMENDATIONS</b>	
<b>8.1</b>	<b>OPPORTUNITIES FOR CLEANER PRODUCTION</b>	
<b>8.2</b>	<b>CLEANER PRODUCTION PROGRAMME</b>	<b>15</b>
	<b>ACKNOWLEDGMENTS</b>	

## **1.0 INTRODUCTION**

Tegel Foods Ltd. Henderson has agreed to take part in Waitakere Eco City's Cleaner Production Partnership Programme (CP3). Objectives of this programme are to help establish Cleaner Production in Waitakere industries by:

- Providing information on how to establish an ongoing Cleaner Production programme through the CP3 workshop and folder;
- Providing the services of a consultant to offer site specific advice.

Waitakere City also sought to obtain waste audit information during the course of the consultant's involvement to assist with its strategic waste management planning. This information is also useful when establishing a Cleaner Production programme. The experience gained from the CP3 programme would also help WCC refine its approach in developing Cleaner Production in Waitakere City.

## **2.0 BACKGROUND**

Tegel Foods Ltd in Henderson operate a poultry processing plant, located in Bruce McLaren Rd. The new plant expansion has been in operation since July 1995, and has been going through a settling in period of hiring new staff and developing systems to make production more efficient. A diverse range of cost reduction, efficiency and management improvement projects have already been initiated. Some focus on the technical, operational and plant side of the industry, and others are personnel management orientated.

## **3.0 PURPOSE OF REPORT**

The purpose of this report is to provide an assessment of Tegel's Henderson operation and suggest:

- Areas in which improvements in environmental performance may be investigated; and
- Areas of special consideration for establishing a Cleaner Production programme.

It is intended to thereby stimulate discussion internally, rather than to solve specific waste generation or environmental problems. This is the function of the Cleaner Production programme.

## **4.0 METHODOLOGY**

An initial meeting was held with key production staff to explain the Cleaner Production Partnership Programme. Current cost saving projects and potential barriers to establishing a Cleaner Production programme were discussed.

Two walk-throughs of the site were made. Then a series of meetings was held with production managers and other personnel between 18 April and 23 April 1996. The departments the staff represented were:

- occupational safety and health;

- dayshift and nightshift management;
- warehouse and distribution;
- human resources;
- engineering;
- office management and accounting.

From the information obtained, a comparison was made with a generic cleaner production programme. This incorporates the stages of:

- establishing environmental policy;
- establishing a cleaner production team;
- collecting baseline information;
- setting objectives;
- collecting detailed information;
- generating options;
- feasibility analysis;
- implementation; and
- monitoring and review.

Other considerations throughout these stages are management commitment, communication, staff awareness, and appropriate resourcing.

## **5.0 RESULTS**

### **5.1 PROCESS DESCRIPTION**

Chickens are delivered from the farm and are transported by conveyor through of a series of discrete stages before reaching the main production hall. Normal process rate is 75 birds per minute. The initial stages are:

- Loading;
- Killing;
- Plucking;
- Gutting;
- Chilling;
- Grading.

These are mainly automatic operations, with manual input required for loading.

The production is from here split depending on the end product.

- Auto Cut-up Portion (ACP). This automatically cuts, sorts and packages pieces to ensure that the minimum weight for a bag of pieces is met with minimum overfill. Maximum rate is up to 85 birds per minute, although this capacity is not used.
- Linko. This processes a whole bird into nine pieces, the output of which is taken by a fast-food chain.
- Thigh-deboner. This is fast but shows some variation in the amount of product left on the bone.

Additional manual lines exist for processing of chicken for an airline and supermarkets.

Processed chicken is then assembled into orders and packed using the Sastek computerised invoicing system. From there it is either sent to the blast freezer and stored before despatch, or stored fresh for despatch shortly thereafter.

## **5.2 SITE OBSERVATIONS**

### **5.2.1 YARD**

#### **Bird Reception**

This fronts onto Bruce McLaren Rd. Trucks are hosed down and the slurry of water and droppings finds its way to the footpath and into the gutter, as do feathers. Droppings are also washed into the feather race, which reduces their suitability for feather meal production. These problems will be alleviated by the resiting of this area to the space to the Western side of the factory away from the road in about one year.

#### **Offal Tower, Fat Pits, Sump, Pumps**

The elevated offal tower holds warm offal which has a moisture content of around 60%. Offal is taken away periodically for conversion into animal feed. A fat rich overflow drains into fat pits before discharge to trade waste, with the accumulated fat removed periodically by a contractor. Trials have been conducted using a bacterial agent (Pro-Clean) to reduce the B.O.D. of the trade waste discharge, and the success of this has led to an internal recommendation for its adoption. A strainer is also to be introduced to screen solids, and the water flow reduced.

A sump adjacent to the offal tower receives the washdown water from the factory floor inside before discharge to trade waste.

Pumps for transfer of the offal are located next to the offal tower. These required water cooling and at the time of the site visit were using 50 000 l of mains water per day. The pumps can operate on two circulation rates - 60 l/min. or 4 l/min. and were then on the former. This had been discovered and it was planned to reduce the rate.

Water from the pumps drained to a sump which discharge to stormwater. Some of this flow may have been findings its way into the fat pits and increasing the quantity of waste discharged to trade waste.

#### **Refrigeration Equipment**

A series of fan assisted radiators were installed as part of the expanded plant's refrigeration system. These were second-hand and capacity is less than that required. To overcome this, mains water is sprayed onto the radiator surface to increase the heat exchange.

## Unsorted Solid Waste and Kraft Recycling Bins

Unsorted solid waste is collected by Waste Management, with kraft packaging separated for recycling. Kraft waste mainly originates from orders which require rework due to changes to orders. Other cartons are used for storage of unfinished orders over the weekend. Reusable containers were found to be impractical for this.

## Live Chicken Crates

Broken crates are stockpiled for repair, at significantly less cost than purchasing new crates.

### 5.3 RESOURCE USE AND WASTE DISPOSAL COSTS

Projected costs for resource use and waste disposal costs are based on production

**Table 1: Projected costs for fuel, power and services for financial year.**

<b>Category</b>	<b>Projected Cost for Year</b>
<b>Energy</b>	<b>\$437 000</b>
Electricity	\$354 000
Gas	\$80 000
Diesel	\$3 000
<b>Mains Water Supply</b>	<b>\$150 000</b>
<b>Waste Disposal</b>	<b>\$285 000</b>
Trade waste discharges	\$159 000
Dewatering of offal	\$80 500
Cleaning of fat sumps	\$28 500
Solid waste disposal	\$17 000
<b>TOTAL</b>	<b>\$872 000</b>

### 5.4 COST REDUCTION PROJECTS

A number of projects under way at Tegel Foods are aimed at reducing costs through improvements in efficiency. Overall yield is under investigation, as is the rework required due to changes in orders.

fuel power and services are projected to cost \$872000 in the coming financial year. Savings of \$200 000 have been set by management as a target. This is to be achieved through reductions in electricity, gas, diesel and water use, and the amount of trade waste discharges and wastes generated.

### **5.4.1 ENERGY**

The largest use of electricity is for refrigeration. After an energy audit in April, Pacific Energy Ltd concluded that little could be done to improve overall electrical efficiency without upgrading plant.

Housekeeping measures are being promoted by production managers to all staff, such as turning off machinery when not in use.

A comprehensive maintenance system is being developed by the engineering department, as well as optimisation of equipment settings for maximum efficiency.

Gas is used for the boiler (scalding for plucking) and other water heating. No options for reduction were identified.

Diesel use is for forklifts, which has been minimised through a change in operational procedure, which was not especially part of the cost reduction projects. An idea from one worker resulted in trucks being backed up to loading bay instead of parked in the yard, reducing the need for forklifts from two to one.

### **5.4.2 WATER**

Water use is being looked at through all high use areas, including:

- Vacuum pumps for offal transport;
- Refrigeration;
- Scalding;
- Chilled water;
- Spinchiller;
- Bird crate wash.

### **5.4.3 WASTE DISPOSAL**

Trade waste savings are being targeted through:

- Reduced water flow through plant efficiencies
- Reduced suspended solids through screening
- Reduced B.O.D. through trial of pro-clean bacteria has had some success and has been recommended to management for adoption by project staff

By reducing excess water in the offal it is hoped to make significant savings on the cost of removal.

Reducing the amount of material removed from the fat pits by 30% would reduce charges by the same, and this is being investigated.

Solid waste management options for cardboard and plastic have been reviewed by Waste Management N.Z. Ltd.

## 5.5 MONITORING

Resource use and waste production is comprehensively monitored.

- Electricity costs are recorded through one meter.
- Water use is recorded through one meter.
- Solid waste disposal records are now reasonably accurate after some invoicing discrepancies.
- Cafeteria, paper, stationery costs are monitored. Theoretical paper usage is being reconciled with the actual use.

Errors in the accounting system are being eliminated as the system is refined after the new plant commissioning.

Management has shown commitment to health and safety and environmental team on site, which will be monitoring these aspects.

- Records are kept of staff training, and what equipment they may operate safely.
- All accidents are recorded.
- Hazards are identified and controlled.

## 5.6 COMMUNICATION MECHANISMS

Overall communication was thought by most production managers interviewed to be fast and effective.

Current mechanisms for communication include:

- Weekly team leaders meetings;
- Reporting from production managers;
- Reporting from team leaders.
- Reporting from contractors;
- Less formalised meetings such as 'tool shop talk' in whole bird department;

Overtime reports are being trialed in the warehouse for team leaders, who are being encouraged to comment on:

- Staffing levels;
- Quality;
- Equipment;
- Opportunities for improvement; and
- Safety.

If successful, this reporting format could be trialed in other departments.

Involvement of team leaders in cost savings projects has resulted in better ownership of the initiatives and less resistance to communication. Similarly, the recent shift change has necessitated consultation with all staff, and opened up communication throughout the plant hierarchy.

## **5.7 TRAINING**

Human resources is responsible for recruitment, induction and training in Tegel culture. People management projects have been initiated as part of developing systems to support people. This programme provides training for team leaders, and covers:

- training needs of team leaders
- developing a safe and healthy work environment
- generic training needs of staff
- on the job training systems and administration
- how to communicate
- how to develop better teamwork

Health and safety training is being established based on the requirements of the Health and Safety in Employment Act 1992. Personal health is also being emphasised along with general safety by some managers.

Staff are gradually introduced to production under supervision, before being allowed to work without supervision, and ultimately supervise others.

Production managers have all been on production/project management courses.

Waste minimisation awareness is being promoted by production managers to team leaders and to other staff already, with particular regard as to housekeeping, energy and water awareness, as well as safety. Several staff interviewed though overall awareness could be further improved among some workers, and that this should be promoted through increased basic efficiency training.

## **5.8 ENVIRONMENTAL POLICY STATEMENT**

Tegel have prepared a revised draft environmental policy statement March 1996.

Key elements of this statement are:

- Commitment to protection of the environment that control is held over, including not only the sites controlled directly, but also the supplies brought in and to some extent the manner in which products and wastes are ultimately disposed of.
- Recognition of the diversity of the products coupled with the diversity of processes producing them.
- Compliance with relevant legislation and codes to maintain good relations with communities.
- Reviewing and minimising use of national resources such as water, energy and fuel.
- Preventing pollution by regularly reviewing practices.
- Teaching cleaner production techniques to minimise raw material usage and minimise waste production.
- Setting of objectives and targets that concur with the policy while allowing viewing of improvement.

- Ongoing improvement in environmental management and environmental performance.
- Tegel staff, suppliers, visitors and contractors are required to be aware of the policy, and to understand that participation is vital in implementing its intent.
- Environmental performance is to be closely linked with other business systems such as occupational safety and health, and to all business management systems. All decision making processes, including contracts of supply for goods and services must allow consideration for the intent of this policy.
- Appropriate resources will be provided to achieve the implementation of the policy, objectives and targets, including management support, people, training, equipment, facilities, time, technology and research needs.
- The policy is public.

## 5.9 SUMMARY COMPARISON OF EXISTING SYSTEMS WITH CLEANER PRODUCTION MODEL

As can be seen from Table 2, most functions necessary for operation of a Cleaner Production programme are partially or fully fulfilled as part of existing systems. Areas which are not fully covered are:

- The establishment and administration of an ongoing Cleaner Production programme
- Incorporation of environmental criteria in monitoring, project initiation, setting of objectives, and feasibility analyses under the programme.

**Table 2: Comparison of Existing Systems at Tegel Foods Henderson with Cleaner Production Model**

Function	Cleaner Production Party Responsible	Tegel Party Responsible	Comments
Environmental Policy Statement	Management	Management	Developed, ready for adoption
Baseline monitoring	CP team Accounting staff	Project team members Accounting staff	Function fulfilled
Programme administration	CP team	Management	Environmental programme not formalised
Project administration	CP coordinator CP team	Project manager Project leaders	Covered in Tegel project manual
Project initiation	CP team	Project owner	Economically driven, no environmental criteria
Support, resourcing	Management	Executive sponsor	Covered in Tegel project manual
Set objectives and timeframes	CP team	Project owner Project team members	Covered in Tegel project manual, but does not specify

			environmental criteria
Collect detailed information (audit)	Assessment team	Project team members	Covered in Tegel project manual
Generate options	CP team	Project owner	Covered in Tegel project manual
Feasibility analysis	Assessment team	Project manager Project team	Covered in Tegel project manual, but does not specify environmental criteria
Implementation	CP team Other employees	Project team	Covered in Tegel project manual
Monitoring and review	CP team Assessment team	Project manager Project owner	Covered in Tegel project manual, but does not specify environmental criteria. Good information generally exists.

---

## 6.0 DISCUSSION

### 6.1 OPPORTUNITIES FOR CLEANER PRODUCTION

The cost reduction projects for fuel power and services address two key areas that would be targeted by a Cleaner Production programme, these being:

- Reduction in resource use;
- Reduction in waste generation

With these areas already being investigated in detail, there would appear to be few additional steps which could be taken for now.

A recent Pacific Energy Audit found no major areas for improvement in electrical efficiency without changes in plant.

Operational improvements can be, and are being brought about through optimising equipment settings and promoting better practices and waste minimisation to the staff by production managers. The housekeeping aspect generally could be improved through more formalised efficiency/waste minimisation training.

Water is, apart from electricity, the greatest cost to Tegel in terms of resource use, and its disposal as a trade waste discharge is the greatest cost. The overriding consideration for potentially reusing/recycling process water is the need to guarantee hygienic conditions in the production of chicken. This means that potable water must be used through all contact stages, and in cleaning applications. The cost of treatment

on site and recycling of used process water to this standard makes potential for reuse limited, even though environmentally this would be an excellent solution.

By-products such as offal and feathers are converted in animal feed products. This provides income/savings on what would otherwise be a large cost for disposal.

Apart from kraft, solid waste is not separated and is disposed of to landfill. There might be significant potential for reduction of this amount by separation of waste at source, particularly for the cafeteria and offices, into paper, plastics, metals, organic and other. The separated streams could then be better managed according to the waste management hierarchy of:

- prevention/reduction;
- reuse;
- recycling;
- treatment; and
- disposal.

A survey of solid waste composition would be able to determine if this is worthwhile pursuing.

## **6.2 EXISTING SYSTEMS AND CLEANER PRODUCTION PROGRAMME**

Existing systems generally provide good monitoring, communication and training.

Communication may be improved by making more informal input from line staff possible, through suggestion boxes, noticeboards and during team meetings. Publicity of cost reduction initiatives would also better involve all staff in these projects and promote their efficiency awareness of staff. More attention could be given to this during induction as specific environmental/efficiency training.

Most system functions necessary for operation of a Cleaner Production programme are partially or fully covered as part of existing activities. Areas needing more formalisation are:

- The establishment and administration of an ongoing Cleaner Production programme
- Incorporation of environmental criteria in monitoring, project initiation, setting of objectives, and feasibility analyses under the programme.

### **6.2.1 ENVIRONMENTAL POLICY STATEMENT**

This draft policy statement overall sets a clear scope for environmental initiatives. It could be further enhanced by the addition of statements on the following:

- Ultimate goal of zero discharges and emissions to the environment
- Minimising use of non-renewable resources
- Phasing out use of hazardous substances

The objective of “teaching cleaner production techniques” could be modified to put the emphasis on establishing an ongoing Cleaner Production programme.

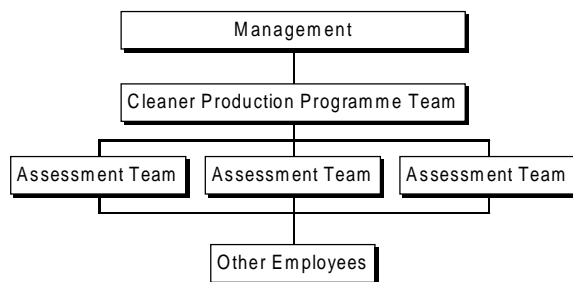
## 6.2.2 CLEANER PRODUCTION PROGRAMME

The Tegel project management manual considers the implementation of individual projects only. A Cleaner Production programme and team would provide an ongoing framework for coordination of individual projects, which would be under the direction of top management once established.

The CP team should include members representing all levels and parts of company:

- Top management;
- Human resources, OSH, production managers;
- Team leaders;
- Line staff.

**Figure 1: Organisational Structure of Cleaner Production Programme**



The multi-level involvement is to promote a forum where ideas from all staff can be received. This is necessary to achieve ownership of the initiatives by everyone, and ensure effective communication.

A possible basis for the team exists as the health safety and environmental team on site, and as project managers of the current cost saving projects. Integrating the two would establish a firm management link between occupational safety and health, environmental management and other business systems as outlined in the draft environmental policy statement.

## 6.3 ENVIRONMENTAL CRITERIA

Environmental performance can be evaluated in terms of:

- Environmental impacts;
- Energy/material/water use;
- Toxicity of materials used;
- Wastes and emissions;
- Occupational safety and health;
- Form in which the waste is produced;
- Toxicity of waste and emissions;

- Regulatory compliance.

### **6.3.1 MONITORING**

Environmental information is required to monitor the criteria above, for:

- Identification of priorities for improvement;
- Setting of objectives;
- Evaluation of options;
- Review of progress

### **6.3.2 PROJECT INITIATION**

The current round of cost saving projects is economically, and not environmentally, driven. While cost savings through resource efficiency tend to promote environmental benefits, such as the reduced environmental impacts throughout the material life-cycle, an economic driver cannot be relied on to achieve progress in all aspects of environmental performance. Specifically targeting environmental performance will enable non-economically based improvements to be made. This can be done by setting objectives based on improvements in the environmental criteria in Section 6.3 above.

### **6.3.3 SETTING OF OBJECTIVES**

Objectives are easier to achieve and measure when well defined, and for this reason it is best if they are quantitative, not qualitative. Goals for reductions in environmental impact based on the environmental criteria above should be set as part of each project.

### **6.3.4 FEASIBILITY ANALYSIS**

Feasibility analysis should consider :

- Environmental;
- Economic;
- Social;
- Technical;
- Legal;
- Occupational safety and health; and
- Overall desirability for those who must live with it.

The current feasibility analysis procedure in the project manual does not directly include environmental performance. This can also be evaluated in terms of the same environmental criteria above.

## **7.0 CONCLUSIONS**

## **7.1 OPPORTUNITIES FOR CLEANER PRODUCTION**

The cost saving projects currently include most significant areas of environmental improvement, these being:

- Reduction of resource use;
- Reduction in waste generation and improvements in management.

Energy use has been targeted through optimisation of equipment settings, elimination of surplus equipment. Little more is possible without changes in equipment.

The nature of the product and process dictate high water usage. Even so, the amount of water use and wastewater production are high priority areas for long-term minimisation. Some results have been achieved in these areas. Further potential for reduction can be summarised in terms the waste management hierarchy:

- Reduction in use from 20-21 litres per bird down to around 14 litres per bird as part of the cost saving projects;
- Reuse in the process is limited by hygiene considerations;
- Recycling of potable water is being implemented for pump cooling water, but the use of potable water for this application could be investigated;
- Treatment of trade wastes to reduce B.O.D. and suspended solids through biological action and screening is being actioned; and
- Residual disposal to sewage system is being reduced in volume and concentration through the above measures.

Similarly, potential for solid waste reduction can be summarised under the hierarchy:

- Reduction in packaging and product waste by reducing rework is under investigation;
- Reuse of containers where possible in the factory found not to be practical, but could be re-evaluated later;
- Recycling of waste kraft by waste contractor, reprocessing of by-products for animal feeds is in place, but other solid waste is not separated which may have potential for recycling;
- Treatment where necessary of solids;
- Disposal to unsorted solid waste to landfill has potential for reduction through source separation and recycling.

Other areas for improvement exist, which although not as significant in economic terms, would serve to further promote environmental awareness within the facility.

These are:

- Double-siding of photocopies and use of recycled paper;
- Eliminating use as far as practicable of disposable items such as foam cups in the cafeteria and offices.

Efficiency training and waste minimisation awareness could be improved, especially for production line staff, and would be best incorporated with induction training, with periodic follow up sessions.

## **7.2 SUITABILITY OF EXISTING SYSTEMS FOR DEVELOPING CLEANER PRODUCTION**

Tegel is already doing much to reduce resource use and waste production. There is room for tuning these measures to better establish a comprehensive approach to environmental management through formalised commitment and systems.

The draft Tegel environmental policy statement of March 1996 is a useful focus for Tegel's approach to the environment. Tegel may consider it appropriate to include the following objectives in the next review of the statement:

- Reducing use of hazardous substances;
- Reducing use of non-renewable resources;
- Achieving an ultimate goal of zero discharges to the environment.

Most essential system components are in place for operation of an ongoing Cleaner Production programme. To best implement this, the following would need to be addressed:

- Establishment of a Cleaner Production team, most likely to incorporate the existing Health and Safety and Environmental team, and the project team members of the existing cost reduction projects;
- Coordination of an ongoing Cleaner Production programme through the Cleaner Production team;
- Incorporation of environmental criteria in setting of project objectives, option generation, feasibility analysis and monitoring;
- Provision of Cleaner Production training as per the environmental policy statement to promote an environmental culture throughout the company.

The establishment of the Cleaner Production programme should be backed up with increased staff training in efficiency and waste minimisation. Additional communication mechanisms such as environmental noticeboards and suggestion boxes may have the potential to better involve staff and improve staff ownership of projects. Recognition for good ideas would also promote involvement.

## **8.0 RECOMMENDATIONS**

### **8.1 OPPORTUNITIES FOR CLEANER PRODUCTION**

It is recommended that consideration be given to the following:

- Existing cost saving projects being incorporated into a Cleaner Production programme, and approached as environmental management projects.
- Reuse of process water for cooling of vacuum pumps, or use of another alternative, be investigated;
- Use of single use cartons for storage of unfinished orders be re-evaluated;

- Separation at source of solid waste into plastics, paper, metals, organic and other categories, as shown to be appropriate by analysis of solid waste composition;
- Double-siding of photocopies and use of recycled paper;
- Eliminating use as far as practicable of disposable items such as foam cups in the cafeteria and offices.

## **8.2 CLEANER PRODUCTION PROGRAMME**

For the purpose of establishing an ongoing Cleaner Production programme, it is recommended that consideration be given to the following:

- The current draft environmental policy statement dated March 1996 be adopted, and possibly revised to include objectives on the use of hazardous materials, non-renewable resources, and an ultimate goal of zero discharges and emissions to the environment.
- A Cleaner Production team is established to coordinate the ongoing nature of the programme. The team will likely incorporate the Health and Safety and Environment Team, as well as the cost saving project managers. Staff from all levels of the factory should also be represented.
- The Tegel project management manual is used for Cleaner Production project management, with environmental criteria being applied in the monitoring, project initiation, objective setting and feasibility analysis stages.

Attention should be given to developing:

- Staff input for project initiation;
- Additional training in waste minimisation and efficiency for staff on induction and regularly;
- Implementation of projects with publicity throughout the facility to gain cooperation of staff.

## **ACKNOWLEDGMENTS**

The Waitakere City Cleaner Production Partnership Programme is assisted by funding from Auckland Regional Council Environment.

The funding provided by the Ministry for the Environment under the Sustainable Management Fund is also gratefully acknowledged.

The author would like to thank the staff at Tegel Foods Henderson for their time and assistance in the CP3 study.

## EXECUTIVE SUMMARY

Tegel Foods Ltd in Henderson has taken part in the Waitakere City Council Cleaner Production Partnership Programme (CP3). The purpose of the programme is to promote the adoption of Cleaner Production in Waitakere businesses through the CP3 workshop and folder, and through site specific advice from a consultant.

Tegel's poultry processing operation was recently expanded and new systems are still being developed to make production more efficient. A number of cost saving and personnel training programmes have been implemented, and targets for significant costs savings have been set.

This report is intended to review the operation of the facility and suggest:

- Areas where specific improvements in environmental performance may be targeted;
- Areas requiring special consideration when establishing a Cleaner Production programme.

The study methodology used in production of this report consisted of:

- An initial meeting with production managers to outline the CP3 programme and discuss existing initiatives;
- Two site walk-throughs, noting relevant information;
- Individual interviews with production managers, noting performance of existing monitoring, information and training systems;
- Consideration of related documents such as the draft Tegel environmental policy statement and Tegel project management manual.

This information was evaluated to determine options for Cleaner Production, and the approach that would be best used for establishment of a Cleaner Production programme.

Resource use and waste production is comprehensively monitored. Communication systems are generally fast and effective. A wide range of staff training exists, but there was found to be a need for further waste minimisation and efficiency training.

The cost saving and other projects address most aspects of Cleaner Production already, being:

- Reduction in resource use; and
- Reduction in waste production and improvement in waste management.

There were few areas identified for immediate improvement which were not the subject of investigation already.

Existing systems were found to be suitable for establishment of a Cleaner Production programme, with modifications to project management guidelines to include environmental criteria in monitoring, project initiation, setting of objectives and feasibility analysis. Additional objectives were identified which could be incorporated in the draft environmental policy statement.

Key recommendations for cleaner production opportunities include:

- Incorporating cost saving projects into a Cleaner Production programme;
- Alternatives investigated to the use of potable water for vacuum pump cooling;
- Evaluation of alternatives to single use cartons for storage over weekends;
- Separation at source of solid waste, as shown to be appropriate by a waste analysis survey;
- Double-siding of photocopies;
- Elimination of the use of disposable items as far as practical in the cafeteria and offices.

Key recommendation for establishment of a Cleaner Production programme are that consideration be given to:

- Adoption of the draft environmental policy statement, with possible inclusion of several other objectives;
- A Cleaner Production team is established to coordinate a CP programme, based on certain existing systems;
- Use of the existing project management with modification to include environmental criteria.

Attention should also be given to additional staff input in initiating projects, increasing staff training in efficiency and waste minimisation, and publicising implementation of projects throughout the facility to gain cooperation of staff.

### **COPYRIGHT CLAUSE**

This work is copyright. No unauthorised copying, adaptation or issuing of this work to the public is permitted without the prior consent of the author except where its copying, adaptation or issuing is undertaken on a non-profit basis.

