final report

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Generic manual for development of environmental management systems at meat processing plants in Australia

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FOREWORD

This manual has been prepared as part of a project (RPDA.302) commissioned by Meat and Livestock Australia (MLA) to develop a tool for the implementation of Environmental Management Systems within the Meat Processing Industry.

Initially this document has been trialed at four meat processing facilities in the following companies:

- SBA Foods Pty Ltd
- Burrangong Meat Processors Pty Ltd
- Metro Meat International Pty Ltd
- Australian Meat Holdings Pty Ltd

These sites were supported by Dames and Moore Pty Ltd in their development of their systems.

The trialing of this tool at the sites has provided example material such as; procedures, forms and flow diagrams. A compilation of these examples is provided in a second volume to this manual.

The final manual is offered to all organisations and facilities within the meat processing industry so they can develop and tailor their own Environmental Management System to their specific requirements with minimal external assistance.

The MLA take this opportunity to thank the sites involved for their participation in the trialing of this generic manual.

EXECUTIVE SUMMARY

This tool has been developed to facilitate the development of an Environmental Management System (EMS) at meat processing facilities. If all the components are developed and sufficient support is provided to the staff so that they follow the requirements, an EMS compatible with the International Standard ISO14001 can be developed.

The benefits of having such a system are numerous. The following quotes are from meat industry managers that have followed the approach spelt out in this tool:

- *"Complaints have dropped"*
- *"The system documents are a very useful tool for new managers"*
- *"The EPA are talking about deleting parts of our license now"*
- *"This project has started a culture change towards using systems in environment, safety and quality"*
- *"The EMS will help with litigation – not that we need that now!!"*

As you can see the results can be very beneficial and far-reaching.

To start, nominate a champion to start the process, allocate some time each week for them to develop frameworks and above all be involved and provide support and encouragement. A step by step guide to the development of an Environmental Management System as detailed in this manual is provided in Section 1.3.

You can expect the documentation to be produced in 4-6 months depending on the availability of the key personnel. It will probably take over 12-18 months to develop the system to a point where it is being followed by most employees and that the more advanced elements of the system are actually being used.

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1. GENERAL GUIDANCE FOR USE

1.1 INTRODUCTION

It is the intention of this document to provide the companies involved in the processing of livestock to meat product with sufficient information to develop an Environmental Management System compatible with ISO 14001 to the extent necessary for their circumstances.

The successful adoption of environmental management practices provides benefits that enhance environmental performance, financial performance and aid in controlling both corporate and environmental risks.

A management system is the framework that provides the tools for an organisation to manage its **processes** and **people** to achieve its environmental objectives and targets in the most efficient manner. Generally, Environmental Management Systems include; organisational charts, environmental policies, procedures and planning for development and implementation, practices, checklists, audits, reviews and avenues for continual improvement.

Therefore, a formal Environmental Management System is a combination of:

- Process
- People
- Paper (documentation in paper or electronic form)

As processes are generally different between organisations and the role and interactions between people are generally different between organisations it is impossible for a 'generic management system' to be developed which can be purchased "off the shelf". Any attempt to use such a system usually leads to a management system being developed which does not reflect the organisation's need to manage the processes, people or information. It is no wonder that these types of generic management systems are perceived to be systems that just create paper and do not add value to the organisation.

However, a 'generic management system implementation tool' outlining generic management principles can be developed and can form the basis of an organisation's site specific Environmental Management System. The key to the successful translation of the generic system to an organisational or site specific management system is input from people within the organisation or the site on specific aspects of the process, people and information.

This generic manual, commissioned by Meat & Livestock Australia, aims to provide generic environmental management principles and give guidance on how an organisation, by considering specific processes and information requirements, can develop an effective site specific Environmental Management System with a minimum of effort. As such this manual should be seen as a tool to help meat processing sites to develop an Environmental Management System sufficient for their needs. Therefore, a meat processing company should be able to follow the steps outlined in this manual, and develop an Environmental Management System which is suitably integrated into existing systems and which the site feels the necessary level of ownership. In so doing, this manual allows the company to decide the goals, scope, focus and level of complexity of their Environmental Management System by providing the management tools and guidance around what will be an acceptable minimum in most circumstances.

The initial question is "What are the overall requirements needed for the Environmental Management System faced by the organisation?" This manual is aimed at developing an Environmental Management System compatible with ISO 14001.

Where ISO 14001 is the goal, there will be a need for the development of procedures, documents and records as specified in the ISO 14001 standard. By following the steps outlined in this document and recording the process in the format of a formal procedure and by adopting strict document control the main requirements of ISO 14001 will be accomplished.

1.2 THE MANUAL

It is recommended that you read Section 2 of this manual before proceeding any further with the development of your Environmental Management System. After reading this Section you should be able to define the following:

- to what extent you wish to integrate your Environmental Management System into existing management systems;
- whether a goal of the Environmental Management System is to achieve certification with ISO 14001;
- what it means for your Environmental Management System to be able to satisfy minimum environmental requirements such as legislative requirements;
- the overriding goals of why you are developing an Environmental Management System; and
- the scope of your operations that you wish to be controlled by an Environmental Management System.

With these critical aspects of the Environmental Management System determined, the rest of the Manual outlines and gives guidance on how you can develop an Environmental Management System to meet your needs.

The manual is a self-help guide and as such gives guidelines, examples and suggested actions for developing your Environmental Management System. It should be thought of as a template to kick-off the thought processes needed to implement Environmental Management Systems and as such you should edit the format of the templates used in the manual to suit your operations. You are encouraged to think laterally about the examples and prompts to ensure that you consider all the issues relevant to your operations and to ensure that you get most out of the Environmental Management System developed.

You will need to decide how much you want to integrate your Environmental Management System into existing systems. There may be reasons for duplicating system elements, for example between the MSQA system and the Environmental Management System so those external monitoring requirements are not affected. Where groups such as AQIS monitor operations it is probably worth consulting them on how best to use existing systems without jeopardising accreditation.

One of the main focuses for this tool is to allow the development of an Environmental Management System using techniques and concepts that will be familiar to food industries. The Hazard Analysis and Critical Control Point (HACCP) methodologies make up a key part of the MLA generic Environmental Management System (see Section 5.0). It is anticipated that you will find the method familiar and that all will be needed is to revisit the approach from an environmental viewpoint. This tool builds on the HACCP concepts by integrating and including principles from risk management and the ISO 14001 standard.

1.2.1 The Manual Format

The format of each chapter of this manual is as follows:

1. A "Key Points box" at the start of each chapter provides a brief summary of the key points covered in the chapter.

2. The text describes the requirements of the section including actions to be taken, responsibilities to be assigned, procedures to be written and background information to direct. Where appropriate, both blank and completed forms will be provided. These may be useful in thinking of how to develop your forms, or they could be used as they are.

3. A Checklist of actions to ensure the objectives of the chapter are met.

A separate manual has been provided which provides examples of the documentation created at some of the sites involved in piloting this tool. The purpose of these examples is to allow you to 'see' the detail of how other companies have developed each of the specific requirements of an Environmental Management System.

It is important that the examples provided are used as examples only and that they are not used as a direct templates to be copied. It is essential that you develop your own system components and that you use the examples to stimulate your thoughts on how the concepts apply to your facility.

This document should be used as a guide only. Neither the MLA nor its consultants involved in the preparation of this manual accept any responsibility or any liability incurred as a result. The steps outlined are just that – they are steps recommended to develop an Environmental Management System. The degree of diligence in which the steps are followed and the levels of experience and expertise which the personnel involved exhibit will dictate the comprehensiveness and suitability of the Environmental Management System that is developed.

1.3 SUGGESTED STEPS FOR DEVELOPMENT OF YOUR EMS

It is recommended that if you are starting to develop an EMS for the first time that you follow the following steps. If you are modifying an existing system to conform to the requirements of a robust ISO 14001 compatible system then it will be obvious to you, which steps you need to take and which will have already been achieved.

Step 1: Ensure that you have nominated an appropriate group or individual to develop the system. This group should include individuals who are worth investing in and who understand the processes and systems that the company operates. It will be important in the later stages of the system development that this group can communicate the systems requirements to the other employees in a coherent and authoritative manner.

Step 2: Ensure that although the team are busy that they have sufficient time to actually do something on this project without too many conflicting demands

Step 3: Ensure you understand the goals of your system (Section 2.4)

Step 4: Develop an Environmental Policy (Section 3)

Step 5:	Develop a Legal Register (Section 4.1)
Step 6:	Develop environmental process flow diagrams (Section 5.1.2)
Step 7:	Decide the basis of your risk assessment method (Section 5.1.5.1 and 5.1.5.2)
Step 8:	Conduct an environmental risk assessment of the site (Section 5.1.5.3)
Step 9:	Identify Environmentally Critical Control Points (ECCPs) (Section 5.2)
Step 10:	For each ECCP fill out the Risk and Control Strategies Table (Table 5.9). This will mean implementing Sections 5.3 – 5.9
Step 11:	Define Internal Responsibilities and Authorities (Section 6.1)
Step 12:	Establish internal and external communication routes (Section 6.2)
Step 13:	Start developing Operational Control procedures for the ECCPs (Section 11.1)
Step 14:	Start developing monitoring procedures for ECCPs (Section 11.2)
Step 15:	Establish improvement-planning goals and allocate responsibilities for their achievement (Section 7)
Step 16:	Establish a Non-Conformance reporting system (Section 12)
Step 17:	Establish a system for controlling documents and records (Section 9)
Step 18:	Develop an environmentally focussed emergency control plan (Section 10)
Step 19:	Train the workforce on the new system requirements (Section 8). This training can be started after Step 10 if you see fit.

You can expect:

Steps 1–4 to take several weeks.

Step 5 will probably take several weeks.

Steps 6–10 will take several weeks for all the information to be pulled together.

Steps 11-14 will take several months.

Steps 15-18 could take up to a month each, especially where agreement with other departments may be required.

Step 19 will take several months of initial effort and then ongoing maintenance and attention.

2. DEVELOPING AN ENVIRONMENTAL MANAGEMENT SYSTEM

Prior to embarking on the development and implementation of an Environmental Management System, it is worth becoming familiarised with the experience of others who have been involved in Environmental Management System implementation. This section discusses considerations from others so that potential issues may be identified early without significant cost or other implications.

It considers the key points in implementation of Environmental Management Systems, lessons to be learnt, points from successful management systems and fundamental principles of Environmental Management.

The MLA hope this tool will be pivotal in the meat industry developing management systems compatible with ISO 14001.

The ISO 14001 Standard for Environmental Management System is an important benchmark in the design and implementation of any Environmental Management System. Many companies will want to develop an Environmental Management System along the principles of the standard, in order to become certified with the standard. In this section the standard is discussed in detail, so that an informed decision can be made about the benefits of this approach and the requirements to achieve this.

Many companies have existing Management Systems. It is important to develop your Environmental Management System in coordination with these, so that the benefits of the existing systems can be gained, and that no duplication of Management System occurs.

2.1 KEY POINTS REGARDING ENVIRONMENTAL MANAGEMENT SYSTEMS

2.1.1 Considerations to be Aware of when Developing your Environmental Management System

The consensus of the companies involved in piloting this tool was that if you bother to formalise your EMS then you should ensure that it is compatible with ISO 14001. In this way they have found it beneficial to be able to go for certification or external audits from customers rather than developing a system which, although functional, does not allow these benefits to be reaped.

The benefits that are possible from developing an EMS are numerous and include the following that were experienced by the sites that participated in the piloting of the tool:

- Relationships with the Environmental Regulatory bodies improved to the point where deletion of license requirements is possible;
- The number of complaints dropped significantly;
- New waste management practices have been adopted;
- Environmental awareness has been raised so that everyone is working together to prevent problems;
- More defined operational control and monitoring procedures;
- Improved internal and external reporting;
- Improved documentation for due diligence purposes;
- Better understanding of processes through analysis;
- Better understanding of legal requirements;
- The documentation developed as part of the system will help with potential litigation;
- Site and corporate management feel confident about risk management;
- The EMS has started a culture change towards systems management with benefits in quality and safety;

- The system has proved invaluable in training new managers; and
- The EMS has been integrated into the quality management documentation (e.g. MSQA).

It is worth understanding why some management systems have failed to deliver real benefits so that you make sure these failures are not repeated at your company.

Firstly, many organisations did not embrace the true purpose of the various management system philosophies. No where does this appear to be truer than in relation to ISO 9000 quality systems. For many organisations that sought to develop quality systems, the sole motivation was to satisfy the purchasing requirements of their major customers, principally government. Under such circumstances, the real goal of quality assurance, that is to assure customers of reliable supply, was often lost to the 'artificial' goals of paperwork generation and control and of course certification. When governments and other major buyers subsequently lost a degree of interest in the need for their suppliers to be quality assured, many of these organisations came to resent or even abandon their ISO 9000 systems. The lessons to be learnt are that it is important to have worthwhile and sustainable objectives in the development of your Environmental Management System, otherwise, no benefit will be gained and the system is likely to be abandoned.

Secondly, many employees saw the push towards management systems as a shirking of responsibility, either on the part of government or their employers. The workplace health and safety legislation of the 1980s for example clearly shifted the onus of responsibility onto employees themselves. There is at least one industrial company that spent a large amount of money placing signs on every mirror. The signs were, and remain, quite common and said, 'You are looking at the person who is responsible for your safety.' Unfortunately this particular company had to spend more money removing the signs because they had all been 'edited' by employees. Beneath each sign was printed, 'Only because the company doesn't care.' The lesson is that the corporate management need to involve their staff in the development of the system, so that they take on board responsibilities that they agree to and, through participation in the system will benefit more from it, as inevitably will the company.

Thirdly, the benefit of the introduction of management systems was all too often overstated. For example implementation of a quality system would yield an increase in productivity of between 30 and 40%. Of course, when developed systems failed to deliver anywhere near these results, organisations were understandably angry. This is not to say that management systems have not delivered benefits. Clearly they have. The lesson is to identify clear and realistic goals for your management system.

Finally, many organisations feared the very nature of change itself. For these organisations, the best way to implement a management system was to simply document current practices in such a way that compliance with the standards and legislation was achieved. The objective of the implementation process was to achieve compliance with the least amount of disruption to the traditions of the organisation. Customers were still not satisfied and employees kept getting hurt, but compliance was achieved. The lesson is that through implementation of a system, benefits should be real. It is an opportunity to improve business and work practices to improve the bottom line, whether this be measured in dollars, environmental improvement or reduced accidents.

All too often, audits constitute nothing more than a verification exercise to confirm that developed procedures are complied with. The substance of the output appears in many cases to be irrelevant. There are many organisations that have struggled to implement ISO 9000 systems. The problem is that management openly did not support the project. Certification audits are conducted and the actual quality of service or product has not improved or is not even good in some cases. Often the results of the certification audits are that minor non-conformances are received and certification is achieved at the first attempt. Clearly in these instances, which are by no means uncommon, compliance with the system is important and performance is not. While the Certification Companies have obtained happy clients, the general disillusionment generated by the granting of certification is high.

In addition to certification to quality standards, the same criticisms can be levelled at Environmental Management Systems, if similar mistakes are made. It is important that in implementing and Environmental Management System, the objective should be in adding value to your activities and organisation.
The management system report card is not all bad however. There exists across all industries, both public and private, examples of organisations that have realistically embraced the philosophies of management system control and have been subsequently rewarded. So what distinguishes the successful organisations from the rest?

Environmental Management Systems tend to fail if the people who operate them see them as:

- a burden rather than an opportunity;
- something which constrains the way they work; and/or
- largely unnecessary.

This usually arises from:

- failure to communicate the purpose of the Environmental Management System;
- not having a clear objective that is adding value to your organisation;
- unrealistic targets or overly limiting work practices;
- failure to recognise local or departmental differences;
- using the Environmental Management System as a control tool rather than a method for enabling the business to meet market demands; and
- failure to manage implementation so that some early benefits are achieved through business development or cost reduction.

2.1.2 Successful Management Systems

Many Environmental Management Systems have directly or indirectly, lead to substantial savings of costs and reduced environmental impacts. An example of this was Bonlac, who through identifying wastes being an issue in their Environmental Management System, implemented waste minimisation techniques which saved valuable product, reduced chemicals use and minimised waste effluent volumes. This lead to cost savings in excess of $100,000 per year.

Successful management system operators embrace the following:

It should be remembered that the management system should be subservient to the organisation, and not the organisation to the system. Successful management systems do not impose on the organisation, but rather support it and add value to it. Procedures exist for sound business reasons and not simply to satisfy an over-cautious consultant or system manager.

No matter how well formulated, documented and resourced the system is, at the end of the day success is totally dependent on people.

This means that without the support of employees, any management system will fail to achieve its potential. Employees therefore need to be meaningfully involved in system design and maintenance.

Environmental Management principles include the principle of continual improvement. To do this, environmental objectives are set, and actions planned to meet these objectives.

1) System objectives must be SMART: Specific, Measurable, Achievable, Realistic and Traceable. The concept of SMART system objectives means that the expected results of the system are drawn from the organisation's strategic plans, are well communicated to all employees and are subject to continual performance measurement.
2) Management must not be merely committed - they must be involved.
3) All system costs and achievements are known and evaluated. This is important in assessing the success of the system, which, if judged to be adding value, will help to ensure the continuation and longevity of the system.
4) The operation of the environmental management system is seen as supporting core business activity. This concept is in many ways the most important. For safety, quality and environment management systems to succeed, they cannot be simply 'tacked on' to the organisational chart as separate entities. The basic objectives of quality systems, ie. to satisfy customers; safety systems, ie. to not injure workers, and environmental management systems, ie. to conduct business in an ecologically sustainable manner strike at the very heart of long term business survival.

As such, the driving force for maintenance of these management systems must be entrenched in the organisation's fundamental strategic planning and resourcing.

2.1.3 Some Fundamental Principles

All management systems contain three essential components. These three facets have been dressed up in a multitude of ways since the management systems were first defined. They apply to financial, personnel, safety, and quality and of course to environmental management systems. While the basic steps are fundamental and appear quite simple, many organisations fail to follow these principles and the management system as a result is not as successful.

This manual is to assist people to use the basic principles and achieve a successful outcome for your Environmental Management System.

The first essential component of a management system is the *identification* of the issues that must be controlled. In an Environmental Management System these are the risks that the company faces under the banner of the environment. These include the usual suite of issues such as regulatory compliance, ground contamination, pollution of watercourses, air pollution, and ecological damage and neighbours complaints. However, increasingly companies are including the following types of business risk issues among those they include under the heading of environment:

- Director liabilities;
- Employee liabilities;
- Project delays;
- Project overruns;
- Customer complaints;
- Managerial time spent dealing with neighbours, regulators etc on environmental issues;
- Asset value;
- Raw material sourcing;
- Just in time philosophies to reduce on site storage;
- Fire risks;
- PCB leaks from transformers or other equipment;
- Plant emergencies (eg. spills of tallow, ammonia etc)
- Stormwater flows;
- Erosion of land (Landcare issues);

- Product contamination;
- Longevity of materials;
- Cost and bottom line profiteering; and
- Property loss.

Experience in implementing management systems has shown that the more that cost and liability issues are included in the management system the more it will be accepted by middle management. By introducing these concepts comprehensively, the Environmental Management System will become a system which is seen to be part of the operating system of the site and the less it is seen as a system for managing the sometimes negligible environmental effects caused at a site level.

The second essential component is to *plan* what needs to be done to control the issues identified. This planning is nothing more than established project management techniques and allows desired and predefined goals to be met in a timely and controlled fashion. This planning recognises the old adage that Rome was not built in a day and that the desired level of environmental performance will probably be some way off and cannot be achieved straight away. It recognises that in planning, consideration needs to be given to people, finances and technical aspects.

The third essential component is the *implementation* of the plan. Often this stage of management system development is omitted or it is assumed that it will occur on its own. It will not. The implementation phase is the communication of the planned requirements and the process by which people change their ways of working. It should be remembered that people are often resistant to change and that this process must be handled sensitively if it is going to be successful.

The last essential component to the management system is the *checking* that management must do to ensure that the planned arrangements are being adhered to and are working. The fact that this evaluation must include a review of the effectiveness is important and must not be forgotten. Audits and reviews that merely check adherence to procedures often do more harm than good. They need to ensure that the management system is working effectively according to goals, objectives and targets of the system.

This manual is designed to ensure that you follow these principles and you should see an underlying trend which requires identification of an issue, through to planning how it will be managed, to managing it and finally checking it is being managed properly.

In developing the sections contained in the manual, each element of your Environmental Management System should be developed with these principles of Identify, Plan, Implement and Checking as a basis. They should be considered with respect to the three parts of any management system, these being people, process and documentation.

2.2 THE ISO 14000 SERIES STANDARDS FOR ENVIRONMENTAL MANAGEMENT SYSTEM

The International Standard ISO 14000 Series provides guidance on the development and implementation of environmental management systems and principles, and their co-ordination with other management systems. The guidelines are applicable to any organisation regardless of size, type, or level of maturity, that is interested in developing, implementing and/or improving an environmental management system. In Australia, the ISO 14001 Standard has been the Environmental Management System standard adopted by certification bodies.

ISO has issued a number of standards for environmental management, in particular:

ISO 14001	Environmental Management Systems – Specification with guidance for use
ISO 14004	Environmental Management Systems - General Guidelines on Principles, Systems and Supporting Techniques
ISO 14010	Guidelines for Environmental Auditing - General Principles
ISO 14011	Guidelines for Environmental Auditing - Auditing Procedures - Auditing of Environmental Management Systems
ISO 14012	Guidelines for Environmental Auditing - Qualification Criteria for Environmental Auditors

2.2.1 The ISO 14001 Standard

The introduction to the ISO 14001 Standard (printed at the front of the Standard) recognises those environmental audits and reviews may not be sufficient to guarantee that an organisation not only meets, but also continues to meet, its legal and policy requirements. To be effective, such audits and reviews need to be conducted in the context of a structured management system and integrated into overall management activity. The role of the ISO 14001 Standard is to provide organisations with guidance on the elements of an effective management system. The Standard has been designed to be applicable to all types of organisations, and is based on the previously discussed methodology of Identify, Plan, Implement, and Check.

The basis of the Standard is continuous improvement based on the following model.

Policy Development

⇓

Planning

⇓

Implementation and Operation

⇓

Checking and Corrective Action

⇓

Management Review

The Standard provides a more detailed specification on the components of each of these elements and these are described briefly below. However, the Standard does not include any performance specifications.

The environmental policy must be relevant to the scale and nature of the organisation's activities and must include a commitment to continual improvement, prevention of pollution and compliance with relevant environmental legislation and regulations. This policy must be communicated to all employees and be publicly available.

The first stage in planning is that organisations ***identify*** the environmental aspects of those activities, products or services that it can control or over which it can be expected to have an influence. Organisations also need to develop a procedure to ***identify*** and update legal and other requirements relevant to the identified environmental aspects. Information on the environmental aspects and the legal requirements is to be kept up to date. Based on the significant aspects, the environmental policy and the

legislative requirements, objectives and targets need to be developed and an environmental management ***plan*** or programme developed to ensure that these objectives and targets are met.

The process of ***implementation*** of the Environmental Management System should involve the definition of roles, responsibilities and authorities necessary for effective environmental management, including the provision of resources necessary for the effective implementation of the system. This includes appointing specific management representatives responsible for ensuring the system requirements are established and maintained and responsible for reporting on the performance of the system to senior management. Training needs should be identified and the organisation should ensure that all employees whose work may create a significant impact on the environment have received appropriate training. Procedures for internal and external (for example, regulatory bodies) communications should be developed and implemented. The organisation should document the system and establish document control procedures. The organisation shall identify those operations and activities associated with the identified significant aspects and develop and implement procedures to ensure that these operations and activities are conducted under specified conditions. Procedures should be developed for accident and abnormal operating conditions as well as for routine operations. In addition, procedures for responding to accident and emergency situations should be established and maintained. These procedures should be reviewed, and revised if necessary, after the occurrence of accidents or emergency situations.

Checking and corrective action involves the monitoring and measurement of the key characteristics of the organisation that can have a significant impact on the environment. Such monitoring should include the tracking of
performance and conformance with the organisation's objectives and targets. In particular, monitoring should include the periodic evaluation of compliance with relevant environmental legislation and regulations. Checking and corrective action should also include procedures addressing the handling and investigation of non-conformances, environmental record keeping and auditing of the environmental management system. Auditing of the system should include assessing whether or not the environmental management system conforms to planned arrangements and has been properly implemented and maintained.

Finally, there should be, at suitable intervals, a review of the environmental management system by the organisation's top management to review the overall effectiveness, adequacy and suitability of the system.

2.3 COMPATIBILITY WITH EXISTING MANAGEMENT SYSTEMS

You will find that some of the requirements for your Environmental Management System will already be in place.

It is likely that some of the systems developed for the control of quality of your product will be applicable for the Environmental Management System. There may be a need to revise the quality control systems so that they can integrate the environmental issues but the fundamental systems may be appropriate. The same may be true for safety management systems. The sites that have used this tool in the pilot programme found that there were considerable benefits to be found by integrating the EMS documentation and training into the quality systems. This was most apparent for those sites operating under MSQA stipulation.

One of the main focuses for this tool is to allow the development of an Environmental Management System using techniques sand concepts that will be familiar to food industries. The Hazard Analysis and Critical Control Point (HACCP) methodologies make up a key part of the MLA generic Environmental Management System (see Section 5.0). It is anticipated that you will find the method familiar and that all that will be needed is to revisit the approach from an environmental viewpoint.

2.4 UNDERSTANDING THE GOALS OF YOUR SYSTEM

Understanding the overriding goals of your Environmental Management System will ensure that they are met. This may sound obvious but it is common place for middle managers to be given the task of developing an 'EMS' and to do so without really understanding why. This situation will lead to changes being required of other members of the workforce that will seem bureaucratic and unnecessary.

It may help to ask the following questions:

- Is the primary focus of the Environmental Management System to ensure compliance with legislation?
- Is the primary focus of the Environmental Management System to ensure that a management system is developed which is compatible with ISO 14001?
- Is the primary focus of the Environmental Management System to gain certification to ISO 14001?
- Is the primary focus of the Environmental Management System to solve particular environmental issues facing the site?
- Are there any customers, regulators, corporate managers or any other party interested in the outcome of your Environmental Management System? If so, what are they?

The following questions, related to environmental performance, may assist in identifying how the Environmental Management System may help at your facility:

- Do you need to generate environmental performance statistics for any reason (external or internal)?
- Do you know the extent to which environmental issues could cost the company?
- Do you know the extent to which the company directors, managers and employees are liable for polluting or potentially polluting events?
- Do you know if there are any issues that could arise that will cause problems for the company as a result of environmentally related practices in the past present or future?
- Are environmental issues costing the company too much to be treated separately from the other issues that managers face and control on a day to day basis?

The answers to the above questions should provide you with enough information to decide why you are developing an Environmental Management System and in which areas it will need to focus.

The MLA and the companies that have been involved in the this project and have developed environmental management systems as a result feel very strongly that if you develop a system it should be made compatible with ISO 14001 even if you do not wish to achieve certification immediately.

2.5 DEFINING THE SCOPE OF YOUR ENVIRONMENTAL MANAGEMENT SYSTEM

If you are intending having your Environmental Management System certified to ISO 14001 it will be important for you to have defined the scope of your Environmental Management System. Strictly speaking your Environmental Management System should cover all of your operations of which you have control and indeed the certification body will expect that to be the case unless you inform them otherwise.

People and organisations that may be under your companies' control include:

- Employees;
- Contractors; and
- Suppliers.

This requires then that concepts of Life Cycle Analysis (LCA) or the cradle to grave impacts of your products and operations be managed as part of the Environmental Management System.

The certification body that you choose to provide you with your certification is likely to expect that you have included your operations that could lead to environmental harm in the scope. For example a scope which includes all your operations except for the effluent treatment plant or rendering plant may be considered suspect.

However, the certification process can be a long one and certification bodies are accustomed to companies having only parts of their operations certified. For example, a forestry company could choose to have only the lumber processing plant certified and exclude the transport and deforestation.

You should answer the following questions as part of your definition of scope for your Environmental Management System:

- Is there a customer or regulator requiring you to develop a certified Environmental Management System? If so, what is the scope or standards they require?
- Do you wish to include the following in your Environmental Management System:
  The livestock storage and handling areas?
  Any transport operations you own (ie. delivery of livestock or cut meat)?
  The farmland you own for irrigation?
  The farmland you use for irrigation – eg. neighbouring properties?
- Do you wish to include safety management in the scope of your Environmental Management System? If so, this tool will not suffice to develop an integrated safety and environmental management system but many of the concepts could be used. You may find that you can save much time and effort by identifying and managing safety issues at the same time as environmental issues.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have: • **An improved understanding of what factors will affect the successful development of your EMS** • **Have a clear understanding of the ISO 14001 series** • **Understood that you can integrate your EMS into existing management systems** • **Defined the scope and goals of your system**		

3. CORPORATE ENVIRONMENTAL POLICY

The Policy should be thought of as the documentation of the environmental strategy for the company. This section examines the role of an environmental policy and options for environmental policies to be implemented. It covers:

- **Defining requirements of your Environmental Policy;**
- **Defining what should be in your Policy;**
- **Guidelines for Policy development; and**
- **Communication of the Policy internally and externally.**

3.1 DEFINING THE NEED AND SCOPE OF YOUR ENVIRONMENTAL POLICY

The first essential part of any Environmental Management System is a "commitment" to the concept of having an Environmental Management System, and then a commitment to the methods developing the system, ie as discussed in Section 2, the identifying, planning, implementing and checking phases of the Environmental Management System.

The Environmental Policy is the documented expression of this commitment, to employees, suppliers, contractors and the public. It states how, through a management system, the Company plans to manage its impacts on the environment. It provides a focus and direction for the environmental efforts of the Company. The policy must be defined by top management, without such a commitment by top management, it cannot be expected that the employees of the company will take any notice of, or participate in, environmental initiatives.

The Policy describes the overall performance goals which have been established for a site against which all subsequent actions can be judged and provides a framework from which to develop the Environmental Management System. It also defines the scope of the Environmental Management System, such as defining what areas of a facility, or an organisation will be covered as part of the system.

The Policy can also be a means of expressing corporate commitment to other voluntary requirements. For example, if say the Company has signed onto the Greenhouse Challenge Agreement with the Federal Government, then the Policy should reflect such requirements.

The ISO 14001 Standard requires that *"Top management shall define the organisation's environmental policy and ensure that it:*

a) *is appropriate to the nature, scale and environmental impacts of its activities, products or services;*
b) *includes a commitment to continual improvement and prevention of pollution;*
c) *includes a commitment to comply with relevant environmental legislation and regulations, and with other requirements to which the organisation subscribes;*
d) *provides the framework for setting and reviewing environmental objectives and targets;*
e) *is documented, implemented and maintained and communicated to all employees; and*
f) *is available to the public.*

3.1.1 Issues to be considered in an Environmental Policy

Details of the scope of the environmental issues to be covered in the Policy and the areas of your organisation can be included in the Policy. Many types of issues can be considered for inclusion in your Environmental Policy. Some of these are listed below. Whilst all should be considered, many are a requirement to be included in any Policy where ISO 14001 is used as a model, such as regulatory compliance.

Considerations for inclusion in any Environmental Policy:

- liquid waste minimisation - reduction, recycling, reuse of liquid wastes;
- solid waste minimisation - reduction, recycling, reuse of solid wastes;
- consumption of raw materials and natural resources - materials, fuels, energy;
- generation of pollutant discharges - reduce or eliminate;
- product design - minimise environmental impacts of production, use, disposal;
- purchasing - identify impacts of raw material production, alternate sourcing;
- planning and development - minimise adverse impacts of expansion;
- ecologically sustainable development;
- regulatory compliance;
- performance evaluation criteria and procedures;
- education and training;
- emergency procedures;
- technology transfer - seek out better methods; and
- community communication/relations.

In addition to these considerations, it is considered that a successful Environmental Policy is likely to:

- be developed, actively supported and implemented by the Board of Directors (if one exists), the General Manager and the Division Managers;
- usually be formatted to fit on one piece of A4 paper;
- be dated and signed by the Chief Executive Officer or the equivalent on site;
- **NOT** commit the Company to objectives or actions, which the Company is not reasonably able to achieve or which require resources, which cannot or will not be made available. Over commitment will result in loss of credibility with employees, customers and external interested parties;
- be consistent with existing Corporate Policies, such as the Quality Policy;
- include a clear statement of intent to comply with all applicable legislative and regulatory requirements and with external and internal standards and codes of practice adopted by the company from time to time;
- commit the Company to provide the resources necessary to achieve the stated objective/s. Such resources may be human, financial, or physical; and
- be made available for public distribution. It could be included in each annual report and copies made available to customers and to the public on request. It should be provided to suppliers as a demonstration of the Company approach to management of environmental issues.

3.2 DEVELOPING YOUR POLICY

3.2.1 The Minimum Requirements for your Policy

In developing your environmental Policy the minimum requirements can be split into four categories:

That the Policy is appropriate for the industry and the activities carried out at the site;

The Policy needs to incorporate all activities and operations undertaken by the Company at the site for which the Environmental Management System is to be developed. This is so that the Policy is representative of the industry and company for which the Policy has been developed. For example, if the site has irrigation of effluent or contains a farm area then the Policy may need to cover aspects related to these operations.

That the Policy contains specific commitments;

A commitment relating to continual improvement of the system and environmental performance required to be included in the Policy. This commitment implies an understanding of methods that could and will be used in the future to improve the environmental performance of the site and reduce pollution from the site.

A commitment needs to be stated for meeting all relevant environmental legislation, codes and industry body requirements and other voluntary agreements or the general minimisation of the site's environmental impact such as waste generated.

A commitment to the prevention of pollution should also be included in the Policy.

As stated in the Standard, the Policy should provide a framework for setting and reviewing environmental objectives and targets. Options for this are:

- to state that there will be a formal management system for setting and maintaining environmental objectives;
- stating the method to be used for setting objectives and targets; and
- stating that environmental improvement goals will be developed as part of the Environmental Management System.

That the Policy is documented and communicated to all employees and available to the public;

The Policy needs to be communicated to all employees and be available to the public. Methods to communicate the Policy to employees include:

- handing the Policy out to all employees; and
- displaying the Policy in sufficient communal and pedestrian traffic areas in Company facilities so as to ensure that all employees are exposed to it on a regular basis.

The policy can be made available to the public by displaying the policy in public foyers, including in the company annual report and/or making it available on request when the public calls in.

That the Policy is implemented and is reviewed for its appropriateness

The rest of the Environmental Management System should provide evidence that the Policy is being implemented. The management review function should ensure that the Policy continues to be appropriate for the organisation.

3.2.2 Other Issues to Include in your Policy

The following requirements can be considered for inclusion in the policy but are beyond the requirements of ISO 14001:

- Include a reference to "best practicable methods, technologies and techniques". The following terms could be used: Best Practicable Means (BPM); Best Available Techniques not Entailing Excessive Cost; and Best Practicable Environmental Option (BPEO).
- Articulate the overall environmental objective/s of the Company and a firm commitment to take positive action to achieve these objectives. The objectives must be achievable and measurable.
- Assign responsibility for environmental management. **ALL** employees have some level of responsibility for environmental management. This responsibility could be articulated in the Policy.
- Commit the Company to provide all employees with environmental education and training sufficient to enable them to understand their environmental responsibilities and to be able to meet them at all times. This statement should include a reference to achieving environmental objectives and to measurement of the effectiveness of the education and training.
- Commit to regular monitoring and review of performance against the established standards of the Environmental Management System.

3.3 COMMUNICATING, IMPLEMENTING AND REVIEWING YOUR POLICY

Communicating Your Policy

Your Policy should be communicated with the staff and made available to the public. You should begin to consider how you would go about doing this.

Implementing Your Policy

The Policy will be implemented through the implementation of the system and the objectives and targets.

Reviewing Your Policy

The Policy is not a to be considered a static commitment and ISO 14001 requires that top management regularly review the Policy for its' appropriateness. This can either be done through the management review function, or through a procedure prepared on the preparation and review of the environmental policy.

Action Checklist:	**Done Y/N**	**Date Completed**
By now you should have: • **Understood the requirements for the environmental Policy;** • **Obtained and defined Corporate or Senior Level support and commitment for Environmental Management;** • **Decided on the wording of the Policy required to define the Company commitment in developing the Environmental Management System;** • **Written the Policy;** • **Decided the extent to which you wish to publicise the policy;** • **Identified the methods to communicate the Policy to employees and the public;** • **Started communicating the Policy to employees and/or externally; and** • **Determined what mechanism will be used to update the Policy.**		

4. KNOW YOUR MINIMUM PERFORMANCE REQUIREMENTS

There are certain minimum environmental performance requirements your company must achieve. These performance requirements may include relevant legal stipulations, Industry Standards and Codes of Practices, Environmental Management Standards and other environmental performance standards. This section investigates methods to identify the relevant performance requirements for your facility. It covers:

- **Understanding regulatory requirements;**
- **Sources of information on regulatory requirements;**
- **Environmental legislation;**
- **Licences and Permits;**
- **Standards and Code of Practices;**
- **Voluntary Agreements; and**
- **The ISO 14001 Standard.**

In order to design and develop any Environmental Management System, the performance requirements of the system need to be determined in the first instance. Is the Environmental Management System to meet a local council requirement, or is it to satisfy the board that compliance and due diligence requirements are being met? Is the Environmental Management System to provide for Cleaner Production initiatives and reduction of costs? Before further development of the Environmental Management System these questions need to be answered.

The section is linked with "Section 5.3: Establish Performance Parameters and Criteria" which discusses how to link these requirements into the design of the Environmental Management System.

4.1 REGULATORY REQUIREMENTS

The minimum goal for any Environmental Management System is compliance with relevant environmental legislation. This section assesses ways to identify the requirements of the relevant legislation, and suggests procedures that could be implemented to obtain this information and make it available and readily digestible for employees.

ISO 14001 requires that:

"The organisation shall establish and maintain a procedure to identify and have access to legal and other requirements to which the organisation subscribes, that are applicable to the environmental aspects of its activities, products or services."

As identified in Section 2 documented procedure allow for a consistently defined and auditable approach to be taken on site.

You must be able to demonstrate that all requirements relevant to your site such as legislation, standards, codes and authorities are identified, accessible and communicated to relevant employees.

The steps considered necessary to be included in this procedure are detailed in the following subsections.

4.1.1 Assignment of Responsibilities

Responsibilities need to be assigned for overall management for the identification, maintenance and update of legislative requirements at the site.

This would include assignment of responsibilities for:

- Communication with regulatory authorities at the local level such as the EPA, and Local Council;
- Identification for requirements in codes and standards of practice; and
- Identification for requirements in Industry Policies and work practices, Voluntary Agreements and Corporate Requirements.

4.1.2 Identifying Relevant Environmental Legislation, Standards and Codes of Practice

Requirements relevant to the meat processing industry are likely to originate from:

- Environmental Legislation, including State and Federal Acts, and Regulations;
- Local Council Requirements;
- Licences and Permits;
- Standards and Codes of Practice; and
- Industry Standards.

You need to develop a method for identifying these requirements, and to then keep them up to date.

A useful preliminary source of information on environmental legislation is "The Australian Meat Processors Environmental Legislative Review." This text, developed for the former MRC in 1996, covers relevant environmental legislation and Codes of Practice for each State in Australia. It has summaries of the legislation, and details how the legislation is relevant to the meat processing industry. It should be remembered that legislation in many states, particularly NSW, has changed since this was developed. While this review provides a good starting point with respect to legislation, it is important to make sure that you are aware of the most recent legislation, and any changes that have occurred in your state since 1996.

Other sources of legislative information include subscriptions from legal publication companies such as CCH Australia Limited and Butterworths who publish Environmental Legislation and send updates out as new laws (Acts) are gazetted. Many companies now offer legislation on CD-ROM, which allows for search facilities that paper publications cannot provide.

Licences and permits will be issued and enforced through local or state authorities, so correspondence with these organisations is required to keep up to date on their requirements.

Industry Standards are variable and can be obtained through Industry affiliations and other related bodies. The Australian Standards often specify the requirements relating to a particular activity.

4.1.3 Legal Register

Once responsibilities have been assigned, with legislative requirements and standards identified, the next step is to develop and implement a process to list your site specific and general requirements for the site in a legal register:

The main goals of the register are:

- to have a quick reference to specific environmental requirements for the site;
- to have the requirements written in a plain language interpretation of the impacts of environmental laws on the facility operations;

- to have the requirements available to relevant personnel; and
- to have all changes in legislation incorporated into the register.

The register should include all legal and other requirements discussed below.

General Environmental Legislation

General Legislative requirements need to be identified for the site. Table 4.1 details a suggested format for the register. The register will specify environmental laws and regulations that apply to the site, and the specific requirements for the site under the legislation, including licence and permit requirements.

In this register, the "person responsible" must identify changes of any particular Act or Code and ensures that the consequences of the changes are communicated and understood by people within the organisation and where appropriate the register kept up to date.

Licences and Permits

For the majority of meat processing facilities, specific site requirements will be detailed in some form of licence, permit, consent condition or other regulatory tool. These may have discharge limits, concentration limits, requirements for maintaining pollution control equipment or other similar but specific requirements. In addition, regulatory authorities have also developed policy and guidelines. It is important that these requirements are known and understood by relevant site personnel.

The site specific requirements would be included in the legal register and would need to be based on the licences and permits, but written in a user friendly way for site employees to be able to understand easily (See Table 4.1 for an example). The register also needs to be updated on a regular basis to incorporate changes to the licences.

For every licence/permit/approval/consent a summary of compliance requirements must be prepared as outlined in Table 4.1. This is because all the compliance requirements may not be immediately obvious in the licence/permit/approval/consent. For example, a Trade Waste Agreement may require regular sampling and analysis and reporting for certain parameters, and periodic sampling and analysis for other parameters not specified in the Agreement but included in the Water Authority Regulations.

Consents or approvals, such as for the construction of a new plant or installation of new equipment should be listed with the location of the documents as any conditions are likely to apply in perpetuity or until amended.

Standards and Codes of Practice

Standards and Codes of Practice relevant to your operations need to be included as part of the legal requirements. To do this requires:

- identification of Australian Standards and Codes of Practice which relate to environmental issues identified in the Register of Environmental Effects for the areas they are responsible for;
- to have the requirements of the standards and codes written in a plain language interpretation relevant to facility operations;
- establishment of a library of applicable Standards and Codes of Practice; and
- ensuring that all required employees with environmental responsibilities have access to information contained in these Standards and Codes of Practice.

Examples of Standards and Codes that may be retained at each location are the Australian Standard AS 1940: The storage and Handling of Flammable and Combustible Liquids; AS 1596 Storage and Handling of LP Gas, and the Australian Dangerous Goods Code.

Table 4.1 identifies how codes of practice can be included in a legal register.

Table 4.1
Legal Register

Act, Standard or Code of Practice, Licence (date for renewal/last update)	Regulatory Authority (eg EPA)	Key Regulatory Requirements Relevant To Your Facility	Person(s) Responsible
Clean Waters Act 1970	NSW EPA Local Council	That materials are not stored in an area where a potential exists for spillage or leakage to occur and contaminate stormwater.	Joe Bloggs Environmental Manager
		That no unlicensed discharges occur, ie no wastewater discharges outside of existing licence requirements.	Joe Bloggs Environmental Manager
Licence Requirements **EPA Licence (renewal date 1/12/98)**	NSW EPA	Monitor effluent from site discharge location at periods of one week for the following contaminants: • BOD • Phosphorus • Suspended Solids • pH	Joe Bloggs Environmental. Manager
		Complete EPA Licence compliance certificate by 30 November 1998	Joe Bloggs Environmental Manager
Trade waste Agreement	Local Water Authority	Prepare pollution reduction program to minimise wastewater discharged from the site.	Bill Dent Plumber
Codes of Practice **AS 1940**	Standards Australia	• Storage and handling requirements for dangerous goods	Joe Bloggs Environmental. Manager
Other Requirements **Greenhouse Challenge Agreement**	Australian Greenhouse Office	• Monitor energy usage and implement action plans	Joe Bloggs Environmental. Manager

4.2 OTHER REQUIREMENTS

There are other requirements that you may incorporate into your Environmental Management System. These could include:

- Voluntary agreements
- Corporate Requirements; and
- Industry Benchmarks.

4.2.1 Voluntary Agreements

If your facility has signed onto particular voluntary agreements such as the Greenhouse Challenge program. The facilities commitment under these agreements needs to be managed.

4.2.2 Corporate Requirements

If your facility is part of a larger company with corporate management, there may exist a number of company initiatives, standards, guidelines, codes of practice and policies that could have specific requirements that need to be incorporated into your Environmental Management System. In the defining the design of your management system, you should identify and incorporate these requirements and included in the legal register.

4.2.3 Industry Benchmarks

A study has been undertaken to identify industry benchmarks for the Meat Processing Industry. This is in addition to any benchmarks that may otherwise exist in the industry.

In developing your Environmental Management System you should integrate as far as possible these benchmarks into the system. This is discussed further in Section 11.

In addition, the MLA has conducted numerous studies related to environmental issues at Meat Processing Plants in Australia. These are listed in an "Information Kit for the Meat Processing Industry – Environment", which is reproduced in Appendix A.

Action Checklist:	**Done Y/N**	**Date Completed**
By now you should have: • **Identified sources of Environmental Legislation** • **Developed a legal register that summarises Environmental Legislation and other requirements relevant to your facility** • **Assigned responsibility for the management of a legal register** • **Identified requirements of licenses, permits, Codes of Practice and other standards** • **Developed a procedure outlining how to prepare the legal register and keep it up to date** • **Implemented your procedure**		

5. IDENTIFYING ENVIRONMENTAL RISKS AND CONTROL STRATEGIES

This section forms the basis of how to manage environmental risks at your facility. Primarily a method for identifying environmental risks using an approach similar to the HACCP method is described.

The section includes:

- **Assembling a knowledgeable team to manage the process;**
- **Conducting an environmental risk assessment of all facilities included in your Environmental Management System;**
- **The identification of Environmental Critical Control Points (ECCPs);**
- **Establishing performance Parameters and Criteria;**
- **Establishing Environmental performance monitoring systems;**
- **Establishing Corrective Actions for potential deviations;**
- **Establishing record keeping procedures;**
- **Establishing verification procedures; and**
- **Developing an environmental risk and control strategies table.**

This section is intended to give you the tools necessary to implement some of the most fundamental parts of your Environmental Management System.

Regardless of whether you are interested in ISO 14001 or not, you must identify environmental issues facing your operation and you must then manage your operations so that you control, at a minimum, the most serious of the issues. It is likely that most of your 'serious' environmental issues will be associated with either achieving or maintaining legal compliance.

In addition to managing the environmental issues it will be important for you to be able to show that you are taking all reasonable steps to prevent environmental harm.

This section of the Environmental Management System tool provides you with the necessary guidance and proforma to conduct this assessment and to document the management of the issues that you find.

Most parts of the requirements of this section are summarised in **Table 5.9**, and discussed in Section 5.9. It is suggested that this table is referred to throughout the development of templates relevant to Section 5.

The environmental issues you may have to manage may include day to day requirements or issues, for example, daily monitoring of effluent as required in a licence condition. Occasionally issues such as run-off from major storm events and also unlikely issues such as large fuel spills during unloading of fuel, (for example, diesel), may need to be managed. It is important that these occasional or unlikely issues are also at least initially considered, as the consequences of these issues may be more important to your business and the environment than the day to day issues. The environmental risk associated with the business or the environment is a function of both the consequences and the likelihood of the issues arising. It is the significant environmental risks that you need to manage through the Environmental Management System.

The identification of environmental risks should be a dynamic part of your Environmental Management System. The risk assessment should be reviewed and revised at least annually and whenever any of the following occur:

- New processes are started on site especially if covered by planning stipulations;
- Land use changes occur;
- Changes in legislation occur; and/or
- Any other changes which might affect the environmental standing of the company.

If you intend on having your Environmental Management System certified to ISO 14001 then you will need to develop a procedure (detailing who is responsible, what has to be done and when it will be done) for compiling the tables on identification of environmental risks and the subsequent control strategies.

When developing the procedure it is important to include provision for using the risk assessment method to evaluate proposed changes to the site as part of the planning process. The addition of this risk assessment will hopefully save a great deal of trouble in later stages of the construction and operation of the new facilities.

5.1 IDENTIFICATION OF ENVIRONMENTAL RISKS

The identification of what needs to be managed, ie significant environmental risks, is a fundamental part of any management system. Therefore an Environmental Management System must start with a systematic identification of environmental issues assessing their consequences and their likelihood and determining which of these issues pose significant risks.

There are many ways of identifying environmental risks. This guide will assist you in taking an appropriate path to identify the environmental risks faced by your site.

It is important to remember that the risk assessment needed to develop your EMS is a high level one that allows you to objectively assess the relative importance of all of your environmental issues. There is no need to conduct a detailed risk assessment of each piece of equipment. Reference to the examples provided should help you decide the level you need to pitch the risk assessment.

Having read the introduction to environmental risk assessment, you may well be asking, "How do I decide what my environmental issues are? What kind of consequences should I be considering and how do I distinguish between major and minor issues and consequences of these issues." Then once you have done this you may ask how to combine the concepts of consequence and likelihood to come up with significant environmental risks. The rest of this section helps you answer these questions but it should be remembered it is your environmental system so the relative importance of the environmental risks identified is up to you – this guide will help you to rank the issues you identify.

5.1.1 Assemble a Knowledgeable Team

The first step in identifying your environmental risks is to assemble a knowledgeable team. At first glance you may feel that you do not have the necessary environmental expertise on site. By looking a little closer you will find that there are a number of individuals on site that can provide invaluable ideas to the process of identifying environmental risks.

These people are likely to include:

- Senior management;
- Engineers;

- Safety personnel;
- Stores personnel;
- Slaughter floor foreman;
- Maintenance personnel (if different from the engineers);
- Leading hand in rendering;
- Training coordinators;
- Washdown officer ;
- Quality system personnel (MSQA, AQIS, AQA etc); and
- External Parties.

Senior management will know about director liability and due diligence. They are also likely to have been involved with complaints or problems with the regulatory bodies.

The company engineers will know about issues such as stormwater control, effluent treatment problems, waste disposal facilities and issues, odour, irrigation, etc.

Safety professionals will know where different chemicals and other hazardous substances are used or stored. They may also have experience with the process of identifying hazards.

Stores personnel should know the amounts of everything used onsite. They will also be aware of contractual ownership issues.

Personnel involved with MSQA, AQIS, AQA, ISO9001 and/or HACCP will be familiar with the operations sufficiently to provide invaluable information regarding the development of process flow diagrams, control points, operating parameters etc. and how existing systems work in the company culture. This is very important although it should be remembered that the Environmental Management System has different goals from the quality management systems and will require different emphasis. Do not be afraid to change the way the quality management systems work but learn from the lessons that would have been learnt during their implementation.

Do not exclude anyone who feels they can provide valuable input to the process – you never know they may have been active environmentalists for years as a hobby!

You may wish to involve external parties such as pollution control officers from the local council, the local EPA officer and/or consultants. If you communicate with regulatory authorities, be careful that you are not exposing yourself to the outside world too early in the process and that you are not going to cause yourself a lot of extra trouble.

Action Checklist:	**Done Y/N**	**Date Completed**
By now you should have:		
Assembled a knowledgeable team to manage the identification of environmental risks		

5.1.2 Describe the Process

The second step in identifying environmental risks is to describe the operations conducted on site so that everyone who is going to be involved in the brainstorming of issues can be clear of what process is being discussed at any one time.

In addition, it is important to describe the processes so that the whole operation defined within the scope of the Environmental Management System (see Section 2.6: Defining the Scope of your Environmental Management System) is covered by the assessment. There will be a difference in the description of the operations for the Environmental Management System than was developed for HACCP. The HACCP assessment would have only considered those operations where the product was involved.

The environmental assessment must include all the waste disposal operations and all the transport operations included within the scope of your Environmental Management System. This could include all the irrigation and effluent treatment operations, all past site usage that could have resulted in contamination of the ground. Effectively the assessment should consider all inputs and outputs from all processes within the scope of the Environmental Management System (see Section 2.6).

The process description should be documented in the form of flow diagrams or as written descriptions. Flow diagrams are probably the best output of the process description, as the graphical format will assist in focussing the mind when trying to identify issues. The process flow diagrams should include the inputs and outputs from each process and the site overall.

Environmental Process Flow Diagrams should be developed to identify all the steps taken to produce the final products and dispose of any left over effluent or waste. These flow diagrams should show the process from ingredient and livestock delivery through to product shipping from site.

The actual extent of the process flow diagrams will be dependent on the scope of your Environmental Management System (see Section 2.6). However, it is important to include processes associated with the provision of utilities, for example, boilers producing steam or hot water for the operation. It is also important to consider:

- "static" processes e.g. storage of fuel or electric transformers;
- civil/structural aspects of the site, e.g. stormwater drainage and collection systems and building materials;
- processes or activities carried out by outsiders on the site, e.g. unloading of chemicals or filling of diesel tanks; and
- non-routine processes such as maintenance.

Verification of the process flow diagrams should be conducted by walking through the facilities in question and checking that all the features of that process have been included.

Provision should be made in the procedures to ensure that when processes change that the identification of environmental issues documented in the process flow diagrams is reviewed and revised as appropriate. Any changes made to the process should be included in a re-evaluation of the risk assessment and the prioritised list of risks.

Example Environmental Process Flow Diagrams are provided in Appendix B. These diagrams are for general meat processing operations.

5.1.3 Identification of Environmental Issues

During the course of developing the environmental flow sheets, it is likely that the group will also identify the environmental issues associated with the site. Many of the environmental issues facing the site will be those associated with the traditional view of pollution. The issues are likely to include:

Action Checklist:	Done (Y/N)	Date Completed
By now you should have:		
1) Developed a flow diagram for the processes at your facility to assist in identification of environmental inputs and outputs of the processes		
2) Developed Environmental Process Flow diagrams to identify all steps taken to produce final products and dispose of any leftover effluent or waste		
3) Verified that the Environmental Process Flow diagrams are accurate based on a walk around tour of your facility		

- Gaseous emissions to air;
- Discharges to sewer;
- Discharges to surface water;
- Discharges to ground water;
- Disposal to land; and
- Raw material usage (intermediate products and utilities such as water and energy).

It is also likely that there are other environmental issues facing the site. These may include:

- Sustainable soil management;
- Land management and pasture improvement;
- Noxious weeds;
- Native flora and fauna habitats;
- Heritage;
- Transportation; and
- Efficient use of resources and maximising recovery of product.

The above list is not meant to be exhaustive and you will need to consider your own issues. It may be useful to break these issues down further, for example, discharges to surface water could be broken down into:

- Discharges from the stormwater system; and
- Discharges from the water treatment plant.

As legal compliance is seen as the minimum standard for the Environmental Management System, an issue should be considered if there is some license or legal requirement which may affect the site with respect to this issue. You may be surprised that efficient use of resources or maximising recovery of product is identified as an environmental issue. Certainly it is unlikely there is any legal requirement to consider these. However, many of you will be aware of the need to consider that water conservation and efficient use of raw materials as important. Further more, these environmental issues have clear links to the financial performance of the site.

From the above discussion, the importance of defining the scope of the Environmental Management System is critical in deciding what issues should be considered. An Environmental Management System focussing purely on compliance will not consider use of resources. Similarly, such an Environmental Management System will not focus on some environmental issues that are clearly

linked to the financial performance of the site. Broadening the scope of the Environmental Management System does allow it to be a vehicle for better environmental and business performance.

5.1.4 Linking Environmental Issues to Site Processes

The next step in identifying environmental risk is linking the processes identified in 5.1.2 with the issues. The first step is to link the normal operations of the plant to the issues; for example;

Emissions to air → boiler use (Oxides of Nitrogen, particulates)
→ traffic (dust)

Sustainable soil management → effluent irrigation
→ crop rotation

It is also important to consider non-routine activities associated with the processes or events and how they may interact, e.g. maintenance, start-up, shutdown, wash-down and equipment malfunction.

It is also important to consider "unlikely" or a "rare" event e.g. spills, leaks, severe storms, drought and bushfires. You may think that some of these you do not have control over and for natural events such as droughts and storms you do not. However, you can still manage the environmental consequences associated with these events. You may see spills and leaks as "accidents". It is important to remember accidents do not just happen. They are a result of avoidable and manageable circumstances. During the initial assessment of environmental risks it is likely that certain processes will be grouped together, e.g. all areas on the site used for clean storage can be grouped together when considering spills.

Finally, environmental issues may be a result of past activities by either the existing company, or by previous occupiers. These environmental issues usually relate to the potential for past disposal to land, which may have led to soil and/or ground water contamination.

5.1.5 Consequences Associated with Environmental Risks

The term consequence can be viewed from a compliance/regulatory consideration, e.g. non-compliance, a notice to act, court case, fines or jail of directors. The consequences can also be considered with respect to the impact on the surrounding environment, e.g. short term local negative impact, catastrophic impact on endangered species or long term, global impact issues.

The consequences can also be considered in terms of community perception, e.g. does it result in a bad relationship with neighbours or significant negative press at a local, state or national level.
Finally, consequences can be seen from a business financial perspective and can be expressed in terms of loss of revenue.

Whether you consider one or some or all of the consequence considerations described above, or you use others, is up to you. It needs to be remembered that if your environmental policy makes commitments with respect to certain performances, then you will need to consider it in the consequence assessment.

When assessing the consequences it is not necessary to go into great detail. It is helpful to bracket the consequence into one defined consequence criteria, e.g. high, medium or low consequence.

5.1.5.1 Consequence Categories and Criteria

The consequence criteria established for your operations should reflect the overall objectives of your management system. It is these criteria that are going to determine the focus of your Environmental Management System. It is therefore worth taking the time and making the effort to ensure they are correct and will meet the overall objectives of your company. The criteria will be an important part of your system should you go for certification to ISO 14001.

The following provides some example consequence criteria that could be used to categorise the risks into high, medium and low.

High:

H1: incident resulting in the serving of a prohibition notice
H2: business interruption;
H3: the potential to cause a high level of impact at global, national, regional or local level; and
H4: a cost of over $25000 for disposal/usage in any year.

Medium:

M1: continuous emission/discharge in excess of authorised limits resulting in an enforcement notice or fineable offence;
M2: incident resulting in a clean up operation or fineable offence;
M3: a cost of between $15000 and $25000 for disposal/usage in any year;
M4: discharge with potential to impact local watercourses;
M5: potential to cause medium level of impact at global, national regional or local level; and
M6: complaints from neighbours.

Low:

L1: incident with minor on-site clean-up i.e. potential for groundwater/soil contamination;
L2: incident resulting in a complaint e.g. from the local community;
L3: a cost of less than $15000 for disposal/usage in any year; and
L4: could cause public concern.

The number of categories of consequence criteria is up to you. You may decide that considering five consequence criteria is more applicable to your facility although three will probably suffice. By using the H1-H4, M1-M6 and L1-L4 type numbering system you will be able to enter the relevant criteria into the risk assessment table and hence track your rationale for allocation in the future. This may seem trivial now but it could save you a great deal of effort when you review the system and the risk assessment in the future.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have:		
1) Defined the consequence criteria you will use for your assessment of significance		

5.1.5.2 Likelihood Criteria

The other consideration in environmental risk is likelihood, that is, how likely the identified issue may occur. For example, routine activities may happen once per day, maintenance once per week, major storms once per year, drought once every 10 years and a major spill every one hundred years. The following provides some example likelihood criteria. When you are assessing the likelihood of accidents and other loss producing events you should assess the probability that the event can occur given an operating scenario and the frequency at which that operating scenario occurs on site.

High:

- event that could or does occur once per week;

Medium:

- event that could or does occur once per month; and

Low:

- event that could or does occur once per year.

Again, the exact number of criteria is up to you and your organisation.

Action Checklist:	Done (Y/N)	Date Completed
By now you should have: • **Defined the likelihood criteria you will use for your assessment of significance**		

The following form (**Table 5.1.5.2**) is provided for you to use to record the consequence and likelihood criteria for your assessment of environmental risk.

TABLE 5.1.5.2
RECORD OF CONSEQUENCE AND LIKELIHOOD CRITERIA

	Consequence Criteria	Likelihood Criteria
High		
Medium		
Low		

Action Checklist:	Done (Y/N)	Date Completed
By now you should have: • **Documented likelihood and consequence criteria for your facility**		

5.1.5.3 Assessment of Significance

The next step is to combine the consequence and likelihood criteria that you have assigned to each environmental issue to determine whether it is a significant environmental risk.

The following table (**Table 5.1.5.3**) could be used to assess significance.

Table 5.1.5.3
Significance Assessment Table

Likelihood Level	Consequence Level		
	High	Medium	Low
High	Significance 1	Significance 2	Significance 5
Medium	Significance 2	Significance 4	Significance 6
Low	Significance 3	Significance 5	Significance 7

Significance: 1 = High priority 2-4 = Medium-high priority 5-7 = Medium priority

It should be noted that you need to decide the levels of significance and that you should allocate the significance weighting in a way that is appropriate for your site. As a minimum it is thought that in the above risk assessment table the issues falling into the risk category levels 'Significance 1' and 'Significance 2' should be identified as 'Significant' using the terminology of ISO 14001.

The risks should be identified by thinking about each operation as existing in the following four distinct phases:

- Normal- a desired, everyday, controlled activity;
- Abnormal- a desired, low frequency, controlled activity;
- Accidental - a non desired, infrequent, uncontrolled activity; and
- Those operations that occurred in the past that could result in environmental impact.

The significance assessment process should be documented for future reference and revision. An example proforma is provided in **Table 5.1.5.3A** for recording the findings of your significance assessment.

Once the consequence and likelihood of each scenario has been identified the Table above should be used to assess the overall significance of the risk. Where the cut off point for significance is drawn is up to you. It is however recommended that a reasonable number of 'significant issues' be identified. It is thought that 20 to 30 significant issues and risks will be appropriate for a first evaluation at a meat-processing site.

The emphasis of the environmental risk assessment process should be on the identification of events and scenarios that are reasonably likely to cause unacceptable loss in the eyes of the company, regulators, customers, employees and other important stakeholders.

Action Checklist: By now you should have:	Done (Y/N)	Date Completed
• Understood the significance concept and table • Applied the significancy model to the environmental issues identified at your facility (section 5.1.5) • Completed Form (5.1.5.3A) that documents the significance assessment for environmental issues at your facility		

5.2 IDENTIFY ENVIRONMENTAL CRITICAL CONTROL POINTS (ECCPs)

Once you have identified the issues that you have now defined as 'significant', you need to develop appropriate control strategies. The first step in developing control strategies is to identify the process steps that are critical to the issue you have identified as being significant.

Environmental Critical Control Points are defined as 'A point, step or procedure in the process at which control (technological or managerial) can be applied and, as a result a significant environmental risk can be prevented, eliminated or reduced to acceptable levels'.

It is important that the full intent of this definition be adhered to when defining whether something is an Environmental Critical Control Point. It is worth noting therefore that the process of establishing Environmental Critical Control Points is essential for those operations that have already been identified as 'significant'.

For each environmental risk identified as significant the Environmental Critical Control Points must be identified.

It is expected that you will find approximately 25 ECCPs in your facility. The number will vary depending on the complexity of your operations and the way that you have conducted your risk assessment and ECCP determination.

You can determine whether a point, step or procedure is an Environmental Critical Control Point by answering the following questions:

Q1 Do preventative measures currently exist for this step in the process to control the identified risk?

If 'Yes' you should move to Question 2
If 'No' you should move to Question 3

Q2 Do these risk reduction measures fully control the risk within acceptable levels?
If 'Yes' this process step is an ECCP
If 'No' you should move to Question 3

Q3 Is risk control needed at this step of the process to control the risk?
If 'Yes' then this process step is an ECCP
If 'No' than this process step is not an ECCP

Table 5.1.5.3A
Environmental Risk Significance Assessment Form

Location/Site	Process/Operation	Issue	Consequence	Likelihood	Significance

An example proforma for the identification of Environmental Critical Control Points is provided in **Table 5.2.** It is suggested that you use the proforma to structure and record your decision-making and to allocate a reference number.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have:		
• **For the significant issues identified in the previous section, identified the Environmental Critical Control Points (ECCPs)**		

5.3 ESTABLISH PERFORMANCE PARAMETERS AND CRITERIA

It is common practice in Environmental Management Systems to stipulate operating criteria in procedures for the significant operations. In fact, it is a specific requirement of ISO 14001.

Performance parameters can typically be divided into managerial and technical parameters. Managerial performance parameters are where the unit of performance can be thought of as an activity of a member of staff. The parameter should address the same issues as procedures ie. defining who is responsible for doing what and how frequently.

Technical performance parameters are typically engineering requirements for a process to work eg. temperature, residence times, pressure, flow rates etc.

ISO14001 states *'the organisation shall establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities'*. These key characteristics are the performance parameters that need to be established to monitor that the system is operating effectively.

These operating criteria will provide the benchmark against which performance monitoring is conducted. Typically, they are:

- output criteria eg. pH, temperature, and BOD; and
- operating or input parameters eg. operating parameters of the rendering plant, number of head killed per day, amount of water used (potable and non-potable), rainfall levels etc.

You will probably find that many of the performance parameters, especially those associated with the product line, have already been identified as part of your quality control systems.

Identifying and defining appropriate performance parameters should be an ongoing task. The parameters should be objective, verifiable and reproducible. They should be relevant to the operations, consistent with the environmental policy, practical, and cost effective and technologically feasible.

You can record the performance parameters in a number of places. Those parameters that have been identified in Quality Management Systems need not be duplicated in the Environmental Management System but should be referenced so that they can easily be found in the relevant Quality Management

Table 5.2
ECCP Determination Table

Process Step	Associated environmental risk: (significant risk)	Q1: Do preventative measures currently exist for this step in the process to control the identified risk? If Yes – go to Q2 If No – go to Q3	Q2: Do these risk reduction measures fully control the risk within acceptable levels? If Yes – ECCP If No – go to Q3	Q3: Is risk control needed at this step of the process to control the risk? If Yes – ECCP If no – not an ECCP	ECCP Number Allocate a number to the ECCP for future reference in other parts of the Environmental Management System

System documentation. Alternatively, operating parameters can be documented in Operating Procedures or in the table provided in Section 5.9 Environmental Risk and Control Strategies.

For each Process Step or Environmental Critical Control Point identified as having a significant risk associated with it, the following steps should be taken to establish appropriate operating parameters:

1. Establish legally defined parameters if they exist. For example, effluent characteristics or noise levels.

2. If there are no regulatory parameters defined for the Environmental Critical Control Point, you need to establish the appropriate operating parameters to monitor the effectiveness of the controls in place. The parameters chosen should be in a range that if achieved will minimise the risk or environmental effect to acceptable levels. For example, the landfill should be limed every four hours or every day.

3. You should keep the relevant documentation which will allow you to demonstrate the process you went through to establish the operating parameters. This documentation may include correspondence with the EPA, Local government or consultants.

For the meat processing industry, a benchmarking study has been conducted by the MLA which looked at a number of environmental parameters and has developed, based on information provided by ten meat processing facilities, typical benchmarking values for these parameters. These benchmarks are available to the industry from the MLA and can be used as criteria for environmental management and may be useful in setting performance objectives for your site.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have:		
• **For each ECCP, established operating parameters to enable monitoring effectiveness of controls in place, either based on technical parameters or managerial parameters**		

5.3.1 Establish operational control procedures

Clause 4.4.6 of ISO 14001 requires the development of operational control procedures for those operations and activities associated with significant environmental issues. These procedures should document who needs to do what and how frequently to control the operations in such a manner that the environmental issues associated with them are reduced to an acceptable level. Section 11 of this manual deals with the requirements for these procedures in more detail.

5.3.2 Establish Environmental Performance Monitoring Systems

'The organisation shall establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment' is a specific requirement of ISO 14001. It is also good practice to keep such records so that the organization has sufficient evidence to prove or disprove liability in the case of a dispute.

Monitoring is a planned series of observations and measurements to assess whether the Environmental Critical Control Points are under control and are functioning within the operating parameters stipulated.

Monitoring may be continuous or discontinuous. The monitoring procedures established should include calibration and equipment maintenance checks. These checks should be recorded. An example proforma for recording this is provided in Section 5.9 in the Environmental Risk and Control Strategies Table.

Section 11.2 "Monitoring Procedures" further discusses procedures for monitoring with respect to the requirements of ISO 14001. This includes recording of information to track environmental performance and relevant operational controls. Monitoring of the conformance with the facility environmental objectives and targets are discussed further in "Section 7: Setting Environmental Objectives and Targets".

For each Environmental Critical Control Point the most appropriate monitoring procedure should be established. All procedures should aim to define who is responsible for conducting activities and when.

If you are going to have your Environmental Management System certified you would need to develop documented procedures. The monitoring procedure should stipulate the following:

- the parameters to be monitored;
- the units that the monitoring results will be recorded in e.g. times per hour or mg/l;
- the frequency at which the monitoring should be conducted (this should specify whether this randomly or at regular intervals);
- define the equipment to be used for each monitoring step;
- nominate an individual or individuals to conduct the monitoring;
- if using laboratories, then define the test methods to be used;
- specify the qualifications/training/experience needed to conduct the monitoring; and
- provide a proforma for recording the monitoring results.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have:		
• **For each ECCP, established a method of monitoring performance against the operating criteria as set out in Section 5.3.**		

5.3.3 Establish Corrective Actions for Potential Deviations

Under HACCP you determine in advance what should happen if an operation starts to move out of the specified operating parameters.

The Environmental Management System should develop similar controls so that in the event of an excursion out of the defined operating parameters the relevant employees know exactly what steps need to be taken.

It is important that the corrective actions developed include a measure for preventing reoccurrence. For corrective actions to be developed which prevent reoccurrence the cause of the nonconformance or problem has to be established so that the root cause can be dealt with. It is only by dealing with the root causes that the corrective action truly deals with preventing reoccurrence.

The corrective actions should include:

- who should be notified internally of the excursion;
- who should be notified externally of the excursion and within what timeframe;
- whether the process should be stopped to prevent a polluting event;
- what containment controls are in place to contain the out of spec material; and
- what records need to be developed to record what corrective actions were taken.

As with Quality Management Systems it is recommended that Corrective Action procedures include the phrase 'and other actions as appropriate' to remind employees that the procedure is not definitive and each situation will be unique.

It is important that the relevant employees are trained on the corrective actions required of them.

The corrective actions should be recorded in the proforma provided in the Environmental Risk and Control Strategies Table in Section 5.9.

Action Checklist:	Done (Y/N)	Date Completed
By now you should have:		
• Developed corrective actions for potential deviations outside defined operating parameters		
• Assigned responsibilities for managing corrective actions		
• Established a method for recording any corrective actions taken		

5.3.4 Establish Record Keeping Procedures

One of the key purposes of conducting this identification and control of environmental risk is to be able to show due process. To make full use of this it is essential that records be kept of the assessment process and the provision made for control measures.

Without good record keeping systems it is impossible to show that you have maintained a sound environmental management system.

See Section 9 on documentation necessary for the Environmental Management System.

Action Checklist:	Done (Y/N)	Date Completed
By now you should have:		
• Developed record keeping procedures to demonstrate due diligence		

5.3.5 Establish Verification Procedures

It is essential that procedures are developed to verify that the environmental controls are working as intended and that the operating parameters are being maintained.

Verification that the systems are working can occur in a number of ways. To ensure that the verification process actually happens when it is supposed to happen the Environmental Management System should specify how, who is responsible and how often to conduct the verification.

The actual verification that needs to be conducted and the frequency of these activities will depend upon the nature of the operation and the frequency at which the operation itself occurs.

It is suggested that the following forms of verification are considered as options for inclusion as verification procedures:

- ongoing verification by an operator;
- periodic, specific and documented verification by an operator;
- periodic inspection;
- first party audits;
- third party audits;
- sampling and analysis; and
- reviewing monitoring results.

Verification procedures should contain the following:

- Defined verification processes for each Environmental Critical Control Point;
- Defined responsibilities for verification;
- Defined frequencies for verification; and
- Methods for recording that the verification has occurred.

Action Checklist:	Done (Y/N)	Date Completed
By now you should have: • **Determined the verification processes to check each ECCP** • **Defined responsibilities for this verification** • **Defined frequencies for these verification checks** • **Determined methods for recording that the verification has occurred**		

5.3.6 Environmental Risk and Control Strategies Table

Table 5.9 provided overleaf should be used to record the Environmental Management System information relevant to those process steps that are associated with the significant environmental issues as described above.

The table can be used to record all the details necessary and/or it can be used as a high level reference system which will provide much of the linkage necessary to demonstrate how each part of the Environmental Management System relates to the others.

The table also details the relevant Operational Procedure Reference that relates to the particular ECCP. The operational procedure can be fully referenced in the table thereby making the table a very important part of the management system documentation or the whole procedure may be too large to include in the table so you can just reference the procedure number. For example, an operational procedure (as detailed in Section 11.1) for the storage of chemicals may have a number OP004, which relates to a particular ECCP and the procedure number alone can be referenced in the table.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have:		
• **Completed the Environmental Risk and Control Strategies Table, such that the process undertaken in Sections 5.2 to 5.9 have been documented**		

Table 5.9
Environmental Risk and Control Strategies Table

Significant Process Steps / ECCP	ECCP No	Technical Performance Parameters	Managerial Performance Parameters	Operational Procedure Reference	Monitoring Procedures	Calibration / Maintenance Requirements (Actions and frequency)	Corrective Actions & Responsibility	Records	Verification Procedures
Rendering	1	Temperature at which rendering by-products boiled at pressure, time and temperature.	Number of times operator checks technical parameters are in place, eg. temperature controls.	OP1	Measure temperature with a thermometer linked by telemetry to control room. Measure pressure by specific pressure gauge.	At every shutdown clean and check accuracy of thermometer.	If the temperature goes beyond operating limits, conduct actions to put temperature within normal range.	Monitor temperature and pressure of the boilers.	

6. ESTABLISHING ENVIRONMENTAL ROLES AND RESPONSIBILITIES AND COMMUNICATION PROCEDURES

This section will assist you to develop appropriate roles and responsibilities within your organisation to ensure that your management system is effective. In addition it examines methods to communicate the Environmental Management System internally, to all staff and externally, to all interested parties. The section includes:

- **Defining Environmental Roles & Responsibility and allocation of resources**
- **Internal Communications:**
  - **Team Meetings**
  - **Performance Evaluation**
  - **Communication through Training**
  - **Corporate Communication**
- **External Communications:**
  - **Proactive**
  - **Reactive**

6.1 DEFINING RESPONSIBILITY FOR ENVIRONMENTAL MANAGEMENT

In terms of structure and responsibility, the ISO 14001 standard requires that *"Roles, responsibilities and authorities shall be defined, documented and communicated in order to facilitate effective environmental management.*

The organisation's top management shall appoint (a) specific management representative(s) who, irrespective of other responsibilities, shall have defined roles, responsibilities and authority for:

a) ensuring that the environmental management system requirements are established, implemented and maintained in accordance with this International Standard;

b) reporting on the performance of the environmental management system to top management for review and as a basis for improvement of the environmental management system.

6.1.1 Nominating an Environmental Representative

In order to meet the above requirements a representative will need to be chosen to manage the process of implementing and maintaining the environmental management system.

In addition to these requirements, Section 4.4.2 of the ISO 14001 Standard has requirements for procedures to be developed to ensure the competence of employees in undertaking their roles in environmental management. The methods for ensuring this are discussed in Section 8: Training.

There are some key considerations in the decision of choosing an appropriate environmental management representative. These include:

- the representative must have sufficient authority from top management to provide resources required in the Environmental Management System and have the backing of management in implementing all parts of the Environmental Management System;
- the role of the Environmental Representative is agreed; and
- the Environmental Representative has responsibilities defined and which are in accordance with his/her authority.

6.1.2 General Roles and Responsibilities

In addition to having a specific person nominated as the Environmental Management Representative it is also considered important that general environmental roles and responsibilities be assigned to all employees at site to encourage ownership of the system. Management structure will vary from site to site, with different roles and responsibilities identified for each person. In this section, overall roles have been assumed for the different levels of management at meat processing facilities. These have been nominated as:

- General Manager;
- Senior Managers;
- Operations or Middle Managers;
- Employees with environmental control related tasks;
- General Employees; and
- The Environmental Management Representative.

While it is acknowledged that this structure will not be completely similar to the management structure at most sites, it does provide a basis for comparison.

The details of the general roles within meat processing facilities and specific employee requirements are detailed in **Table 6.1.1**.

Table 6.1.1

Roles and Responsibilities in Environmental Management

Level of Management	Roles	Specific Employee Requirements for Environmental Management
General Manager or Managing Director	• Responsible for effective management of environmental issues and for the Implementation of the Environmental Policy; • Delegates authority to implement the Environmental Management System to the Environmental Management Representative; • Make available resources essential to the implementation and control of the management system. These resources include human resources and specialised skills, technology and financial resources; • signs Environmental Policy.	Commitment to the Environmental Management System process. Understanding of liabilities associated with environmental impacts. Understanding of the legal implications of breaches (both corporate and individual liability).
Environmental Management Representative	• Ensuring the Environmental Management requirements are established, implemented and maintained; • Responsible for the day to day management of the Environmental Management System; • Designation and delegation of responsibilities for developing procedures relating to Environmental Management to other personnel; • Reporting on the performance of Environmental Management to top management for review and continued improvement; • Making sure managers and supervisors have the knowledge to fulfill their responsibilities e.g. train the trainer programs; • Identifying compliance requirements	Awareness of the organisation's significant environmental issues and why they are deemed significant. Understanding of techniques that might be applicable in controlling these issues. Knowledge of trends in the development of significance, eg. legislation, community expectations, and their relevance to business development. Understanding of techniques to communicate and set the agenda for environmental issues within the organisation. The identification of opportunities for improvement. Knowledge of relevant techniques for environmental management as defined by industry codes and affiliations. Knowledge of designing and implementing Environmental Management Systems. Understanding of the legal implications of breaches (both corporate and individual liability).

Senior Managers	• Responsible for effective implementation of the procedures for Environmental Management within their overall areas of operation (or as required by the Environmental Management Representative); • Accountable for employees working under them; • Ensuring personnel in their area are aware of environmental management system procedures and work instructions; • Identifying the resources that they require and justifying those requirements to senior management; • Ensure the commitments in the Environmental Policy are maintained; • Ensuring employees of the Manager's area are made aware of procedures, Environmental Critical Control Points and other aspects that relate to the Environmental Management; • Specific responsibilities are to be identified and formally assigned.	Understands which environmental issues affect the business. Understands legal implications of breaches (both corporate and individual liability). Has knowledge of how to incorporate environmental considerations into business planning and decision making. An understanding of Environment Management at the facility. The identification of opportunities for improvement. An understanding of liabilities associated with environmental impacts.
Operations or Middle Managers	• Responsible for effective implementation of the Environmental Management Procedures within their overall areas of operation (or as required by the Environmental Management Representative); • Accountable for employees working under them; • Ensuring personnel in their area are aware of environmental management system procedures and work instructions; • Identifying the resources that they require and justifying those requirements to senior management; • Ensure the commitments in the Environmental Policy are maintained; • Ensuring employees of the Manager's area are made aware of procedures, Environmental Critical Control Points and other aspects that relate to Environmental Management; • Specific responsibilities are to be identified and formally assigned.	An understanding of the significant environmental effects of the activities they manage, the reason these aspects are significant and the available means for controlling these effects. The roles of individuals they manage in ensuring environmental protection and the skills these individuals require to be effective in these roles. An understanding of environmental legislative requirements. The legal implications of breaches (both corporate and individual liability). The identification of opportunities for improvement. An understanding of the environmental significance of decisions they make. An understanding of the Environmental Management System and their roles and responsibilities.
Employees with specific environmentally related tasks	• Undertaking their work as described in the Environmental Management System procedures and Standard Operating procedures; • Reporting Non-Conformances; • Responsible for environmental performance within the scope of their activities; • Identify areas for improvement; • Showing initiatives in Environmental Management	Knowledge of what is required in normal and abnormal operating conditions and why. Understanding of the importance to the organisation and environment of any failure to undertake their tasks properly. The legal implications of breaches (both corporate and individual liability) Understanding of how their tasks fit into the wider activities of the organisation, its policy and objectives. An understanding of their responsibilities with respect to Environmental Management. The identification of opportunities for improvement.
General Workforce	• Undertaking their work as described in the Environmental Management System procedures and Standard Operating procedures; • Reporting Non-Conformances; • Responsible for environmental performance within the scope of their activities.	An understanding of how processes performed by the operator can impact the environment. Knowledge of steps they can take to minimise these impacts. The legal implications of breaches (both corporate and individual liability). An understanding of responsibilities within the Environmental Management System. The identification of opportunities for improvement. An understanding of relevant procedures detailed in the Environmental Management procedures.

6.1.3 Recording and Communicating Responsibilities

Roles and responsibilities need to be documented and communicated to relevant employees so that there is understanding amongst managers and employees of what is expected of them and what is expected of fellow employees. In addition, documented responsibilities allows for new employees or third parties to quickly understand the roles of employees in the Environmental Management System, and provides a record that assists in the demonstration of due diligence.

The ISO 14001 Standard has specific requirements for designation of roles, responsibilities and authorities. These are:

"Roles, responsibility and authorities shall be defined, documented and communicated in order to facilitate effective environmental management.

Management shall provide resources essential to the implementation and control of the environmental management system. Resources include human resource and specialised skills, technology and financial resources"

In order to define environmental responsibilities within your management structure, a useful tool is an organisational chart that states what the environmental roles are according to the existing company structure. This can be used to ensure that those with environmental management responsibilities have the authority to carry out their roles.

There are a number of ways to document and communicate responsibilities. These include:

- Job descriptions;
- Key Performance Indicators (KPI's);
- Procedures; and
- Matrices.

Job Descriptions

Job descriptions are a common way (already used at many meat processing facilities) to define the responsibilities of an employee that holds a particular position. They would normally describe job-related activities such as expected work requirements and specific job tasks. In the same way as for most task related work, requirements and roles with respect to environmental management could also be integrated into these position descriptions.

Key Performance Indicators

Responsibilities may be written in terms of achieving set performance targets. These may be stated in job descriptions.

Procedures

A number of procedures will be required to be developed as part of any Environmental Management System. These procedures should contain roles for those responsible for any part of the procedure. The procedures as set out in Section 11: Operational Control and Monitoring Procedures details these requirements.

Matrices

Matrices can be used to describe employee responsibilities in a summary form for quick reference.

6.2 INTERNAL COMMUNICATION AND REPORTING

Once the decision has been made to develop a system to manage environmental issues, methods of communicating the system and its details to employees at the facility need to be established.

This requirement is formalised in the ISO 14001 Standard which requires *"that the organisation shall establish procedures for internal communication between the various levels and functions of the organisation."*

Action Checklist:	Done (Y/N)	Date Completed
By now you should have: • **Nominated an appropriate environmental management representative.** • **Defined general roles ;and responsibilities for all staff with respect to ISO 14001; and** • **Communicated these in an appropriate way (i.e. job descriptions, procedures, etc.).**		

6.2.1 Initial Awareness Training of the System

The Initial Awareness Training of the System is the first obvious step in communicating the company's commitment to environmental management and the system for managing its environmental issues. In order to have a successful launch the system needs to be communicated effectively to all employees with high level management support indicated. This can also be considered environmental awareness training. A suggested method for this includes:

- The General Manager to hold a workshop with senior personnel to notify them of:
  - the system;
  - the importance of the policy;
  - the reasons for implementing the management system;
  - the environmental management representative given the responsibility for the system;
  - the planned method of development of the system; and
  - a timeframe for implementation of the system.

- Conducting workshops for employees. This could be at regular change of shift meetings, or be a formalised meeting at any other appropriate time. The workshops could be given by the senior managers and cover similar aspects as detailed above, although they should be presented in a way that is appropriate to the employees needs.

This issue of awareness training is also dealt with in Section 8.0: Environmental Training.

6.2.2 Ongoing Communication and Reporting

The internal communication and reporting of specific elements of any system for environmental management is crucial to the ongoing success of environmental management at the facility. This communication needs to address all employees at the facility who have environmental tasks or undertake tasks that have been identified to be associated with significant impacts. This includes the tasks required in Section 5: Identifying Environmental Risks and Control Strategies.

Typically, communications for environmental management at your facility should involve the following personnel:

- General Managers;
- Senior Managers;
- Operations or Middle Managers;
- Works Engineers;
- Departmental Supervisors;
- Employees tasks related to significant environmental issues;
- The Environmental Representative; and
- General Employees.

You may already have established means of communicating to personnel in your organisation. As part of developing your communication procedure, you should examine your existing communication forum for their effectiveness for communicating both upwards and downwards on environmental issues. Once you have evaluated this you may identify areas where existing communication forums can be used for environmental communication and areas where new forums need to be created. Detailed below are some other methods you may want to consider to effectively communicate internally.

- **Team Meetings** Many companies implementing environmental management strategies initiate the formation of a central group to provide a focus for decision making on environmental issues for the facility. This group is often called an environmental team or and environmental committee.

  It is important that the team contains people with management authority, and as such it follows that the team would comprise management and others with key environmental management responsibilities. The team may even be formed from an existing management team. The team would typically meet on a monthly basis and discuss any issues relating to environmental management that have arisen. The meeting may comprise part of existing business or other management type meetings

  Minutes of the meetings are generally developed and can be written up and put in public areas for all personnel to have access to them.

- **Performance Evaluation** Most companies have some sort of performance evaluation of employees, with criteria specific to the tasks required of the person. Environmental performance indicators can be bought into the criteria for all personnel, with environmental criteria being related to responsibilities for environmental management.

- **Training** Training is an effective way to communicate many aspects of environmental control to all levels of employees. Discussion of training requirements is detailed in Section 8.0: Environmental Training.

- **Ideas for Environmental Initiatives and Complaints** It is important that all employees have a means to provide input, either positive or negative, to environmental management. In order that employees feel a comfortable in providing this input, a forum for all employees to report on environmental management at the facility should be developed. This could cover:

  - Suggestions for improvements in environmental management and systems management;
  - Environmental initiatives for the facility or employees;
  - Environmental incidents, complaints and other issues at the facility that need to be developed. (A method for this is discussed in Section 12: Getting Problems Reported and Solved)

The appropriate forum may be monthly, quarterly or weekly meetings and may be coupled with Quality or OH&S Meetings.

- **Environmental Coordination** Communications systems between the Environmental Management Committee (if one is developed, which normally comprises managers and others with environmental management responsibilities) environmental coordinator, senior management and employees is required in order that information relating to the environment management can be distributed effectively amongst the facility. Methods for this includes company newsletters, notice boards, information sheets and the like. As a minimum, methods of communication between the following personnel should be developed:

  ⇒ General Management to all personnel;
  ⇒ The Environmental Manager to the General Manager;
  ⇒ The Environment Manager to all personnel; and
  ⇒ The Environmental Management Committee to all personnel.

- **Corporate Communications** Where the corporate headquarters are located separately from the site, methods to communicate aspects of environmental management at the site to corporate headquarters, and from the headquarters to site, should be set up.

6.2.3 Preparation of Procedure

Once you have identified the key internal communication forums within the organisation for environmental management you should then consider the value in documenting this procedure. As discussed in Section 2.0 the need for a documented procedure should be considered on site by site basis depending on the perceived value of a documented procedure.

6.3 EXTERNAL COMMUNICATION

This section covers the requirements for communication of any aspect of environmental management to people and organisations external to the facility. Such organisations could include:

- Government authorities such as the EPA, Local Councils, Local Water Authorities and State agencies such as in NSW the Department of Planning, and the Department of Water and Land Conservation;

- Environmental Groups such as local concerned residents, Greenpeace and Animal Rights groups;
- Media reporters;
- Neighbours; and
- Community Groups such as schools, local business communities and progress associations.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have: • **Identified how your facility will manage the communication of environmental management and the Environmental Management System to employees at your facility and to Corporate personnel;** • **Developed procedures to formalise these communications; and** • **Begun to implement these procedures.**		

The ISO 14001 Standard requires that "*With regard to its environmental aspects and environmental management system, the organization shall establish and maintain procedures for receiving, documenting and responding to relevant communication from external interested parties.*

The organisation shall consider processes for external communication on its significant environmental aspects and record its decision."

This section is split into two sections:

1. proactive reporting, or reporting initiated by the facility; and
2. Reactive reporting, such as in the case of an environmental incident.

6.3.1 Proactive Communications

Proactive communication is initiated by the facility, and can be used to raise awareness of the environmental management initiatives at the facility. It has many potential benefits, not the least of which could be the maintenance of a transparent and cooperative relationship with external stakeholders such as neighbours and government enforcing agents.

Examples of proactive communication includes:

- **Environmental Performance Reporting**: Detailing environmental performance in a report generated for the public or any other stakeholder. This reporting is aimed at making business more transparent to the general public. Many companies have developed these reports. Recently, the NSW EPA has developed a guide for writing Environmental Reports that may be useful in determining what is required.
- **Open Days** Open days allow for a sense of the community being involved at the site. However, this approach may not be appropriate in all locations, depending on the operations
- **Community Handouts/Newsletters** Communication regarding issues that may impact on neighbours, such as potential odour issues.
- **Reporting to Government Authorities** This includes regular reporting to government authorities outside of regulatory requirements such as stated in licence or permit conditions (discussed further below). Regular reporting to such authorities may help to engender a more positive relationship with the authorities than maintaining a minimal level of communication.

In addition to the reporting requirements above, consideration should be given to internal assessment of planning, so that while not only the best result for the Regulatory agencies is gained, the facility can incorporate benefits from the lessons learnt at other developments.

6.3.2 Reactive Communication and Handling Complaints

Reactive communication covers all required communications with regulatory authorities such as the EPA, Local Council as well as Community Groups, neighbours or anyone from the public. Typical communications include reporting of compliance with licence or permit conditions, response to external complaints, or general environmental issues.

In the case of legal action where it may be important that due diligence can be demonstrated, it may be important that procedures are developed to manage and record these communications effectively.

Examples of external reporting of a reactive nature, where procedures may be required to ensure that effective management and recording of the communications can be demonstrated include:

- reporting monitoring results and other material to demonstrate compliance with the site licence;
- responding to complaints from the general public or community groups;
- responding to questions or issues raised with government authorities; and
- reporting of monitoring of effluent discharges to the local water authority.

Procedures for dealing with complaints could be done in conjunction with Section 12.0: Getting Problems sorted out, which discusses the development of methods to deal with things that go wrong on site. **Table 6.3.1** provides a guideline for the minimum issues to be recorded to satisfy the requirements of ISO 14001.

Table 6.3.1

Typical Complaints Log

Date & Time	Person & Contact details	Detail of Complaint	Response	Employee Initials
30/3/99 5:00pm	Mrs. Brown 48753332	Odour complaint	Irrigation of waste water ceased until the wind stops	DB
2/4/99 3:00pm	David Parker Greenpeace 02 99531111	General complaint about our facilities environmental performance	Sent a copy of our environmental policy and asked our environmental representative to call see letter reference xxxx	DB

6.3.3 Communications in the Planning Process

There are a number of considerations in the planning process that should be communicated to relevant authorities, in order that planned developments are designed and constructed in a way that is consistent with the requirements of these authorities.

Many companies have gone through the process of design and construction, only to find that the operation of the plant or equipment did not meet requirements of a government authority. It is important to ensure that all current and likely future requirements of authorities are identified and

documented early in the design phase, in order that they can be incorporated with little costs. Retrofitting unsuitable equipment is normally a much more expensive option.

To prevent this, communications need to be set up between the facility and local authorities for the planning phase of work that may have an associated significant risk or impact. In addition, external contact should be made with suppliers and other users of similar equipment in order that the most suitable equipment is used in all situations. The facility should solicit response from these parties proactively, such that the ultimate design is the best for a given situation.

A checklist of typical planning actions is given below:

- Identification of environmental issues for the development;
- Noise limits from the EPA or local council;
- Wastewater effluent limits from EPA or local council;
- Dangerous goods storage requirements from WorkCover or equivalent;
- Future development plans by Council for the given area and its surrounds, eg potential for change in landuse around the site that may limit site's operations;
- Identification of air emissions and what limits may apply in minimising the odour levels under the EPA or Local Council;
- Stormwater management issues from Council; and
- Initiatives for waste reduction programs required by Council or EPA.

6.3.4 Preparation of a Procedure

As discussed in Section 6.2.3 the value in preparing a procedure to cover external communication should be considered on a site by site basis using guidance from Section 2.0.

Action Checklist:	Done (Y/N)	Date Completed
By now you should have: • **Identified how your facility will manage the communication of environmental management and the Environmental Management System to external parties such as government authorities and the general public;** • **Identified how you will handle complaints;** • **Identified the need for communications with local authorities with respect to planning requirements for future works with significant environmental risks or impacts;** • **Developed procedures to formalise these communications; and** • **Implemented these procedures.**		

7. SETTING ENVIRONMENTAL OBJECTIVES AND TARGETS

This section covers the process for planning environmental improvement through the establishment of environmental objectives and targets. The requirements of ISO 14001 are explained and a method is suggested for implementing environmental improvements according to the standard or without the standard as a model. Methods for successful goal determination at your site are discussed.

One of the key goals of an Environmental Management System is to allow and provide a structured process for continual improvement, the rate and extent of which will be determined by you in view of your site specific needs and issues.

ISO 14001 states that *'although some improvement in environmental performance can be expected due to the adoption of a systematic approach, it should be understood that the Environmental Management System is a tool which enables the organisation to achieve and systematically control the level of environmental performance that it sets itself.'*

To this end you should develop a process as part of your Environmental Management System which will manage the extent to which the site improves its environmental performance. This improvement will be different for each site depending on the issues facing the site and the pressures it is under with regard to environmental interests.

As a minimum the Environmental Management System should incorporate basic project management principles in that end goals are defined, milestones to achieve the final results are identified and the actions necessary to reach the milestones are communicated to the relevant employees.

ISO 14001 has the following requirements for setting objectives and targets and establishing an environmental management program:

"The organisation shall establish environmental objectives and targets, at each relevant function and level within the organisation.

When establishing its objectives and reviewing its objectives, an organisation shall consider the legal and other requirements, its significant environmental aspects, is technological options, its financial, operational and business requirements and the views of interested parties.

The objectives and targets shall be consistent with the environmental policy, including a commitment to prevention of pollution."

The following hierarchy should be applied to the setting of your improvement goals:

Objectives	=	Long term goals
⇩		
Targets	=	Short term goals
⇩		
Programme	=	Definition of who does what and by when to meet the targets

Implementing an Environmental Management System and/or any significant process or facility changes to meet environmental requirements will often require substantial investment of both time and money. This investment should be planned. If you do not already have a system for recording goals and allocating resources (both personnel and capital) then the following proforma may assist you to document the goals and actions. You may even find it a useful way of recording environmental planning information and keep it recorded separately to other business planning activities although the links should be apparent to you.

Table 7.0
Environmental Improvement Planning Form

Objective	Priority/ Source	Targets	Action	Responsible Person	Deadline	Estimated Cost ($)
1. Reduce Stormwater Pollution	Table 5.9	1. See below				
		2.				
		3.				
2. To have a workforce who is aware of their environmental obligations	System	1. Identify training needs				
		2.Conduct Awareness training for 100% of personnel				
		3. Develop contractor induction training package				
3.		1.				
-						
		2.				
		3.				
		4.				

The objective should generally relate to a significant issue raised in Section 5 Table 5.9. If the issue raised in Section 5.9 can not be managed through control procedures then objectives and targets may need to be identified to manage this significant issue.

Other potential sources for environmental objectives include:

- The environmental policy;
- Issues associated with implementing the system; and
- Issues associated with the organisations legal and other requirements (see section 4.0).

The number of targets needed to meet an objective is up to you. The more you break down the long term or large goals, the easier it will be to manage the implementation of the necessary actions.

The other important part of setting objectives and targets is to ensure that they are assigned to the relevant personnel within the facility and that the environmental manager does not get assigned as the responsible person for all of the environmental objectives and targets.

Also, for each target, a number of actions may be required. These actions can be broken down to the detail of specifying the action as required. The following example may be useful in understanding this approach:

Objective	Priority/ Source	Targets	Action
Reduce Stormwater Contamination	High Reference Table 5.9	1. Contain stormwater runoff from farm area dams and treat	A) Install overflow weir at farm dams
			B) Redirect pipe to treatment plant
		2. Contain leaks from the fuel store	A) Conduct regular (yearly) integrity inspections of all tanks
			B) Install bunding around the fuel store
		3. Reduce suspended solids from entering drains	A) Revegetate disturbed soil area to reduce sediment movement
			B) Install grit traps in site drains

If used and diligently managed the above system to its maximum extent it can be a powerful project management tool both for the development and implementation of your Environmental Management System and for longer-term management of environmental activity on the site.

When deciding what goals you should set for your Environmental Management System it will be of much use if you follow the age-old guidance of SMART goal setting.

SMART goal setting involves:

- Specific;
- Measurable;
- Achievable;
- Realistic; and
- Traceable.

A typical goal a company may set is 'To reduce waste'. If the SMART principle were applied to this goal the following changes would occur:

Make the goal specific:

What type of waste are you going to target? The more specific you can be the more likely you are to have a successful outcome both in terms of achieving the goal at the end of the day but also ensuring staff understand what they have to do

Make the goal measurable:

How much are you going to reduce the production of the specific type of waste by and against what benchmark and against what criteria? Is it feasible to measure these criteria – do you need to rethink the units?

Make the goal achievable:

This is taken to mean achievable within the confines of your operation i.e. the financial and operating constraints you may have as a business in a competitive market.

Make the goal realistic:

This is taken to mean ensuring that it is technically feasible for the goal to be met. For example, a goal of zero waste may not be technically impossible.

Make the goal traceable:

It is important in setting objectives and targets that the overall goals are traceable throughout the company. For example a goal of reducing paper waste may well affect several departments; the targets for each department should reflect the overall objective for the company.

Therefore, a SMART objective may be to:

'Reduce the phosphate loading in effluent discharged as irrigation water to Xmg/L per head of throughput by the year 2000'

Or

'Reduce the phosphate loading in effluent discharged as irrigation water by 35% by the year 2000 based on 1990 levels'

7.1 Tracking Performance

It is important that you establish a system to monitor the company's performance in achieving the goals that have been set.

There are many ways this can be achieved. The frequency, which the performance assessment needs to be made, will depend upon the timescales established in the goals. For example, if there are a series of targets with weekly or monthly timescales, the performance reporting frequency will need to be different from a situation where most targets have yearly timescales.

It is suggested that the environmental representative be required to report on performance of objectives and targets at board meetings. In this way performance will be measured and senior management remains informed of progress.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have:		
• **Understood the requirements of ISO 14001 for continual improvement and the need for objectives and targets;**		
• **Developed objectives and targets for your site to improve its environmental performance based on the risk identified and the Policy of your site;**		
• **Completed the template as provided or a similar system to record the Objectives, Priorities, Targets, Actions, responsible persons, deadlines and costs for environmental improvement at your site; and**		
• **Demonstrated partial achievement of your objectives and targets.**		

8. ENVIRONMENTAL TRAINING

Environmental Training is an important part of Environmental Management. The competency of all personnel, and thus the whole of the Environmental Management System, relies on their ability to carry out their specific roles (as discussed in Section 6). Environmental training, along with relevant experience is crucial in ensuring this competency.

This section highlights the requirements for Environmental Training, and puts forward a method to undertake an environmental training needs analysis in order that:

- **Requirements for each role are determined (defined in Section 6);**
- **Criteria for each role are determined;**
- **Training needs for individuals with responsibilities in environmental management are identified; and**
- **Records are maintained to demonstrate appropriate environmental training.**

Following the needs analysis, a Training Program should be developed. This should be a progressive program aimed at meeting the needs analysis results. A number of training options for various staff members are discussed.

The Company should ensure that people given environmental responsibilities within the framework of the Environmental Management System are trained to effectively handle these responsibilities (such as outlined in **Table 6.1.1**). This can be done through a formal environmental educational/training structure or integrated into other training programmes that may already exist, such as for quality or induction training.

The ISO 14001 Standard has defined requirements for training. It states that *"The organisation shall identify training needs. It shall require that all personnel, whose work may create significant impact upon the environment, have received appropriate training.*

It shall establish and maintain procedures to make its employees or members at each relevant function and level aware of:

a) the importance of conformance with the environmental policy and procedures and with the requirements of the environmental management system;
b) the significant environmental impacts, actual or potential, of their work activities and the environmental benefits of improved personal performance;
c) their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the environmental management system, including emergency preparedness and response requirements; and
d) the potential consequences of departure from specified operating procedures.

Personnel performing the tasks which can cause significant environmental impacts shall be competent on the basis of appropriate education, training and/or experience."

In summary, in order to meet these requirements, the site must:

- identify training needs for all levels of employees;
- ensure that all personnel who work in areas related to environmentally significant issues have received appropriate training; and
- ensure that employees have relevant training for their function.

8.1 TRAINING NEEDS

8.1.1 Employees

This section will investigate methods to identify environmental education and training needs for employees.

Specific Environmental Responsibilities have been determined in Section 6. These are summarised in **Table 6.1.1**, for general employee groups. It is anticipated that other groups will exist outside of the nominated groups, and therefore the table may need to be altered to suit particular company structures.

The following personnel groups were identified in Section 6.

- General Manager;
- Senior Managers;
- Operations or Middle Managers;
- Employees with environmental related tasks;
- General Employees; and
- The Environmental Management Representative.

For those employees who have been identified as having specific environmental responsibilities, the identification of competencies, qualifications or skills required will provide a basis for a training needs analysis.

8.1.2 Training Needs Analysis

The proforma provided in Table 8.1 can be used to conduct and document a Training Needs Analysis.

Roles

In this column the role of a particular employee at the facility is listed. The roles are for anyone that has an input to environmental management or has tasks associated with significant environmental issues. The requirement is to list all roles as considered appropriate for the facility.

Role Criteria

In this column, the competency criteria for each of the roles are established. Levels of competency may be identified through individual qualifications, acknowledged skills or years of experience in a particular position or field.

For example, an Environmental Management Representative may need to be trained in Environmental Management Systems Auditing and have had 5 years experience in the meat industry to be able to demonstrate competence in their role.

Person

This column records name of the person who is in or has been nominated for the role as described in Column 1.

Training Needs

For each employee, the training needs are determined by assessing what training and/or experience is required for each employee to bring them up to the competence required for their position. This will depend on the existing level of training and competency of the individual.

Training courses that are available internally and externally will need to be identified to meet training needs. Details of typical training programs that may be appropriate are detailed below in Section 8.2. Once these training requirements are identified, a Training Plan can be developed that will plan the method for the provision of training as detailed. This is further discussed in Section 8.2.

Record of Proof of Training and Experience

In this column, records that demonstrate the training and experience of personnel are listed. This should be regularly updated to demonstrate that all personnel have sufficient training to be competent in their roles. These records will assist in the demonstration of due diligence.

ISO 14001 requires that all people who perform tasks that can cause significant environmental impacts, that is, responsible for any ECCPs, will need to demonstrate that they are competent to perform these tasks. Methods to do this include the passing of a test following a training course, certification with third party bodies, proven experience in the field or similar measures. These details should be included in the records of the needs analysis.

All facilities locations must identify training needs for contractors or suppliers who are employed at the property. Contractors who work on activities linked to significant environmental risks or impacts at the company should undertake induction training.

8.2 ENVIRONMENTAL TRAINING PROGRAM

Once the training needs analysis has been completed for personnel at the facility, an Environmental Training Program to progressively meet the requirements of the need analysis (to achieve the required level of competency, qualifications or skills for personnel) will need to be developed.

The Training Program will define training to be undertaken by all personnel with environmental management responsibilities. The training, will vary depending on the findings of the training needs analysis, hence different levels of personnel will get different levels of training.

A list of some typical environmental training courses available is detailed in **Table 8.2.**

In order that the training requirements are kept up to date, there should be a mechanism for periodic review of the training needs, the available programs, and the implementation of the training plan.

8.3 CONTRACTORS

For contractors who may operate on your site, especially if their tasks relate to operations that are linked to significant impacts, training requirements should be identified and provided. The level of training may depend on their own company's environmental training, or the extent to which they operate at your site. At a minimum, induction training is considered essential. This should cover:

Table 8.1
Employee Competence Record

Role	Role Criteria (Training and experience required)	Person	Training Needs	Record of proof of training, experience & competence
EMS Auditor	a) trained in Management Systems Auditing	Fred Dunn	Undertake 3 day Environmental Management System auditor course and 3 day Technical Environmental Auditor Course	Completed EMS Auditor Certification Course (QSA Certified) and passes the exam
	b) aware of the site EMS			Involved in the development of the EMS
	c) has had 5 years experience in the meat industry			Has 10 years in the meat industry
Environmental Manager	d) has meat industry experience	Joe Buckley		Worked at MMI for 5 years as a slaughterman
	e) has had 3 years experience in environmental management			Environment manager at MMI for 3 years
	f) understands environmental law and its application to the meat facility			Completed course in Environmental Law by correspondence with Griffith Uni.
Environmental Compliance Auditor	g) degree in environment management or similar	Bill Anderson		Has degree from Bond University
	h) knows the site			Has worked at the site for 5 years
	i) certified auditor with QSA			Has certification with QSA
Area Environmental Coordinator eg Boning Room Supervisor	Completed Induction Training	John Spong		Completed Induction Training on 3/1/98
	Completed External 2 day course on Environmental Policy and EMS			Will complete the course on 4/5/98
Any Permanent Employee	Completed two hour induction course presented by Environment Manager	Various		Completion of the induction training

- Training on the emergency procedures for the site;
- Safety equipment required in certain areas;
- Significant environmental issues at the site;
- Environmental issues that people will be involved/responsible for; and
- Records should be kept of training requirements and training undertaken for contractors.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have: • **Understood the objectives for Environmental Training;** • **Conducted an Environmental Training Needs Analysis by following the method identified in Section 8.1. This includes:** ☐ **Ensuring the competency criteria for each role is determined;** ☐ **Identification of training needs for individuals or positions with responsibilities in environmental management in order that the required level of training is provided to all relevant personnel;** ☐ **Recording the process of the needs analysis and training provided using a suitable method such as demonstrated in Table 8.1** ☐ **Recording data maintained to demonstrate competency of people in their roles.** • **Developed a Training Program to meet training needs;** • **Identified a plan for implementing the training program;** • **Identified a method for updating the environmental training needs analysis as required; and** • **Developed a training procedure.**		

Table 8.2
Types of Training Courses for Employees and Contractors and their Expected Outcomes

Type of Training	Training Outcomes	Suggested Audience
1. 1. Environmental Compliance Training	Identification and awareness of legislative responsibilities. Awareness of due diligence liabilities. Updates on new and planned legislation.	Corporate managers. Employees whose actions can affect compliance.
2. Induction Training	Awareness of site and environmental issues at the site Awareness of the Environmental Management System and specific responsibilities for Environmental Management. Awareness of Environmental Emergency requirements specific to relevant personnel	All new personnel and contractors.
3. Environmental Issues and Awareness Training (this should be tailored to cover site specific and company specific issues, as well as an introduction to regulatory issues)	Identifies environmental issues that people may not have understood or known of, therefore increases sense of commitment and environmental responsibility for their work activities. Instils a sense of environmental responsibility. Promotes involvement in environmental management. Provides baseline of knowledge for all to work from. Can provide a line of communication of environmental policy, requirements under the policy and corporate objectives to all employees, and thence achieve some level of commitment to these. Facilitates understanding of the organisation's intent in environmental management.	All personnel
4. Specific Training for procedures	Acceptance of procedures. Assurance that procedures are understood by all relevant personnel. Compliance with procedures. Increased awareness of the Environmental Management System and its objectives.	Staff who are required to perform specific duties in environmental management, especially those covered by specific procedures.
5. Environmental Management Systems Training	Increased sense of ownership of and involvement in the system. Awareness of the structure and elements of the system. Awareness of all significant roles and responsibilities in Environmental Management. Awareness of program for Environmental Management System implementation, achievement of objectives and targets etc. Awareness of documentation required for the system.	All personnel
6. Emergency Procedures Training	Continued awareness of emergency response procedures Awareness of evacuation procedures	All personnel
7. Environmental Compliance Auditor Training	Further consolidates environmental awareness and compliance training. Provides an in house resource for identifying environmental issues, impacts and aspects. Reduces the requirement for use of external consultants. Establishes a core group of internal auditors that can conduct audits thereby keeping knowledge in house.	Specific staff targeted to conduct environmental audits, to be involved in the audit process, or to be involved in developing impacts and aspects registers.
8. Environmental Management Systems Auditor Training	Provides an understanding of the potential problems and pitfalls of Environmental Management System. Detailed understanding of the Environmental Management System. Identifies what to look out for in Environmental Management System implementation and auditing.	Key personnel responsible for the development and implementation of Environmental Management System and any personnel requiring detailed understanding of the system.

9. GUIDANCE ON CONTROL OF DOCUMENTATION

Documentation is required as part of any Environmental Management System to be able to define the processes and procedures that make up the Environmental Management System, particularly in respect of being able to demonstrate due diligence. In addition, there are specific requirements for documentation in the ISO 14001 standard.

This section discusses:

- **The records that must be kept as a minimum;**
- **Documentation required under the ISO 14001 Standard;**
- **A Document Control System; and**
- **A Record keeping system.**

Documentation of environmental management procedures is an important part of demonstrating due diligence, as well as being required as part of a management system that is to be certified to ISO14001.

All procedures should define the following for the task in question:

- Who
- What
- When

The 'who' component of the procedure addresses who is responsible for taking the relevant actions ('what') and at the specified frequency ('when').

9.1 RECORDS NECESSARY AS A MINIMUM

You need to keep evidence of some of your decision-making processes with regards to environmental control and some records which will enable you to demonstrate due diligence.

As a minimum it is recommended that the following records be kept:

- The process you went through to identify your environmental risks;
- The job descriptions or other means of allocating environmental responsibility;
- Legal requirements;
- Permits and licenses;
- Monitoring records;
- Environmental training records;
- Inspection, calibration and maintenance work;
- Details of non-conformances, accidents, complaints and subsequent follow-up action;
- Waste disposal information; and
- Contracts which define liabilities between contractors, suppliers and your company.

9.2 ENVIRONMENTAL MANAGEMENT SYSTEM DOCUMENTATION

The ISO 14001 standard states the following requirements for documentation of an Environmental Management System.

"The organization shall establish and maintain procedures for controlling all documents required by this International Standard to ensure that:

a) they can be located;
b) they are periodically reviewed, revised as necessary and approved for adequacy by authorized personnel;
c) the current versions of relevant documents are available at all locations where operations essential to the effective functioning of the environmental management system are performed;
d) obsolete documents are promptly removed from all points of issue and points of use, or otherwise assured against unintended use; and
e) any obsolete documents retained for legal and/or knowledge preservation purposes are suitably identified.

Documentation shall be legible, dated (with dates of revision) and readily identifiable, maintained in an orderly manner and retained for a specified period. Procedures and responsibilities shall be established and maintained concerning the creation and modification of the various types of document."

Therefore you need to develop a document or process which (in paper or electronic form) describes the core elements of the management system and how they interact. It should also provide direction to be able to identify the whereabouts of all documents and records generated by the Environmental Management System.

It has been the experience of the meat processing sites involved in the pilot programme of this tool that a manual containing the procedures and a separate manual containing the documents that are generated as a result of implementing the procedures was the best way of keeping the documentation. This proved to be a good way of keeping the procedures and documents together but divided so that they were easily found when required. The records were kept somewhere else – in most cases in the department where they were generated.

There are a number of ways in which this can be achieved. You can develop your Environmental Management System in such a way that there are electronic links (hypertext links) between the various documents and levels within the Environmental Management System.

Alternatively, you can write a front section to your Environmental Management System manual that describes the Environmental Management System and how it works.

The main links that need to be addressed in this part of the Environmental Management System are the following:

1) The hierarchy of defined goals and actions and how these relate to different departments:

Policy ⟶ Objectives ⟶ Targets ⟶ Programme

2) The hierarchy of controls developed to monitor and reduce risks identified:

All environmental issues identified

↓

Those issues identified as "significant"

↓

The operations/processes that result in the significant issues/risks

↓

The Environmental Critical Control Points (ECCPs) within those processes

↓

The defined operating parameters for the ECCPs

↓

The monitoring procedures linked to the operating parameters

↓

The operational control procedures/work instructions used to control these operations

3) The reporting processes to reflect communications from external parties to the company and how these are responded to (refer to section 6).

9.3 DOCUMENT CONTROL SYSTEM

If you do not have a document control system as part of a quality management system you must develop a document control procedure which is implemented with regard to all the documents which form part of the Environmental Management System. It is a common failing in both quality and environmental management systems that document control systems merely cover procedures. This is a gross omission of one of the core purposes of the management system. The main purpose of the document control system is to ensure that all documents necessary to implement and to demonstrate effective implementation are maintained in an appropriate manner.

It should be remembered and is worth noting before going any further in the development of a document control system that it is very easy to allow the document control system to become too onerous. The purpose of the document control system is to support the Environmental Management System and to allow the company to improve its environmental performance.

The document control procedures should ensure that:

- all documents can be found;
- all documents are periodically reviewed, revised and approved for adequacy by authorised personnel. This should be defined so that someone is made responsible for this at a specified frequency;
- the current versions are used where appropriate;
- obsolete documents are promptly removed from all points of issue and use;
- documents are stored in a way that they remain legible;
- that documents are dated (including revision dates);

- all documents are retained for a specified period; and
- individuals have allocated responsibility for creating and modifying documents.

9.4 RECORD KEEPING

You must keep environmental records to be able to demonstrate compliance with legislation, any memoranda of understanding that you may have agreed to and signed on to with local industrial groups or community groups and the Environmental Management System requirements itself. The latter is especially important if you intend to achieve certification to ISO 14001 at some point in the future. Records are your means of showing that you have conducted certain activities that put you in a good position to demonstrate due diligence.

The Environmental Risks and Control Strategies table (see Section 5.9) is a good place to document which records need to be kept for the Environmental Management System.

You should develop a procedure to ensure that records are kept in an appropriate manner. The procedure should include consideration of the following:

- Identification of what is worth keeping as a record;
- Collection of records;
- Indexing;
- Filing;
- Storage;
- Maintenance;
- Retrieval for future use;
- Retention times; and
- Final disposal (this should take into account the sensitivity of the information).

A simple record keeping system could be developed around a table listing the records that need to be kept, where the record can be found, the retention time and who is responsible for it as shown in **Table 9.4.**

Table 9.4
Record Keeping System

Record Name	Location	Retention Time	Responsible Person

Typical records that could be kept include effluent monitoring results, any monitoring required to demonstrate compliance with regulatory requirements, emissions data, product use, disposal volumes and any measurement of environmental performance with respect to benchmarks.

Action Checklist

By now you should have:

1. **Identified the minimum records that your facility should keep;**
2. **Identified which documents, in addition to the minimum documents as identified above, are required to be kept as part of your environmental management system;**
3. **Developed procedures detailing what records will be kept and how; and**
4. **Developed a document control system suitable for your Environmental Management System;**
5. **Developed a procedure on document control; and**
6. **Developed a record keeping system.**

10. EMERGENCY PREPAREDNESS

Emergency situations often have environmental impacts such as water that you use to control fires or chemical spills discharging into local waterways. Environmental Management Systems should have procedures to manage these potential environmental emergencies so that environmental impacts can be minimised. This section covers the steps involved in the development of these procedures. These are:

- **The identification of potential environmental impacts from emergency situations at your facility;**
- **Assignment of responsibilities for the management of the identified potential emergencies; and**
- **Development of the procedures for the management of the identified environmental impacts from emergencies situations.**

Once the procedures are developed, they need to be effectively practiced and maintained to keep up with changes in hazards or the nature of the facility. The section describes typical potential emergencies in the meat processing industry and lists the contents of effective procedures.

Emergency situations often have environmental impacts associated with them. For example, water you use to control fires can become contaminated and then discharge to waterways. In order to address these environmental issues, procedures need to be developed that prepare for and manage such emergencies. This section describes approaches for identifying and assessing potential types of emergency situations, and methods for developing strategies to prevent and prepare for in order that associated environmental impacts are minimised.

Most facilities will already have emergency or fire response procedures. In many cases, to cover the requirements of this section, the existing procedures may just need to be modified for environmental issues. The main steps to developing the requirements for this section involve:

1) Identification of the potential for environmental impacts from emergency situations;
2) Assigning responsibilities to employees for emergency management; and
3) Development of procedures for the management of environmental impacts from emergency situations.

For Environmental Management Systems that are to comply with the ISO 14001 Standard, the following requirements must be met:

"The organization shall establish and maintain procedures to identify potential for and respond to accidents and emergency situations, and for preventing and mitigating the environmental impacts that may be associated with them. The organisation shall review and revise, where necessary, its emergency preparedness and response procedures, in particular, after the occurrence of accidents or emergency situations. The organisation shall also periodically test such procedures where practicable."

10.1 IDENTIFICATION OF ENVIRONMENTAL EMERGENCIES

The first step is the identification of all possible environmental impacts from emergency situations. Whether an emergency situation requires a procedure or not will depend on the likelihood and consequence of the emergency occurring (see Section 5). If, through the consequence criteria and likelihood criteria, a significant impact has been identified from an emergency situation, then a procedure should be written to control the impacts.

Typical emergency situations and their causes in the meat processing industry that may require emergency procedures to be developed are detailed below.

10.1.1 Fires

Fires can lead to many environmental impacts. Some typical causes of fires in the meat processing industry are:

- electrical short circuiting;
- welding near flammable materials; and
- combustion of polystyrene panels or other flammable materials.

The environmental impacts from such fires could include contamination of stormwater, release of toxic gases and production of hazardous waste (liquid and solid).

10.1.2 Liquid Waste Emergencies

Liquid waste emergencies include:

- Tallow or fat spills as a result of a breakdown in processing equipment or leakage from storage tanks;
- Blood spills as a result of incorrect procedures in the blood collection area, a breakdown in processing equipment or leakage from storage tanks; and
- Detergents and sanitiser spillage from handling and storage.

The impacts from these emergencies include stormwater contamination affecting downstream watercourses e.g. increasing BOD levels in runoff receiving areas, sedimentation, and fire risk (in the case of dangerous goods waste).

10.1.3 Solid Waste Spills

Solid waste spills can occur in the handling, storage and processing of animal dung, paunch solids and rendering raw material.

10.1.4 Odour Emergencies

Odour emergencies can happen due to:

- Rendering breakdown leading to disposal problems of rendering raw material which can lead to significant odour production; and
- Anaerobic Pond Odour can occur at the start up of the pond or following an event that changes the pond condition. Spills of sanitiser to the pond could make such changes.

10.1.5 Chemical Spills/Leaks

Emergencies related to chemicals storage and handling include (but are not limited to):

- ammonia leaks from the breakdown of refrigerator plant, failure of evaporator or condenser units or as a result of accidents (eg fork-truck hitting ammonia lines);

- chlorine leaks from chlorine stored in water treatment plants for potable water supplies; and
- fuel and oil leaks from above ground and underground storages.

10.2 ASSIGNING RESPONSIBILITIES TO EMPLOYEES FOR EMERGENCY MANAGEMENT

Responsibilities need to be allocated for the development of the emergency procedures and for the implementation of the procedures. These responsibilities should be included in the emergency procedures developed for this section.

10.3 DEVELOPMENT OF PROCEDURES FOR THE MANAGEMENT OF IDENTIFIED POTENTIAL ENVIRONMENTAL EMERGENCIES

Once the emergency situations have been identified, and those requiring procedures to be written are selected, procedures should be developed.

Where possible, existing emergency response plans or procedures should be reviewed and where appropriate modified to include coverage of environmental emergencies.

The following requirements apply to the implementation of emergency response plans/procedures:

- all employees with specific responsibilities in emergency response plans must undergo initial and periodic refresher training; and
- drills involving people, equipment and external emergency services providers (such as the fire brigade or the State Emergency Service) must be undertaken on a planned basis at regular intervals.

10.3.1 Other tasks to be considered in developing procedures for emergency response

There are a number of other tasks and requirements that should be considered of importance in the development of an emergency response plan or procedures.

In summary these tasks are:

- assign responsibility for internal and external communication;
- develop emergency contact lists for internal and external contacts;
- establish criteria for notification of the emergency to senior management;
- establish a hazardous materials inventory for internal and external use;
- identify local emergency services providers and other local providers of expertise which may be of assistance in managing an emergency;
- identify neighbours who should be advised in the event of an emergency;
- identify specific training needs for persons with specific emergency response responsibility;
- identify community communication requirements;
- detail the scope of the plan/procedure(s);
- detail the purpose of the plan/procedure(s);
- having on site spill kits for clean up of liquid waste;

- consider processes for disposal of contaminated absorbent material used during spill response;
- documentation and reporting of incidents;
- review and revision of emergency response procedures;
- distribution list; and
- area and plant maps and plans.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have: • **identified the potential emergency situations at your site that could lead to significant environmental impacts;** • **assigned responsibility for management of the identified emergency situations;** • **developed procedures for the management of the identified potential environmental emergencies; and** • **planned practice drills for emergency response.**		

11. OPERATIONAL CONTROL & MONITORING PROCEDURES

1) OPERATIONAL CONTROLS

Increased levels of formalisation are required to control operations that pose significant environmental risks identified in Table 5.9. This section covers the requirements for these controls, and what should be included in the operational control procedures.

In particular it addresses:

- **Integration of operational controls into other existing system procedures such as quality systems;**
- **When operations are required to have operational procedures written;**
- **Linkage of operational controls to environmental issues as determined in Section 5;**
- **When the procedures are to be implemented;**
- **Who is responsible for tasks as set out in the procedure;**
- **What controls need to be in place for each operation.**

Areas where written operational control procedures are likely to be required in Meat Processing Plants are listed.

2) MONITORING PROCEDURES

This section discusses the development of procedures to monitor Environmental Critical Control Points (following on from requirements detailed in Section 5) and covers what is required if the goal is to achieve certification to ISO 14001.

The section will help you define :

- **The procedures for the monitoring of ECCPs;**
- **The content of the procedures;**
- **Tracking performance against benchmarks; and**
- **The benchmarks to be used for the meat industry.**

11.1 OPERATIONAL CONTROL PROCEDURES

This section discusses the development of formal systems of control for the operations at the facility such that all significant environmental issues identified that relate to facility operations are being appropriately managed. The development, implementation and maintenance of operational controls are a critical aspect of the ability to demonstrate due diligence in environmental management.

The requirement for any particular Operational Control Procedure should have already been identified in Section 5, Table 5.9 – Environmental Risk and Control Strategies. In this table the Operational Control Procedures are linked back to the relevant environmental issue or ECCP.

For companies aiming at ISO 14001 certification, the standard requires that "*the organization shall identify those operations and activities that are associated with the identified significant environmental aspects in line with its policy, objectives and targets. The organization shall plan these activities, including maintenance, in order to ensure that they are carried out under specified conditions by:*

a) establishing and maintaining documented procedures to cover situations where their absence could lead to deviations from the environmental policy and the objectives and targets;

b) stipulating operating criteria in the procedures; and

c) establishing and maintaining procedures related to the identifiable significant environmental aspects of goods and services used by the organization and communicating relevant procedures and requirements to suppliers and contractors."

The experience of companies involved in implementing management systems using this generic tool has been that existing Operational Procedures were often in place in Quality Management Systems. These procedures were either relevant or partially relevant to the environmental issue or ECCP requiring a procedure. In these instances, the procedures were modified to include controls to manage the environmental issue.

Areas outside of production, such as wastewater treatment or waste disposal usually did not have existing procedures and new procedures were needed relating to environmental management.

The use of existing Quality Procedures in the development of Operational Procedures has the following advantages:

- integration of management systems and therefore reduced overlap or duplication between systems; and
- reduced development time and ease of use through people being familiar with the format of the existing procedures.

In your existing management systems such as your quality system, operational control procedures that you may have in place could be called:

- Standard Work Instructions (SWIs);
- Standard Operating Procedures (SOPs);
- Standard Work Procedures (SWPs);
- Work Instructions (WIs); and/or
- Document procedures such as Checklists.

It is very important that Operating Procedures, whatever their form or name, state the following:

- **Who** is responsible for tasks or other requirements as set out in the procedure;
- **What** controls need to be in place for each operation; and
- **When** the activities described in the procedure are to be implemented.

Companies who have developed Operational Procedures using this tool have found that the success of developing the procedures depended heavily on how effectively the "Who, What, and When" of the procedure was covered. If these three areas were not considered, the effectiveness of the procedure was found to be diminished considerably. Conversely, any detail not related to these three areas is likely to be superfluous.

The procedures should be pro-active rather than reactive so that risks associated with an activity are reduced through preventative measures. For example, consider a situation at a meat processing plant where there is a significant risk of tallow spillage by forklift truck impact. The Operation Control Procedures would need to control a number of aspects of the operations such as the competency of forklift truck drivers, the pre-inspection of forklifts each shift, forklift speeds, routing of the forklifts, barriers around the storage areas and other storage specifications (from storage procedures). More than one procedure will cover all of the factors involved in such an incident.

Operational criteria may also be needed to define the key characteristics of the operation, as the operational criteria can be directly related to environmental impacts. For example, the operational control procedure related to the rendering operations will need to specify temperature, pressure, residence times etc to fully control the operation.

The MLA has commissioned many studies that may assist you to develop operational criteria for your plant. These studies are listed in Appendix A – "Information Kit for the Meat Processing Industry – Environment".

For meat processing facilities, depending on where significant risks are identified, written operational controls are likely to be needed for:

- effluent treatment plant operations;
- farming operations, e.g. silage, paddock erosion, sampling;
- rendering operations;
- cleaning gang activities;
- skin shed operations;
- waste disposal and contractor management;
- skin disposal; and
- livestock area – cleanliness and run-off.

Action Checklist:	**Done (Y/N)**	**Date Completed**
OPERATIONAL CONTROL PROCEDURES		
By now you should have:		
1) Developed and documented Operating Control Procedures for activities that are related to the significant environmental risk or impacts detailed in Table 5.9.		
These Operating Procedures should contain:		
☐ Who is responsible for tasks as set out in the procedure;		
☐ What controls need to be in place for each operation;		
☐ When the activities in the procedure should be implemented; and		
☐ Defined operating criteria or conditions for the activity or process described in the procedure.		

11.2 MONITORING

For any organisation there will be minimum monitoring requirements. These are typically:

- Detailed in legislative requirements: These may be stipulated or enforced by the EPA (or equivalent in your state), local council or the local water authority. What ever these monitoring requirements are, they should have been identified and detailed in the Legal Register as developed for Section 4 of this manual;
- For any activity or process identified that may impact on neighbours or the community that the facility needs to directly manage; and
- Monitoring to demonstrate due diligence.

The monitoring requirements will cover:

- ECCPs as identified in Section 5; and
- Non ECCP related monitoring, such as those required for outputs, such as trade waste discharge or stormwater discharge.

Monitoring requirements for many ECCPs will have been developed as part of Section 5 and be detailed in Table 5.9. In this section the full details of the monitoring required should be developed. The monitoring is a planned series of observations and measurements to assess whether the Environmental Critical Control Points are under control and are functioning within the operating parameters stipulated.

For the majority of non-ECCP related outputs, details of the monitoring requirements should be indicated in the legal register, as developed for Section 4. Any monitoring that is not detailed in the Legal Register, but necessary to do for whatever reason, should also be developed and detailed in this section.

In order to develop procedures as part of this section, it is worth considering the following steps:

1. Identify what needs to be monitored. This is defined as the key characteristics of the operations that have had significant risks associated with them as well as legislative requirements, due diligence or here monitoring is need in problematic areas;
2. Identify a method for conducting the monitoring;
3. Implement the monitoring;
4. Record the results of the monitoring; and
5. Use the results, to prove or otherwise, compliance with legal requirements, corporate policies and other benchmarks.

There are specific requirements for monitoring in the ISO 14001 standard, as stated below.

The organization shall establish and maintain documented procedures to monitor and measure, on a regular basis, the key characteristics of its operations and activities that can have a significant impact on the environment. This shall include the recording of information to track performance, relevant operational controls and conformance with the organization's environmental objectives and targets.

Monitoring equipment shall be calibrated and maintained and records of this process shall be retained according to the organization's procedures.

The organisation shall establish and maintain a documented procedure for periodically evaluating compliance with relevant environmental legislation and regulations.

Monitoring of key characteristics of Operations and Activities

The first part of this requirement discusses procedures to monitor and measure key characteristics of operations and activities. This has already been discussed in Section 5.2 and 5.5 which details the identification of and monitoring of the Environmental Critical Control Points (ECCPs). The ECCPs need to be monitored so that deviations, trends and excursions from pre-determined operating parameters are recorded and so that due diligence records are generated and maintained.

Monitoring may be quantitative such as effluent monitoring, for example, for water quality such as BOD or pH, or it may be qualitative such as monitoring the effectiveness of cleaning activities.

In Table 5.9, Technical Performance Parameters and Managerial Performance Parameters should have been documented for each of the ECCPs. The sixth column of the Table, titled Monitoring Procedures should be used to either:

1. Document the monitoring procedure/activities to be conducted for the ECCP; or
2. Reference the monitoring procedures for the ECCP that are documented elsewhere.

Where monitoring requirements can be described succinctly so that they can be detailed in the table, there may be no need for further documentation outside of the table. If, however, a detailed procedure is needed to define the monitoring required, a separate procedure should be written.

Tracking performance

Monitoring on its own is no use unless the results are measured against an appropriate standard or other specific criteria to determine the level of performance of the activity or operation being monitored. It is important that for each operation monitored, the results are compared against the appropriate criteria and the results recorded.

For meat processing plants, a benchmarking study has been sponsored by the MLA to determine appropriate performance levels for particular key environmental indicators, such as effluent quality, solid wastes and the number of incidents at the facility. Benchmarks from this study, will be useful for assessing the results of the monitoring at your facility and help you determine your site's performance relative to other sites.

As discussed in the above section, operational criteria are often key characteristics to determine the environmental impacts of a particular operation. It is therefore important that environmental monitoring covers relevant operational controls, for example, controls detailed in the procedures developed in Section 11.1. The monitoring should be able to provide a record of when operational controls have not been successful in meeting relevant standards or benchmarks and be used in a timely fashion to find a solution.

Action Checklist:	**Done (Y/N)**	**Date Completed**
MONITORING **By now you should have:** **1. Developed and documented Monitoring Procedures for activities that are related to significant environmental risks or impacts (previously identified in Table 5.9).** **These Monitoring Procedures should contain:** **☐ Who is responsible for tasks as set out in the procedure;** **☐ What needs to be done to conduct the monitoring; and** **☐ When the activities should be implemented.** **2. Developed a system where monitoring results are compared against criteria or benchmarks to determine performance levels.**		

12. GETTING PROBLEMS REPORTED AND SOLVED

This section addresses the need for corrective actions to be taken if and when something goes wrong and an incident occurs. The benefits of having this established as a formal system is that management can quickly identify a potential problem and be proactive in managing the problem.

You need to decide:

- **What types of events should be reported and investigated; and**
- **The responsibilities for reporting such events.**

As a minimum, a non-conformance or accident reporting system should be developed for employees to provide a forum for which environmental incidents are reported and logged. Staff should be trained in what constitutes a reportable incident, the importance of the forms and how to use them.

If something goes wrong on site what happens?

This section of the Environmental Management System will assist you to develop an answer to this question.

You probably have systems for identifying non-conformances with quality criteria and food safety/hygiene criteria. If something were to happen that could or did affect the environment do you have similar systems?

The benefits of investigating accidents should be obvious. If something goes wrong it is important that management is informed so that the appropriate actions can be taken and that similar events can be prevented.

At the start of the development of an Environmental Management System it is acceptable if only environmental accidents are reported and investigated. As the Environmental Management System becomes more sophisticated the accident reporting system should be expanded so that near-misses are also reported and the lessons that can be learnt to prevent them are learnt.

It should be the responsibility of all employees to report accidents and near misses. To ensure that they are able to do this they will need to be trained in what constitutes an environmental accident and/or near miss and how they should report it and to whom.

This means there must be a very visible and easy to use system in place to allow them to do this.

The types of events that should be reported and investigated include:

- Spills;
- Complaints from the community or local authorities;
- Breaches of license or discharge conditions; and
- Raw material wastage.

It is recommended that a non-conformance or accident reporting form be developed and distributed around the site. Table 12.0 provides an example of such a form. The form requires the following to be recorded:

- a description of the event;
- the immediate response taken;
- corrective actions to be taken; and
- sign-off for actions taken.

One of the most important parts to the form is the Corrective Action. The Corrective Action is the longer-term response that is determined to be required in order that a similar environmental undesired event will not happen in the future.

Systems should be established for the logging of all non-conformances or environmentally undesired event reports as well as systems to ensure that:

- persons are delegated to be responsible for corrective actions;
- the corrective actions are developed and completed; and
- the corrective actions are signed off.

Staff should be trained on the importance of using the form and how to fill it out.

Depending on your facility, you may find it useful for some or all of these systems to be electronically based.

If a comprehensive system is to be developed then a written procedure should be developed which documents the following:

- The type of events which should be reported;
- The timing and how events should be reported;
- Who should be notified (internal and external);
- Who is responsible for conducting investigations;
- How to conduct the investigation; and
- The reports that should be prepared.

It is suggested that a two tiered system be developed in that all accidents and events are reported and only the significant events are investigated. It will be necessary for you to define the criteria that will make an event be of high, medium or low significance. Many organisations document this on the reverse of the form. The form itself does not need to be A4, in fact many companies have the forms printed specially and have them in pocket book size.

Many organisations have found it useful for the forms to be printed on carbon paper so that multiple copies can be made. For example, three copies might be made: the first is retained by the employee reporting the event, the second may be sent to the supervisor and the third to the Environmental Coordinator.

In the above form only events which have a high or medium significance need to be investigated. Therefore only the Description and Immediate Response sections would need to be filled out for all events.

Use of these systems to show that events are reported and that the actions taken are recorded will assist in demonstrating due diligence.

Table 12.0
Environmental Undesired Event Reporting Form

Description

Reported by Date: _____

Reported to: Time:

Location:

Significance: High ☐ Medium ☐ Low ☐

Brief Description

Immediate Response

Actions taken at scene:

Corrective Action

Actions needed to prevent recurrence:	(Responsible person)
1.	1.
2.	2.
3.	3.
4.	4.

Sign-off

Sign off actions taken:

1.
2.
3.
4.

All actions taken-sign off: _____ Date:

Formal training should be provided to all personnel involved in the investigation of significant accidents. This training should include how to evaluate what the root causes were that caused an event and how to report these and suggest actions to prevent recurrence.

Periodically, for example on an annual basis, the accident report forms can be analysed to assess whether there are trends that have occurred. These trends could be that accidents occur most frequently in one department or on one shift or that the root cause for accidents always appears to be a lack of awareness amongst staff. This type of periodic evaluation is a very powerful source of management information. The findings will probably have knock-on effects in other management areas such as safety and quality.

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have: **1) Identified the types of events that require reporting;** **2) Assigned responsibilities with regard to environmental incident investigation;** **3) Developed a form to enable the reporting of incidents;** **4) Developed a system for the logging of environmental incident reports** **5) Developed a system for ensuring corrective actions are determined, completed and signed-off; and** **6) Trained staff on the use of the forms and when they are required.**		

13. AUDITS AND REVIEWS

A key aspect to any good management system is the process by which the company assures itself that the system is adequate and the procedures established are actually being followed.

Three levels of evaluation are discussed:

- **Environmental Compliance Audits – against a specific criteria such as legislative requirements, policies, or Industry Standards;**
- **Environmental Management System Audits; and**
- **Management System Reviews.**

Methods and procedures to conduct the audits and checks should be developed and implemented.

13.1 ENVIRONMENTAL COMPLIANCE AUDITS

These audits are designed to evaluate the degree to which the company conforms to specific criteria. The criteria against which the audit is to take place must be clearly defined for both the auditor and the auditee.

The most common form of compliance audit involves performance assessment against legal requirements. Your Environmental Management System should include some form of periodic legal compliance evaluation. This can be in the form of an audit. It is recommended that suitably trained and/or experienced auditors conduct legal compliance audits at least annually.

ISO 14001 states that *'the organisation shall establish and maintain a documented procedure for evaluating compliance with relevant environmental legislation and regulations'.*

A checklist of issues that needs to be addressed in the compliance audits should be developed. It is recommended that the compliance auditors develop and use a checklist specifically designed for the site in question and tick off each item as it is assessed in the audit. In this way the auditors will investigate the same things and the tick-off sheet will provide a record that the auditor considered those issues.

Persons responsible for conducting the audits should be trained in auditing skills and the requirements of the relevant environmental legislation.

13.2 ENVIRONMENTAL MANAGEMENT SYSTEM AUDITS

ISO14001 requires *'Environmental Management System audits to be carried out in order to*

a) determine whether or not the Environmental Management System
   1. Conforms to planned arrangements for environmental management including the requirements of the International Standard, and
   2. has been properly implemented and maintained; and
b) provide information on the results of audits to management.'

In addition to ISO 14001, there are other 14000 series standards that are relevant to Environmental Management System Audits. These are:

- ISO 14010: Guidelines for environmental auditing – General Principles;
- ISO 14011: Guidelines for environmental auditing – Audit Procedures – Auditing of environmental management systems; and
- ISO 14012: Guidelines for environmental auditing – Qualification criteria for environmental auditors.

Before embarking on developing an auditing program for your facility, you should make yourself aware of the requirements of the standards.

Environmental Management System auditing has two key facets:

1. Firstly, it must be determined if the management system structure and content satisfies the overall intent of having the Environmental Management System. This step of the management system audit is often termed a 'documentation adequacy' audit. This is conducted to verify that the system documentation is adequate in terms of the relevant legal, ISO 14001 commitments and other company requirements. In addition, the documentation adequacy audit should determine if all appropriate environmental issues and risks have been identified. A site visit or tour is required to accomplish this.

2. Once the structure and documentation of the system has been validated, an 'implementation' audit needs to be conducted to confirm whether or not the documented requirements are being implemented and whether the implementation is effective. Audit is a detailed process that reviews the process, activities and outcomes of the organisation in detail.

3. The audit should evaluate the extent to which policy objectives and targets are being met.

Both the documentation and adequacy audit must be undertaken to provide a total Environmental Management System audit.

13.2.1 Type of management system audit

The audit type can be considered in two basic ways. Firstly, audits can be classified on the basis of who conducts them, either first, second or third party. The second method of classification is according to location and whether the audit is conducted within the auditors own organisation or not, ie internal or external.

First party audits are audits where both the auditor and auditee both work for the same organisation. These audits are typically less formal and take less time than other audits.

Second party audits are those where the auditee is from a customer organisation. Accordingly, the focus of the second party audits is on the contractual relationship between the two parties. Normally issues not affecting the contract are not subject to assessment.

Third party audits are carried out by independent bodies and may or may not be accredited by a body such as JAS/ANZ. These audits are often the most formal and are normally focussed on ISO 14001 or regulatory requirements.

Audit Phases

There are four audit phases within the total audit process:

1) Preparation and planning;
2) Performance of the audit;
3) Reporting; and
4) Follow-up.

The performance phase of the audit is the most visible to most of the workforce and yet should only take approximately 30% of the time.

Environmental Management System audits should be conducted by individuals who have at least several years experience in the meat industry and who have been trained in the techniques of system auditing.

During certification to ISO 14001 the qualifications of the system auditors is often evaluated so it is important that the appropriate personnel are used.

The Environmental Management System audits can be conducted in one of three ways:

1. by department for the whole system i.e. select a department and audit all elements of the environmental management system applicable to that department;
2. by element of the Environmental Management System standard for the whole company; and
3. by aspect or impact i.e. select and environmental issue that is significant and follow its management all the way through the system

It is recommended that the Environmental Management System audit reports be written to include a summary of the audit findings to act as a record that the audit took place. The detail of the audit findings should be documented as non-conformances and should therefore fall into the management system for dealing with non-conformance. (See Section 12)

The auditor and the auditee both have responsibility for follow-up of the findings of the audits. The auditee should be responsible for determining the corrective actions needed and initiating action to correct non-conformances and correcting the causes of the non-conformances. The auditor is responsible for undertaking the follow-up to verify that the corrective action is adequate and should be involved in the close out of the corrective action form.

13.3 MANAGEMENT SYSTEM REVIEWS

It is important that the Environmental Management System is reviewed periodically. The review frequency is up to you but it is recommended that it is conducted at least annually. In the review you should consider:

- the **continuing suitability** of the Environmental Management System for the activities and operations occurring at the facility, that is, Is the system still suitable for current operations?;
- the **adequacy** of the Environmental Management System, that is, Does the system cover all environmental issues at the facility? and
- the **effectiveness** of the Environmental Management System, that is, is the system properly implemented and maintained?

The review will be particularly important if the process has changed. You should establish systems to ensure that environmental considerations are made if the following changes occur:

- new risks are identified as a result of new information, new external pressures, changes in scientific knowledge etc;
- if new raw materials or new suppliers or contractors are used;
- if the processes are changed (equipment and new products);
- changes in the relevant environmental legislation;
- production throughput changes;
- the scope of the environmental management system changes; and
- employees change (whether or not they are key to the environmental management system).

The reviews should be documented. The following provides a list of issues that review team members should assess before the review meeting so that their findings can be discussed:

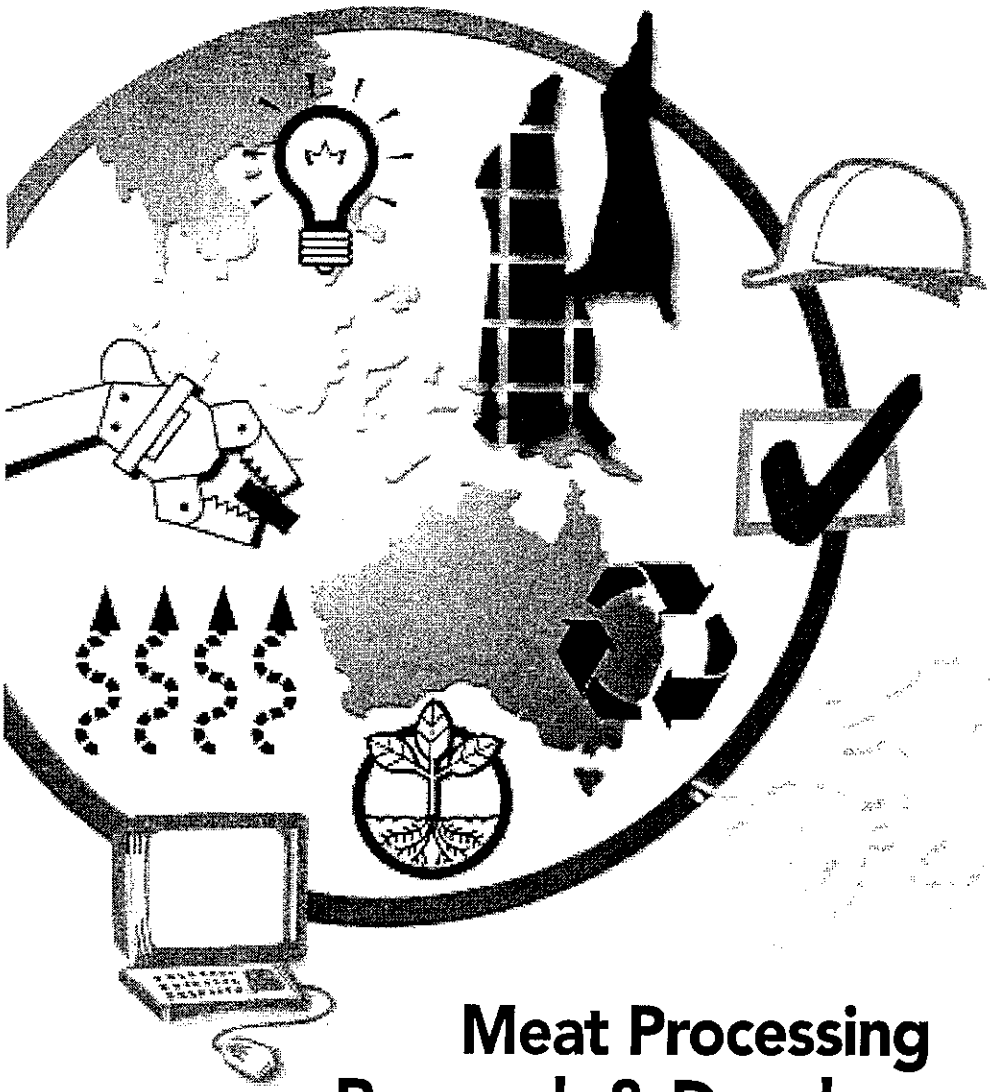
1. The company environmental policy.
2. Audit reports for their area.
3. Minutes of previous system reviews.
4. Monitoring results (technical monitoring, monitoring against improvement goals etc).
5. Complaints and other communication with external parties.
6. Environmental corrective action request forms/accident report forms.

Minutes of the environmental management system review meeting should be taken and a copy kept as a record. Actions arising from the review should be incorporated into the improvement programme (See Section 7) and/or as corrective action requests (see Section 12).

Action Checklist:	**Done (Y/N)**	**Date Completed**
By now you should have:		
1) Understood the different types of system evaluation: ☐ **Environmental Compliance Audits;** ☐ **Environmental Management System Audits;** ☐ **Management System Reviews;**		
2) Developed appropriate evaluation systems for the management system you are developing;		
3) If you plan to develop your Environmental Management System to comply with ISO 14001, you need to define Developed procedures that specify the details of the Management System Reviews.		

Appendix A

Information Kit for the Meat Processing Industry - Environment



Meat Processing Research & Development Information Kit

MEAT & LIVESTOCK
AUSTRALIA

FOREWORD

Meat & Livestock Australia (MLA) is committed to adding value to Australia's meat and livestock industries. Its activities are equally divided between research and marketing to maximise benefits to the Australian meat and livestock industries.

This Information Kit (Second Edition) was developed to ensure that current and intending meat processors have access to information generated from completed research that impacts meat processing. Information about research work in progress shall be published periodically in Accelerate, the newsletter produced by the Processing & Product Innovation Business Unit. Updates to this R&D Information Kit shall appear in the MLA web site **http://www.mla.com.au**

The assistance of the Australian Meat Processing Corporation Pty Ltd (AMPC) in funding recent R&D meat processing research, and the cooperation of the National Meat Association (NMA) and the Australian Meat Council (AMC) in guiding some research projects, are gratefully acknowledged.

Meat processors are encouraged to contact MLA regarding materials listed in this booklet. The contact details are:

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CONTENTS

ENVIRONMENT R&D – MEAT PROCESSING SECTOR

Project	Project No.	Resource Available
GENERAL		
Benchmarking of Environmental Performance (1998) Covers the results of an industry-wide environmental benchmarking study of nine medium to large red meat processing sites throughout Australia in 1997/98. Benchmarks include nine numerical benchmarks expressing resource consumption or pollutant output per tonne Hot Standard Carcase Weight and nine management benchmarks typically covering all aspects of a site's management of environmental issues.	RPDA.308A	Brochure, Full Report
ENVIROFACTS Newsletter (1994-1998) Quarterly newsletter targeted at practitioners working in the processing sector. The latest information, current issues, etc, on environmental issues affecting the meat processing sector are provided.	M.416	Newsletter
Environmental Management System for Red Meat Processing Plants (1999) A generic Environmental Management System (EMS) has been developed for red meat processing plants. The EMS is ISO 14000 compatible and is based on the HACCP methodology typically used by the meat industry for quality management to permit ready integration into existing management systems. The EMS comes as two manuals: one containing a clear description of the EMS, the second providing templates developed during a trial at four industry sites in Australia. The templates assist plants to develop their own EMS and reduce EMS development time and effort.	RPDA.302	Manual

Project	Project No.	Resource Available
MRC Environmental Issues Research Program (1996) The previous Environmental Issues Research Program (1993-1996) has been outlined in a video. The video can be used as a training resource to promote awareness of the current environmental issues facing the industry.	M.953	Brochure, Video

SOLID WASTE

Anaerobic Solids Review (1996) A review of current anaerobic digestion technology/ microbiology for treatment of solid "Non Manure and Paunch" (NMP) wastes from meat processing, identified critical process parameters, anaerobic digester design criteria, NMP waste handling issues, composition of liquid and solid digestion residues and environmental issues specifically relating to solid NMP waste digestion. Order of magnitude costs, technology gaps, research needs and environmental issues were identified. Treatment in combination with abattoir wastewater or as codisposal in municipal refuse digestion schemes was found to be possible in the industry.	M.737	Brochure, Full Report
Application to Abattoirs: Composting Techniques and Feedlot Waste Solids (1991) Results from six pilot scale composting trials on the application of temperature-controlled, aerated pile composting techniques for solid waste and feedlot manure are demonstrated, evaluated and reported.	AMT.051	Full Report
Composting of NCV Skins (1999) Composting of NCV skins was successfully achieved during a full scale trial at an Australian abattoir. The report details issues, recipes and equipment required to operate the composting system.	AMT.031	Full Report

Project	Project No.	Resource Available
Disposal of NCV Skins (1995) The environmental suitability of current industry disposal practices was assessed and "best practices" for NCV skin disposal are outlined.	M.611	Full Report

LIQUID WASTE

Best Practice Wastewater Treatment (1998) Clear and concise guidelines for the red meat processing industry to achieve best practice wastewater treatment and disposal/reuse, determine the most effective and cost efficient treatment options for individual plants, achieve compliance with regulatory environmental requirements with respect to effluent discharges, and identify available wastewater treatment technologies are presented in a manual.	RPDA.308B	Brochure, Manual
Compost Market Study/Liquid Waste Filtration (1995) The use of liquid waste filtration systems in small domestic plants medium was addressed in this report. Wastewater from a small domestic abattoir was successfully released to sewer (minus paunch contents stream) after filtering through woodchip and sawdust mixtures. The solids used for filtering were then composted with the liquid paunch contents. The utilisation of timber industry woodchip and sawdust waste as the filter was found to be a low-cost method for dewatering and filtering effluent.	M.682	Full Report

RPDA.302 Generic manual for development of environmental management systems at meat processing plants in Australia

Project	Project No.	Resource Available
Covered Anaerobic Ponds to Treat Abattoir Wastewaters (1998) An anaerobic lagoon, a simple and low cost technology that treats wastewater from abattoirs, can only accept low organic loading rates and require long hydraulic retention times. A full scale covered anaerobic lagoon was constructed at an abattoir and operated to investigate its usefulness for odour-free anaerobic treatment of wastewater. Although the project is ongoing, an interim report is available.	M.665	Full Report
Effluent Irrigation Manual (1995) A comprehensive irrigation manual was prepared to assist the red meat processing industry manage the disposal of effluent by irrigating in an environmentally responsible manner. The manual provides a compendium of information and includes three sections covering a 'walk through' audit of the design, operation and management of an irrigation system.	M.476	Manual
Effluent Treatment – Present Status and Future Requirements (1991) A survey of 45 meat processing plants to audit the range of effluent treatment technologies used by the Australian meat processing industry was undertaken and appropriate strategies to reduce emissions recommended.	M.050	Full Report
Nutrient Removal in Abattoir Ponds (1998) Two technologies for nutrient removal were investigated at pilot scale in this project – one was a 1 ML novel aerated pond that removed nitrogen down to levels suitable for irrigation and the other was an 8,000 litre Sequencing Batch Reactor for nitrogen removal. Both technologies successfully achieved the desired nitrogen removal in pilot scale trials at an abattoir.	M.478	Full Report

Project	Project No.	Resource Available
Removal and Recycling of Proteins from the Wastewaters of Abattoirs Using Clay (1998) Clays are non-toxic substances with a strong affinity for proteins and are sometimes used in animal feeds. The innovative use of clays for the recycling of soluble effluent proteins from abattoir liquid effluent was investigated. Methods for the extraction of clay-protein complexes from wastewaters were explored and possible technologies for the application of the process to abattoirs were examined.	RPDA.311	Full Report
Stickwater Evaporation (1996) Stickwater operation can capture nutrients found in abattoir wastewater streams. The applicability of evaporation technology for the meat processing sector was examined in this report.	M.734	Full Report
Wastewater Management – "Identification of Nutrient Sources, Reduction Opportunities and Treatment Options" (1995) A seminal study in the generation of nutrients in wastewater streams inside meat processing plants was performed by two research teams in five abattoirs during 1995. This report lays a strategic basis for cleaner production and waste stream segregation and treatment for the industry and has been used to significantly reduce nutrient generation in recent meat processing plant construction and retrofit projects.	M.445	Brochure Full Report
Wastewater Treatment – Literature Review (1979-1993) Trends in the treatment of abattoir wastewater and related issues as at 1993 are presented over the period to 1993.	M.320	Full Report

RPDA.302 Generic manual for development of environmental management systems at meat processing plants in Australia

Project	Project No.	Resource Available
Water and Waste Minimisation Manual (1995) Abattoir operations that utilise water, focusing on those areas that have the potential to impact on the environment through effluent discharge have been identified. Effective water utilisation procedures and practices within meat processing plants are presented in the manual developed for plant management.	AMT.002	Manual, Video
ODOURS		
Biofilter Guidelines (1996) A set of guidelines for the effective and reliable operation of biofilters in treating odorous gas waste streams emitted by meat processing plants was developed. Instrumentation suitable for helping meat industry personnel to monitor the health and performance of biofilter beds was developed, trialled and costed.	M.887	Guidelines, Video, Full Report
Odour Management – Biofilters (1992) Low-cost biofilter technology was found to reduce odour nuisance from rendering plants.	M.060	Full Report
Odour Minimisation for the Meat Processing Industry (1997) The latest odour reduction technology options and odour minimisation strategies available to processing operators are investigated.	AMT.033	Brochure, Video, Full Report

Project	Project No.	Resource Available
Odorous Components in Waste Gas Emissions from Rendering Plants (1998) Samples of odorous gas streams were taken from five rendering and abattoir plants throughout Australia and analysed using three types of odour measurement – dynamic olfactometry, gas chromatography – mass spectometry (GS-MS) and "electronic nose" instruments. Compounds most responsible for the distinctive odour of each gas stream were identified as "Most Nuisance Compounds" and their typical concentration measured. It was found that different odour streams could be fingerprinted, especially by the Electronic Nose.	RPDA.303	Full Report
Wastewater and Odour Management (1992) A conference was convened to focus attention on waste and odour environmental matters facing the Australian red meat industry. A series of papers presented at the conference provide a valuable source of information for processors on existing technology, recent developments and prospects for the future.	CS.178	Conference Proceedings
GASES		
Clean Technology Tanning (1996) As a result of research into the tanning and fellmongering industry, a range of clean technology processes are recommended.	CS.200	Summary Report

Greenhouse Gas Emissions for Australian Beef and Sheep Industry: On Farms, In Feedlots and in Transport and Meat Processing Facilities (1997) — M.245 — Full Report

An assessment of greenhouse gas emissions associated with the production, transport and processing of cattle and sheep is provided in this report. Priority issues arising from the extent of emissions, the implications for research, and preparedness for policy change in this area are examined, and a model of the atmospheric sink of methane is developed. The processing sector made relatively small contributions to greenhouse gas emissions compared to farming and transport.

Total Reuse of Chrome Tanning Liquors (1997) — RPDA.310 — Full Report

A simple system of total reuse of wet-blue chrome tanning liquors which reduces effluent loads of chromium, sodium chloride and sodium sulphate, and reduces cost, was developed. The process, referred to as the "Improved Chrome Liquor Recycling (ICLR) Process" involves the collection of excess chrome liquors which are not directly recycled, and reusing it as delime wash. The process was piloted in a commercial tannery and trialled to a full scale commercial production. It was found that the process reduced chromium and salt effluent loads and resulted in good quality wet-blue leather.

Trivalent and Hexavalent Chromium – Environmental Safety Review (1995) — M.557, M.309A, M.309B — Full Report

A study of the case for, and against, chromium release to the environment.

PACKAGING AND RECYCLING

Packaging Trends (1996) — M.713 — Brochure; Full Report

Current practices in red meat industry packaging and recycling are examined and regulatory positions regarding packaging material in major export markets are assessed. Best packaging practice and improved options for the industry with respect to packaging, including more environmentally friendly packaging, down-gauging of packaging materials, different packaging concepts, recycling, etc, are recommended.

Appendix B

Example of Environmental Process Flow Diagrams

APPENDIX B

EXAMPLE: ENVIRONMENTAL PROCESS FLOW DIAGRAMS

The following diagrams are a representation of typical meat industry processes and can be used as a basis to develop a process flow diagram for your facility. The first diagram, Diagram C-1, covers the overall plant operations, with sections for all of the different process and links where product is moved from area to area

The following diagrams detail the product Inputs and Outputs (at the top of the diagram) and the Environmental Inputs and Outputs associated with the activity or process (at the bottom of the diagram) for each of these operations.

For example, the first diagram details Livestock and Handling conducted at the facility. The inputs to the operation are cattle and feed. The output is cattle, ready for the slaughterhouse. The activities are holding, feeding and penning up. The inputs related to environmental issues are water, cattle trucks and electricity for lighting. The outputs are wastewater, dung solids, yard odour, dust and noise.