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HACCP based quality assurance systems in the meat industry MIC.001

1997

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Meat Industry Council

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MEAT & LIVESTOCK
AUSTRALIA

Final Report to the Meat Research Corporation

on a project to implement

HACCP based Quality Assurance systems in the meat industry

Supported by the DIST Food Quality Program

and the Meat Research Corporation Food Safety Key Program

Meat Industry Council
November 1997

Contents

1 Introduction

This project was commenced in March 1996 and was completed at the end of August 1997. The project has been part funded by the Meat Research Corporation under its Food Safety Key Program. Other funding was provided by the Department of Industry, Science and Tourism under the Department's Food Quality Program.

This Final Report has been prepared to present project results to the Meat Research Corporation. All project activities have been completed, and it is now possible to:

- report the substantive outcomes for the project participants including enterprise level improvements made since the beginning of the project
- provide examples of the materials distributed to industry in the course of the project, and
- report on the achievements of the communication program conducted to inform industry of the project outcomes.

2 Phases 1 and 2

Phase 1 was the set up phase of the Project. By December 1996 the project had progressed in the following areas:

- establishment of enterprise level HACCP teams (Quality Focus Groups)
- conducted a preliminary audit of each site
- undertaken systems design including generic materials
- undertaken customisation activities at sites
- undertaken field testing of company procedures
- sought initial certification of systems by the Regulatory Authorities,
- reviewed commercial trials
- commenced preparation of a package to deliver the systems.

Further Phase 2 activities were conducted in early to mid 1997, including:

- four review workshops held in late January to review the preparation of plant level systems in conjunction with the State and Federal regulatory authorities. These workshops assisted the plants in the project to identify improvement opportunities for their systems, and to enable the regulatory authorities to improve the consistency of their audit and review functions.
- two day internal audit training courses provided to enterprises in the project to ensure that skills existed to provide the basis of management review of systems, and to start the continuous improvement cycle.
- attendance of Project delegates at an international HACCP conference which provided valuable information on the latest trends in HACCP systems design, particularly the trend towards documentation of industry best practice in prerequisite programs.
- a series of workshops held with regulatory authorities to address the issues of the use of HACCP systems as a regulatory tool, and the development of protocols for HACCP audit. These workshops fed back to the ARMCANZ Meat Standards Group for endorsement of the protocols.

Final Audit Results

The audit report was presented on the 30 May 1997.

The report showed:

- all sites have significantly improved their systems since the previous audit in June/July 1996

- the sites which scored low in 1996 have improved more than the sites which scored high

- measured improvements were made in system compliance and in product hygiene.

A copy of the report is included as Attachment A.

3 Phase 3

Generic quality systems

Generic quality system structures have been provided through the dissemination of documentation in ISO format produced for the MRC by Australian Meat Technology. This has supplemented previously available material notably two publications from AQIS: a generic QA Handbook for the meat industry and a guide to HACCP implementation. Other material and in some cases industry training had previously been made available through some of the State Authorities.

HACCP training materials are widely available. Materials were developed for the HACCP training workshops in this project by Australian Meat Technology and Aus-Meat, and delivered at workshops in mid 1996.

Model HACCP Tables/Systems

This has been provided through the preparation of the Guide to Implementation and Audit of HACCP, now published as SCARM Report 60. This is attached as Attachment B. In addition, some generic material sourced from the US based International Meat and Poultry HACCP Alliance was made available to industry through the final workshops. These are attached as Attachments E and F.

Problems have arisen whenever practitioners have tried to make examples more specific than the examples in the Guide, since it leads to the adoption of HACCP plans with no practical use, and enterprises are faced with having to start again. The value in the implementation of a HACCP system lies in the disciplined application of the method to an enterprise's own operations. A system which is based on one operation, even a generic one, cannot be readily used to manage a second operation, since unless the discipline has been followed it cannot be shown to an auditor that the system identifies and manages the particular risks in the second operation.

Generic prerequisite programs describing best practice for 16 operations areas were prepared and distributed. These programs are substantially transferable between operations, and are attached at Attachment C.

Validation of critical limits at critical control points is a major requirement of HACCP systems implementation. A set of reference material to assist in microbiological validation has been prepared and is attached as Attachment D.

Case Studies

Enterprises in the project prepared Case Studies and presented these to the Industry Workshops conducted in July/August 1997. These are attached as Attachment G.

Common Linkages

Directors of the four meat industry projects have maintained close coordination during the running of the projects, with approximately quarterly coordination meetings.

The Meat Industry Council's Project 2 shared a common Steering Committee with this Project. Liaison has been close since it has always been intended that the plants in Project 1 would acquire systems which would allow easy progression to the Project 2 system once that is proved. Both projects use a common basis for system foundations.

The Pig Industry Project has provided valuable input due to its focus on the producer side of the industry and the links between producers and processors.

Liaison with the Smallgoods Project has been close and common materials have been used in some areas. Liaison has been important due to the large sectors of the smallgoods industry which fall under domestic regulation. This has flowed into the workshops which Project 1 held with regulatory authorities.

Dissemination of results to industry

Dissemination of results to industry took place as a series of industry workshops, combined with distribution of materials developed during the project. This process began with workshops for the export industry in Perth and Adelaide during March 1997, as pilots to develop workshop structure and content. Final workshops had a total attendance of 400 people and were held as follows:

Location	Date	Attendance
Coffs Harbour, NSW	19/7/97	20
Adelaide, SA	26/7/97	65
Melbourne, Vic	6/8/97	65
Perth WA	9/8/97	105
Rockhampton, Qld	15/8/97	35
Brisbane, Qld	16/8/97	90
Wagga Wagga, NSW	23/8/97	20

The involvement of the regulatory authorities in these workshops was most important due to the importance that their requirements place on enterprise system design and operation.

Commercial Linkages with customers and suppliers

There are strengthening examples of these linkages, despite the early days in the development of most systems. Strong customer/supplier linkages have been slow to develop in many enterprises because:

- most of the enterprises in the industry are commodity suppliers
- only a minority have moved to being suppliers of branded product into specific markets or customers
- the evolution of mature supplier/customer links occurs late in the development of most systems, taking 3 to 5 years, and this project has only been running for one year.

Most enterprises in the project have not yet had time to revise and mature their systems to enable establishment of strong links, although the project now includes:

- a supplier of beef cuts into a supermarket chain which offers a double guarantee if the customer finds the meat unsatisfactory: money back plus product replacement
- two suppliers of branded premium lamb carcasses into two supermarket chains
- several commodity producers in the project who have been able to comply with customer quality systems which incorporate HACCP, as is the case with major buyers of manufacturing grade beef and sheepmeat as well as major supermarket chains.

4 List of Attachments

Attachment A: Report on the Project Final Audit

Attachment B: HACCP Implementation and Audit Guide (SCARM Report 60)

Attachment C: Generic best practice prerequisite programs, with an explanation of the use of such programs in HACCP systems

Attachment D: Generic references for validation of microbiological critical limits

Attachment E: US example generic beef slaughtering HACCP model sourced from the International Meat and Poultry HACCP Alliance.

Attachment F: US example generic Pork slaughtering HACCP model sourced from the International Meat and Poultry HACCP Alliance.

Attachment G: Case studies from participating plants

Attachment A: Report on the Project Final Audit

AUDIT OF FINAL HACCP/QA SYSTEMS

FINAL REPORT

JUNE 1997

for the MEAT INDUSTRY COUNCIL

Supported by the DIST Food Quality Program and the MRC Food Safety Key Program

DISCLAIMER

The views expressed in this report arise from observations made by the consultants during audits of the quality systems of Project 1 sites and do not necessarily represent the views of the Meat Industry Council

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EXECUTIVE SUMMARY

- This report summarises the findings from a final systems audit undertaken by Alliance Consulting & Management at 15 meat processing establishments participating in the Meat Industry Council Project 1 - HACCP Fast Track Project.

- The approach taken by us was to assess the people, system and outcome in relation to HACCP and QA System development and implementation. While detailed findings are provided, these document where each site is at with respect to the implementation of suitable systems for a HACCP program. The data provided are not meant to be used for any attempt at inter-site comparison but serve as a useful measure of progress made at each site since the first audit undertaken some nine months earlier.

- This report benchmarks each establishment and the progress made since the first audit with respect to:
  - their quality system in respect of the ISO9002 standard
  - within ISO9002 element 4.9 Process Control, each site's position with respect to a HACCP plan
  - a measure of each slaughtering establishment's ability to produce a hygienic carcase prior to and after any corrective action.

- A standard checklist was used for both audits at each site and covered approximately 800 individual items within the ISO9002 requirement. Each checklist item was scored from 0 (nothing in place) to 10 (considered best practice) and average scores then calculated for each ISO9002 element.

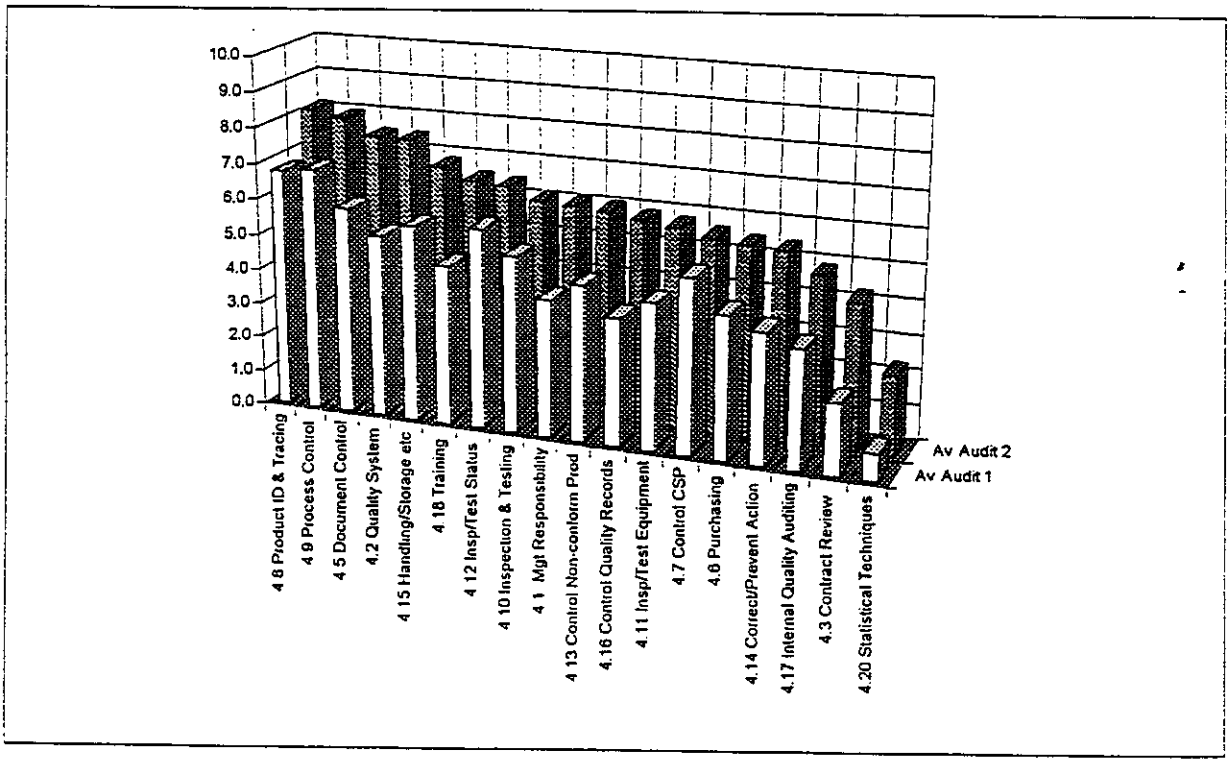
- To assist sites in the successful implementation of their QA and HACCP systems we found they needed:
  - less regulatory and more self management
  - integration of all requirements into their QA systems
  - more time before the success of implementation can be fully judged
  - improved problem solving skills
  - over the longer term to take a big picture outlook.

ISO9002/MSQA COMPARISON

- The main findings from the ISO9002 comparison were:
  - no site had yet attained ISO9002 or MSQA certification although three sites had their system approved by their respective State Authority and one site was awaiting a final audit for ISO9002 certification. A further eight QA manuals had been developed to meet the requirements of MSQA
  - average ISO9002 score increased 27.7 from 80.3 at Audit 1 to 108.0 at Audit 2 (max score = 180) while individual element increases ranged from 0.6 to 2.3

- the range in scores between the highest and lowest scoring sites dropped from 74.2 in Audit 1 to 29.1 in Audit 2
- in rank order the only ISO9002 elements which did not exceed an average score of 5 out of 10 were 4.20 Statistical Techniques (2.3), 4.3 Contract Review (4.2) and 4.17 Internal Quality Auditing (4.8)
- there were two broad groupings amongst the sites; one group had fully embraced their quality system as their own while the other group appeared to have followed the QA approach purely to meet a regulatory requirement.

Average ISO9002 Element Score at Audits 1 & 2 Ranked by Audit 2 Score



PROCESS CONTROL COMPARISON

- The element Process Control was scored under the following four broad areas:

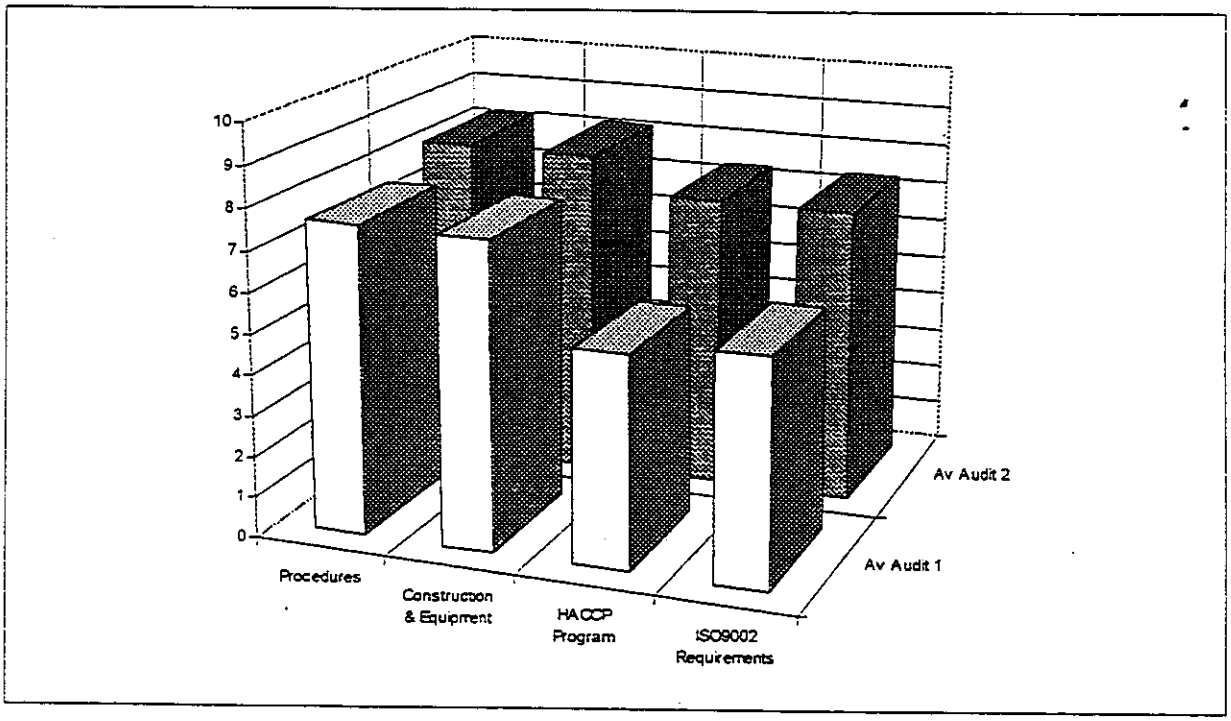
1. ISO9002 Requirements:
   - Average score 7.3 out of 10, an increase of 1.9 since Audit 1
   - Range in site scores from highest to lowest fell from 5.9 in Audit 1 to 2.9 in Audit 2
   - All sites had a planned and documented production process
   - All processes were carried out under controlled conditions with adequate control exercised over any materials used
   - Workmanship standards for production and inspection personnel were well defined in all but one case.

2. Construction and Equipment - overall there was good compliance exhibited by most sites (average score 8.3 out of 10 an increase of 0.7 since Audit 1) for this component which was assessed to ARMCANZ requirements.

3. HACCP Program - this component is discussed in more detail below, however, the average score was 7.3 out of 10 an increase of 2.1 since Audit 1. The range in site scores from highest to lowest fell from 6.0 in Audit 1 to 3.2 in Audit 2.

4. Procedures - overall there was good compliance with food safety requirements exhibited by most sites (average score 8.2 out of 10 an increase of 0.6 since Audit 1) for this component. The range in site scores from highest to lowest fell from 5.3 in Audit 1 to 3.7 in Audit 2.

Average Process Control Component Score at Audits 1 & 2 Ranked by Audit 2 Score

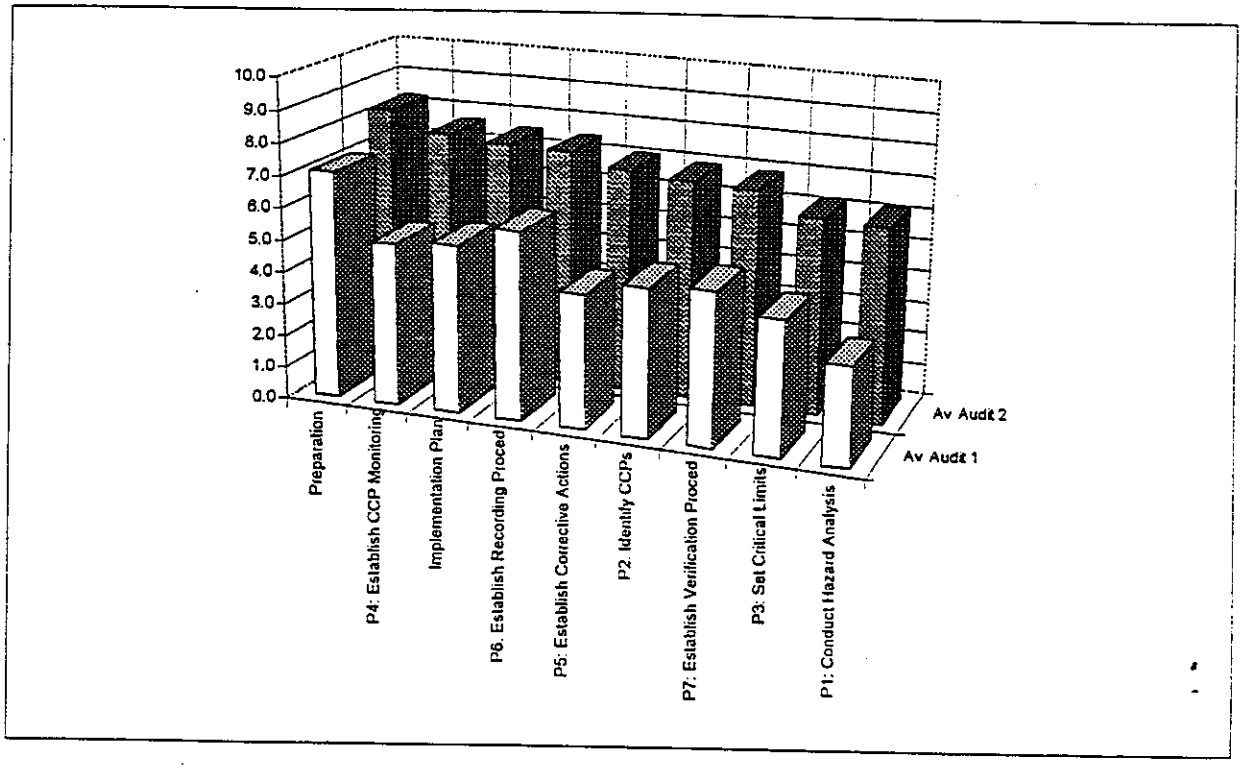


HACCP PROGRAM

- Participants could score a maximum of 90 based on their demonstrated preparation, knowledge and understanding of the seven HACCP principles and their implementation plan.

- The average score for all sites was 63.6 an increase of 19.4 since Audit 1. Individual component scores increased between 1.2 and 3.0 from Audit 1 to Audit 2.

Average HACCP Component Score at Audits 1 & 2 Ranked by Audit 2 Score



- The main findings for each component of HACCP were:
  - preliminary preparation had been undertaken by all sites (average score 8.3 out of 10 an increase of 1.2 since Audit 1)
  - knowledge and understanding of Principle 1 Conduct a Hazard Analysis recorded the largest increase since Audit 1 (average score 6.1 an increase of 3.0 since Audit 1). Some sites had revisited their hazard analysis and conducted it in a formal manner while most sites had updated their potential hazards. All sites had not retained adequate documentation of this Principle
  - only two sites could not define control and critical control points (CCPs) (Principle 2) and a further two could not demonstrate how to identify CCPs using valid scientific criteria (average score 6.9 an increase of 2.3 since Audit 1)
  - Most sites (80%) exhibited a basic knowledge of Principle 3 Setting Critical Limits (average score 6.2 an increase of 2.0 since Audit 1) and only one site was unable to explain how critical limits were used to measure compliance within a HACCP plan. However, only five sites had documented their rationale for critical limit selection
  - Most sites correctly understood Principle 4 Establish Critical Control Point Monitoring (average score 7.6 an increase of 2.6 since Audit 1) with most monitoring undertaken as per the Meat Hygiene Assessment or ARMCANZ requirements
  - All but one site could demonstrate a complete understanding of Principle 5 Establish Corrective Actions (average score 7.0 an increase of 2.8 since Audit 1)

- The average score for Principle 6 Establish Recording Procedures was 7.4 an increase of 1.6 since Audit 1. Only three sites were unable to demonstrate the development of records for documenting HACCP activities
- Four sites demonstrated a limited understanding of Principle 7 Establish Verification Procedures (average score 6.8 an increase of 2.0 since Audit 1). Only two sites had not yet implemented a program of microbiological testing
- HACCP plans had been implemented at all sites (average score 7.5 an increase of 2.3 since Audit 1). Additional time is required before the success of implementation can be fully assessed.

- Many sites indicated they were still receiving close scrutiny from regulatory authorities with respect to implementation of their HACCP plans. This scrutiny extends to what should be included in the quality system and how the system should be validated. We would prefer to see a quality system which is developed by each company using sound methodology and which assesses outcomes (ie, if the desired outcome is not reached then corrective and/or preventive action are implemented).

- Implementation of corrective and preventive action, although improved at all sites, had some limitations including:
  - problem solving skills continue to be lacking at most sites, as demonstrated by processes and records being analysed daily rather than over longer time periods to determine the need for preventive actions
  - most sites were focussed on meeting regulatory requirements for inspection and testing and the control of non-conforming product although attempts were being made to investigate the underlying cause of problems
  - few sites had extended their quality system to address customer complaints other than in an ad-hoc fashion.

OUTCOME

- Acceptable quality levels (AQL) which measured levels of carcase macro-contamination were used to provide a benchmark of the outcome of individual site's quality systems from which subsequent improvement could be measured. AQLs were measured prior to trimming and washing (slaughterfloor) and following corrective action (chiller).

- Average slaughterfloor AQLs improved 39, 14 and 35% respectively for pigs, sheep and cattle from Audit 1 to Audit 2.

- Average chiller AQLs improved 46, 53 and 51% respectively for pigs, sheep and cattle from Audit 1 to Audit 2.

- Although most sites routinely measured AQLs on the slaughterfloor, this was usually carried out following corrective action. Only one site had implemented a system of scoring macrocontamination prior to any corrective action.

- Microbiological testing had commenced at all but two sites. These sites were:
  - routinely testing contact surfaces and personnel equipment primarily for total viable counts (TVC)
  - routinely testing carcase product (53% TVC, 67% *E.coli* and 53% Salmonella)
  - undertaking *E.coli* and Salmonella testing of product primarily to meet the requirements of the Mega-Reg
  - having water supplies tested for Coliforms and *E.coli* but primarily through another party (eg, AQIS or Shire Council)

RECOMMENDATIONS

Throughout this report we have made a number of recommendations which are summarised below.

Quality System Documentation, Implementation and Maintenance

That:

1. Additional time is required before the success of implementation of QA and HACCP systems can be fully assessed.
2. All sites fully implement their documented Quality system regardless of third party approval/certification.
3. All sites give consideration to incorporation of AUS-MEAT requirements into their overall Quality system.
4. All sites revisit their processes and analyse records, covering longer time periods, in an attempt to establish trends and find ways to improve their system.
5. The industry move to ensure any reference to regulators in contract review be removed.
6. All sites incorporate livestock purchasing as an integral component of their Quality system. This may be assisted through industry adoption of producer Quality systems such as Cattlecare and Flockcare.
7. All sites ensure control of inspection, measuring and test equipment is adequately addressed in their quality system and the documented procedures followed.
8. All sites review the relative importance of all quality records and address preservation and disposition practices as appropriate.

Regulatory Requirements

That:

9. The industry move to bring the requirements of differing authorities acting within the QA area into line to streamline the auditing of plant Quality systems and thus remove the current duplication of effort.
10. Regulators ensure company Quality systems meet the requirements of all relevant legislation but not extend their control to documentation content and layout (other than for regulatory requirements).
11. Regulators not be pedantic about receipt of a "clean" document before they issue approval via a desk audit.
12. Regulators stand back and encourage each site to use the agreed corrective and preventive action process for all types of problems. The regulators then audit outcomes of this process against their regulatory requirements.

Training

That:

13. All sites continue to work on or develop a skills matrix for all employees and attempt to document the skills/experience required for each specific task.
14. Future training on HACCP focus on the more technical areas including microbiological hazards, risk assessment and validation/verification.
15. Sites be supplied with training in "root cause" problem identification and problem solving.
16. All sites undertake basic training in the use of statistical techniques which are specifically tailored to the meat processing industry.

Outcomes

That:

17. All sites concentrate on development of their own inspection and testing requirements which incorporate the regulatory requirements rather than simply follow regulated guidelines for inspection and testing. The current systems often reflect the perceived/actual input being exercised by relevant regulatory authorities who are reluctant to allow sites to develop their own system, audit that system and then measure it against recognised industry standards on the basis of outcome.
18. Where appropriate, sites should investigate systems for quantifying the type and extent of non-conforming product to assist in subsequent quality system analysis and review.
19. All sites ensure they use independent internal auditors for each section of their quality system.

20. An internal audit schedule be developed that covers all aspects of the quality system, including HACCP, with the respective audit frequency for each section reflecting the relative significance of that section and/or the frequency of compliance.
21. All sites ensure timely corrective action be undertaken for any deficiencies highlighted by the audits and that records show these have been closed out.
22. Sites be encouraged to update their HACCP Monitor software to the latest version which addresses some of the limitations of the original version.
23. Sites consider routinely scoring AQLs on the slaughterfloor, prior to any trimming or washing, and chart the data collected to verify the outcome of their HACCP plan.
24. All sites review their existing microbial testing programs to ensure they provide data which allows for validation/verification of existing and new processes and work practices.

1. INTRODUCTION

During March to May 1997, the Meat Industry Council (MIC) contracted Alliance Consulting & Management (Alliance) to conduct final site audits of 15 meat processing establishments Audit 2) participating in a project to fast track the implementation of HACCP based QA systems.

This reports summarises our findings of the systems audit undertaken at each establishment together with a comparison to the initial audit undertaken during June to August 1996 (Audit 1). There were three main aspects to our approach - assess the **people**, assess the **system** and assess the **outcome** in relation to HACCP and QA System development and implementation. Each stage used internationally accepted principles and competencies, against which each plant was evaluated and an objective score applied.

People

- Assess the competency of nominated individuals who have been (or need to be) HACCP trained against the International HACCP Alliance training skills criteria.

System

- Conduct an audit of the current quality system against the Codex HACCP principles, ISO9002 standard and MSQA requirements;
- conduct an audit of the process of developing the system.

Outcome

- Evaluate the technical detail of the HACCP plan;
- assess carcases for Acceptable Quality Level (AQL) scores using a modified Meat Hygiene Assessment format (ie, faecal, ingesta etc scored minor, major, critical rather than zero tolerance).

Our approach was based on benchmarking all sites so that they could obtain valuable feedback information to assist them in subsequent development of their respective HACCP programs.

2. METHODOLOGY

2.1 AUDIT CHECKLIST

An audit is defined as a systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are adequate to achieve stated objectives.

Most companies have some systems in place which form part of the future quality system. Our audit assessed the effectiveness of the existing efforts and provides background information to support the development of improved systems.

Our audits were aligned with ISO9002 and HACCP, based on the requirements under ARMCANZ as documented below.

Quality Systems Under ARMCANZ

The new Standard for the Hygienic Production of Meat published by ARMCANZ is based on a 1994 revised draft of the original Code of Practice for the Production and Inspection of Meat for Human Consumption. It is written with substantial compliance to and consistency with Codex Alimentarius, Volume 10 (1994), Recommended International Code of Practice for Fresh Meat. It includes a section on format of Quality Assurance Systems for meat processors (section 4 of SCARM Report No. 54).

The following clause is taken from the standard, section 4:-

"Where the controlling authority approves a quality assurance arrangement for the purpose of production and hygiene quality control of meat, as required under this Standard, the quality assurance arrangement shall conform to the following principles:

(a) the quality assurance arrangements shall be consistent with the quality management and quality assurance standards outlined by Standards Australia (AS/NZS ISO9002). The essential elements of these arrangements shall reflect ISO9002 Clauses under Section 4 - Quality System Requirements:

4.1 Management responsibility (quality policy, organisation, management review)
4.2 Quality system
4.3 Contract review
4.4 Design control (exclusion statement)
4.5 Document and data control
4.6 Purchasing
4.7 Control of customer-supplied product
4.8 Product identification & traceability

4.9 Process Control
4.10 Inspection & testing (including records)
4.11 Control of inspection, measuring & test equipment
4.12 Inspection & test status
4.13 Control of non-conforming product
4.14 Corrective and preventive action
4.15 Handling, storage, packaging, preservation and delivery
4.16 Control of quality records
4.17 Internal quality audits
4.18 Training
4.19 Servicing
4.20 Statistical techniques...

(b) Process control (ISO9002 Clause 4.9 above) shall be achieved through the application of the Hazard Analysis Critical Control Point (HACCP) approach, using the seven principles defined by the Food Standards Programme of the Codex Alimentarius Commission...."

Checklist Preparation

A standard checklist was used at each site and covered approximately 800 individual items. The checklist was based on the ISO9002 Quality System standard and was customised to expand the HACCP area within system element 4.9, Process Control, with the skills and competencies required by the International Meat and Poultry HACCP Alliance (which are taken directly from Codex Alimentarius).

The audit checklist was used to prepare detailed reports for each site. Comments were recorded and scores allocated to each checkpoint to provide uniform comparisons between the sites audited and between the two audits. The scores provided for graphical presentation of results.

Scoring system

Each audit item was scored in relation to how it met the checklist requirements according to the following system:

0 Total or significant absence or inadequate implementation of a checklist requirement.

1-4 Temporary breakdown or part implementation of a checklist requirement and/or problems exist. (score related to degree of breakdown)

5 System/skill is in place which, if documented and maintained, should meet the checklist requirement.

6-9 System meets the checklist requirement and measured process improvements are in place. (score related to degree of improvement shown)

10 Approach and/or method includes measured process improvement and is considered best practice in its field.

2.2 AUDIT TEAM

The same audit team undertook both audits and comprised three people, two of whom visited each site. The same Audit Team Leader was used at all site audits therefore assuring consistency of audits.

2.3 SITE AUDITS

The method of auditing was as per the international standards auditing guidelines (AS3911.1, AS23911.2, AS3911.3). These standards cover the auditing process, the audit team and management of audit programs. The audit was conducted over approximately a two day period by the review team and consisted of:-

- A review of quality system documentation presently held relating to HACCP, AQIS MSQA and ISO9002, and State Department of Health regulations;
- Discussions and interviews with company staff and employees on their roles, duties and hypothetical question/situations to assess their skills, competence, knowledge and responsiveness to the current quality system;
- Inspection of facilities, construction and equipment to assess their compliance to regulatory and other stated requirements and company quality manuals;
- Assessment and monitoring of procedures carried out by staff and employees;
- Inspection of records collected by staff;
- Collection and analysis of Acceptable Quality Level scores (AQLs); and
- A review of any microbiological testing being undertaken.

Acceptable Quality Level (AQL) scores

AQLs were used as a measure of the outcome of the HACCP system. Twenty carcases (beef sides) of each species slaughtered were randomly selected and assessed on the slaughter floor prior to washing and trimming using a modified ARMCANZ system. A further 10 carcases (beef sides) of each species were randomly selected and scored in the chiller. The AQL scores were used as a means of assessing the HACCP program at each site and the overall fast track project. The site scores should not be used as a benchmark to rank sites against each other. The AQL system is merely a guide to the successful implementation of the planned HACCP system.

Microbiological testing

A review was made of all microbiological testing routinely undertaken at each site. This review covered what was being tested, how often it was tested and for what microbes.

3. RESULTS AND DISCUSSION

Throughout this report, site codes are consistent across all figures but have been randomly changed from the first audit to maintain confidentiality. In order to maintain confidentiality of individual site data we have elected to provide site averages at the final audit (Audit 2) together with the respective gain for each site, since the first audit, rather than present a direct comparison between Audit 1 and Audit 2 site averages.

3.1 ISO9002/MSQA COMPARISONS

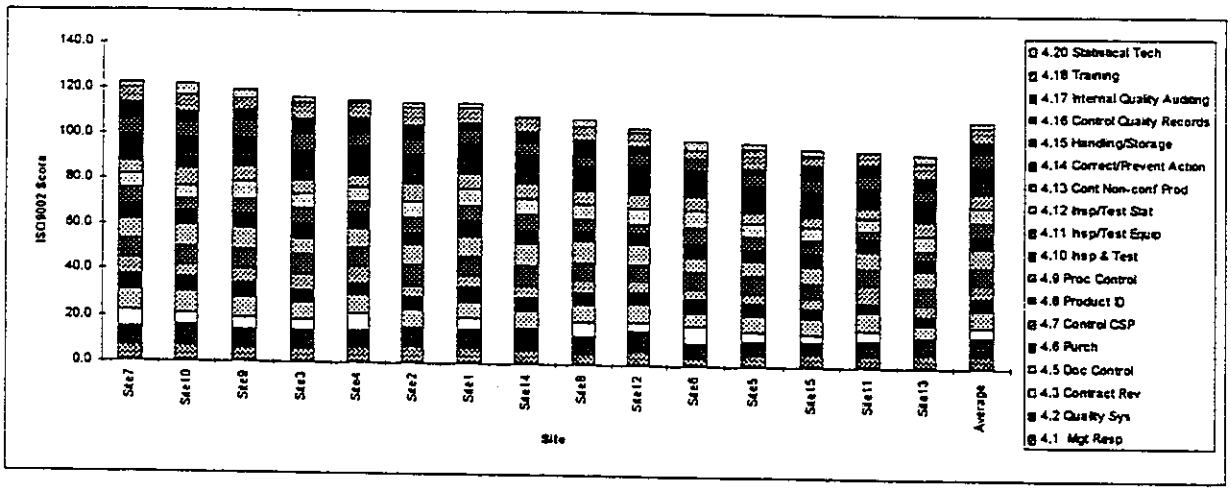
3.1.1 All Elements

Figure 1 provides a ranking of all 15 sites in relation to meeting the system requirements of ISO9002 at Audit 2. A maximum score of 180 is possible under the Alliance scoring system (4.19 Servicing has not been included in Audit 2 since most sites had indicated this element as not applicable to their operation at this point in time).

No plant had attained ISO9002 or MSQA certification although three site's QA systems had been approved by their respective State Authority, eight QA manuals had been developed to meet MSQA requirements and one site was in the process of meeting the requirements for ISO9002 certification.

Between Audit 1 and Audit 2 the average gain per ISO9002 element ranged from 0.6 to 2.3, while the overall average score per site increased from 80.3 to 108.0 respectively. The range between the highest and lowest scoring sites decreased from 74.2 to 29.1 from Audit 1 to Audit 2 respectively.

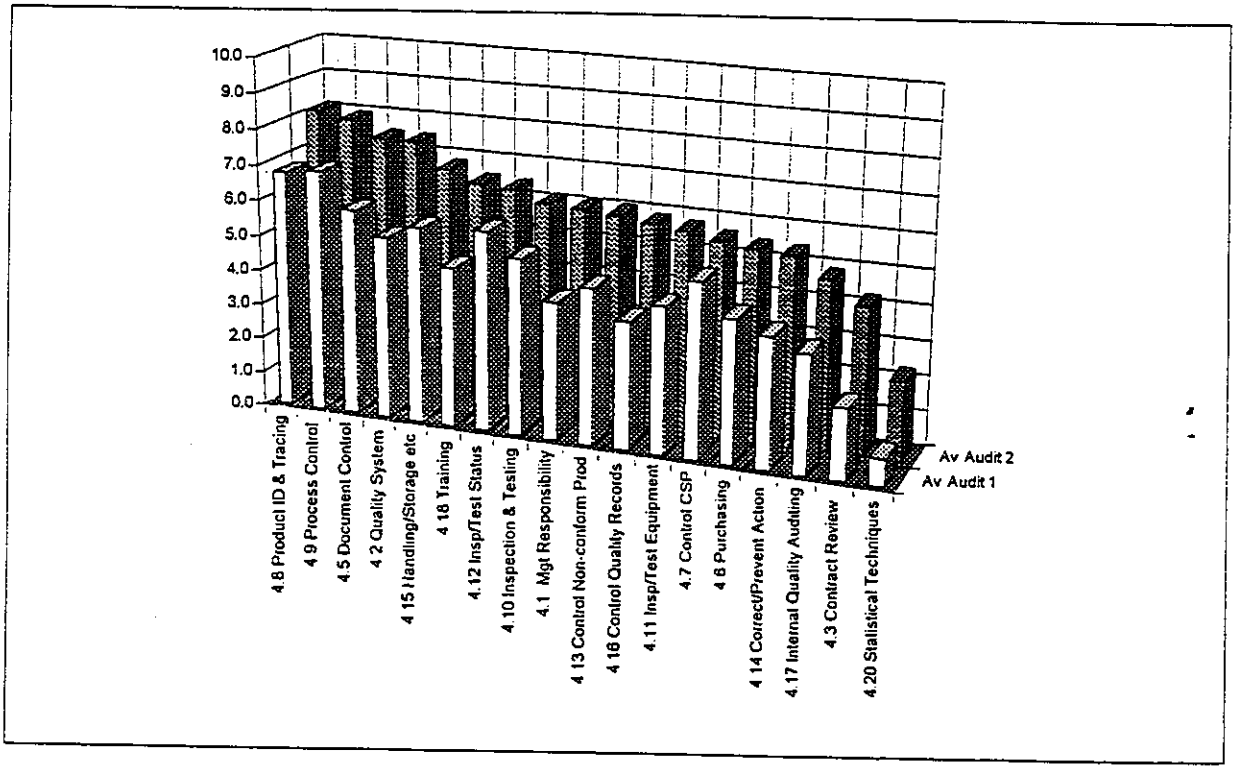
FIGURE 1 : SITE ISO9002 COMPARISONS



3.1.2 Individual Elements

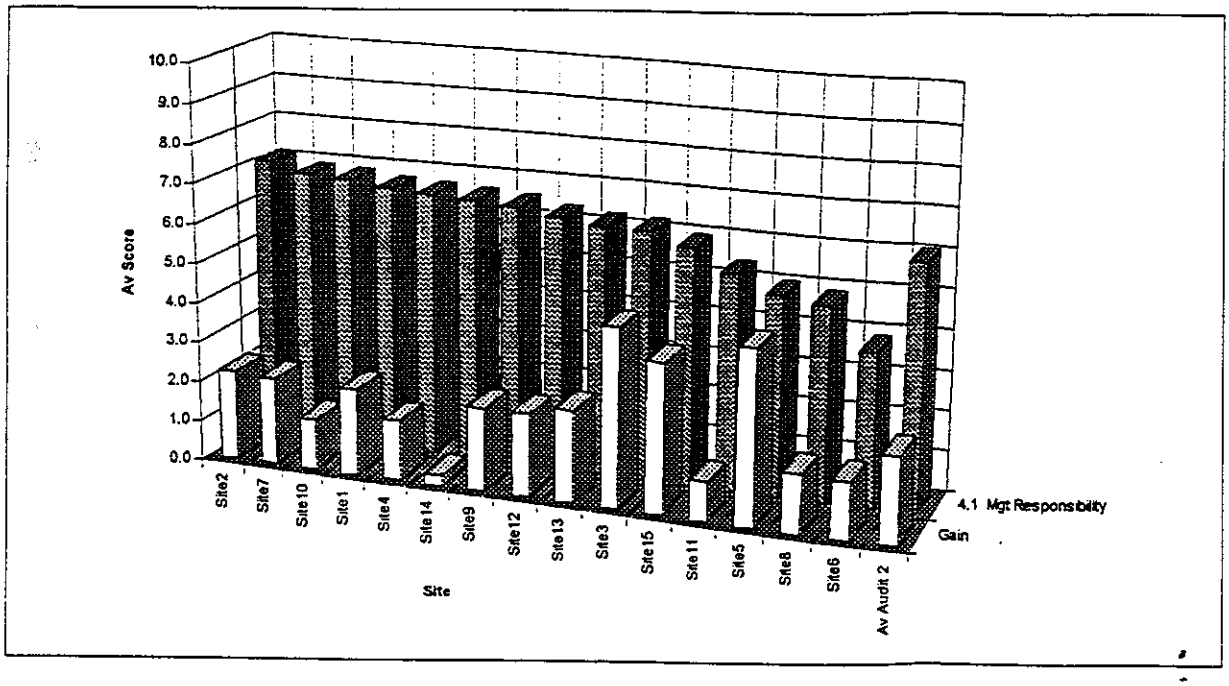
Figure 2 provides a summary of the average scores for each ISO9002 element at the first and final audits.

FIGURE 2 : AVERAGE ISO9002 ELEMENT SCORE AT AUDITS 1 & 2 RANKED BY AUDIT 2 SCORE



A detailed examination of each element displayed in Figure 2 is provided, by site, in Figures 3 to 20 together with the respective gain made for that element since Audit 1. The maximum score possible for each element is 10. Summary comments on each element are made beneath the respective figure.

FIGURE 3 : ISO9002 ELEMENT 4.1 MANAGEMENT RESPONSIBILITY



The average score for Management Responsibility was 6.0 an increase of 2.1 since Audit 1. Only two sites did not exceed score 5.0 (cf, 13 sites in Audit 1).

Strengths

- All sites had a defined quality policy and a demonstrable commitment to quality
- A management quality representative had been appointed in all cases
- Responsibilities and authorities were generally clearly defined for all quality functions.

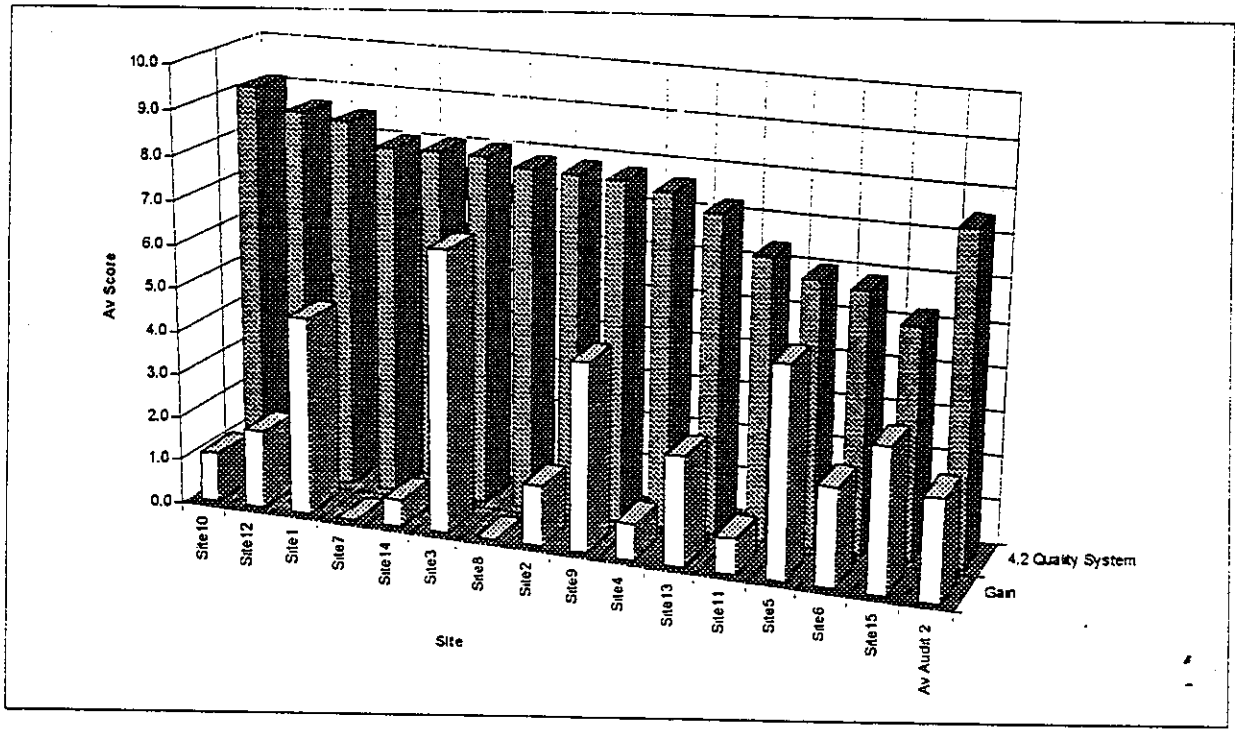
Weaknesses

- Seven sites had not referenced HACCP principles within their documented quality policy
- Most sites had implemented regular management meetings to review current quality system outcomes but these were generally limited to the area of process control rather than a less frequent review (eg, quarterly or half yearly) of the quality system. This observation reflects the finding that most sites have not yet obtained formal approval for their quality system and were unable to demonstrate that the system was fully implemented and operational.

Recommendations

- That all sites fully implement their documented Quality system regardless of third party approval/certification.

FIGURE 4 : ISO9002 ELEMENT 4.2 QUALITY SYSTEM



The average score for Quality System was 7.5 an increase of 2.3 since Audit 1. Site scores ranged from 5.3 to 9.1 compared with a range from 1.3 to 8.0 in Audit 1. No site scored below 5.0 for this element (cf, seven sites Audit 1).

Strengths

- All sites had a documented quality system which at least met their respective regulatory requirement. Although some sites had fully embraced their quality system as their own, others appeared to be following the QA approach purely to meet a regulatory requirement.
- Standard operating procedures (SOPs) had been written and were suitably cross referenced
- Generally work instructions had been developed for slaughterfloors and offal rooms and were either being completed or nearing completion for boning rooms and loadouts.

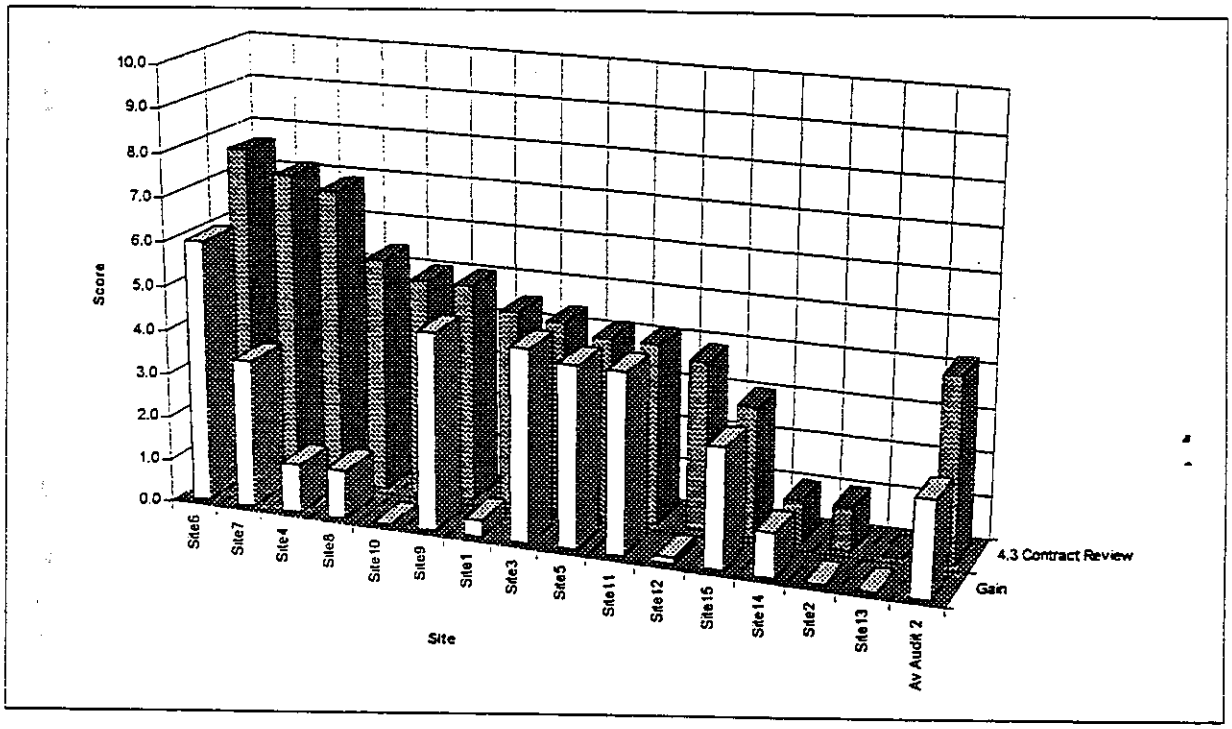
Weaknesses

- Some sites had elected to keep their AUS-MEAT manual separate to their QA manual in order to ensure the requirements of all authorities were placated. This approach does appear to create duplication of effort and may reduce the successful implementation of the respective QA systems
- The industry does appear hampered by the differing authorities all undertaking auditing of their requirements within overall plant QA systems, resulting in some cynicism at plant level.

Recommendation

- That the industry move to bring the requirements of differing authorities acting within the QA area into line to streamline the auditing of plant QA systems and thus remove the current duplication of effort.

FIGURE 5 : ISO9002 ELEMENT 4.3 CONTRACT REVIEW



The average score for Contract Review was 4.2, an increase of 2.2 since Audit 1. Only six sites scored 5.0 or above (cf, 2 sites Audit 1) while less than half the sites (7) had made any real progress (ie, gain 2.8 or more) since Audit 1.

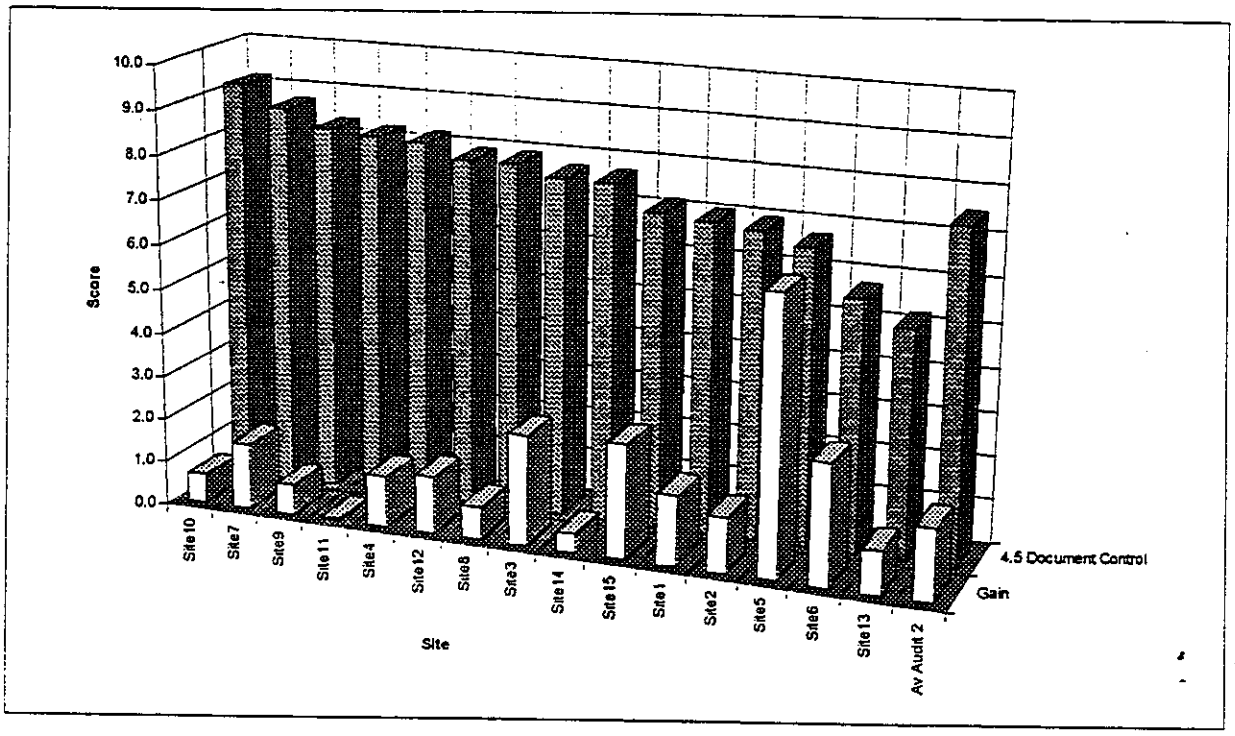
Weaknesses

- The relatively low scores for this element probably reflect an overall objective on behalf of most sites to meet the regulatory requirement for implementation of a QA system rather than individually embracing QA as an important component of the business operation. This observation is compounded by the AQIS proposal (QA Handbook, 1996) that contract review applies to the contract between the processor and the regulator.

Recommendations

- That the industry move to ensure any reference to regulators in contract review be removed
- That the charter of regulators be to ensure plant QA systems meet the requirements of all relevant legislation but not be extended to control of documentation content and layout (other than for specific regulatory requirements).

FIGURE 6 : ISO9002 ELEMENT 4.5 DOCUMENT & DATA CONTROL



The average score for Document and Data Control was 7.5 an increase of 1.6 since Audit 1. Site scores ranged from 5.2 to 9.2 compared with a range from 0.4 to 8.5 in Audit 1. No site scored below 5.0 for this element (cf, four sites Audit 1).

Strengths

- All sites had implemented a system controlling the relevant documents in their Quality system, particularly in relation to Process Control and HACCP
- Procedures for document and data approval and issue were generally well documented.

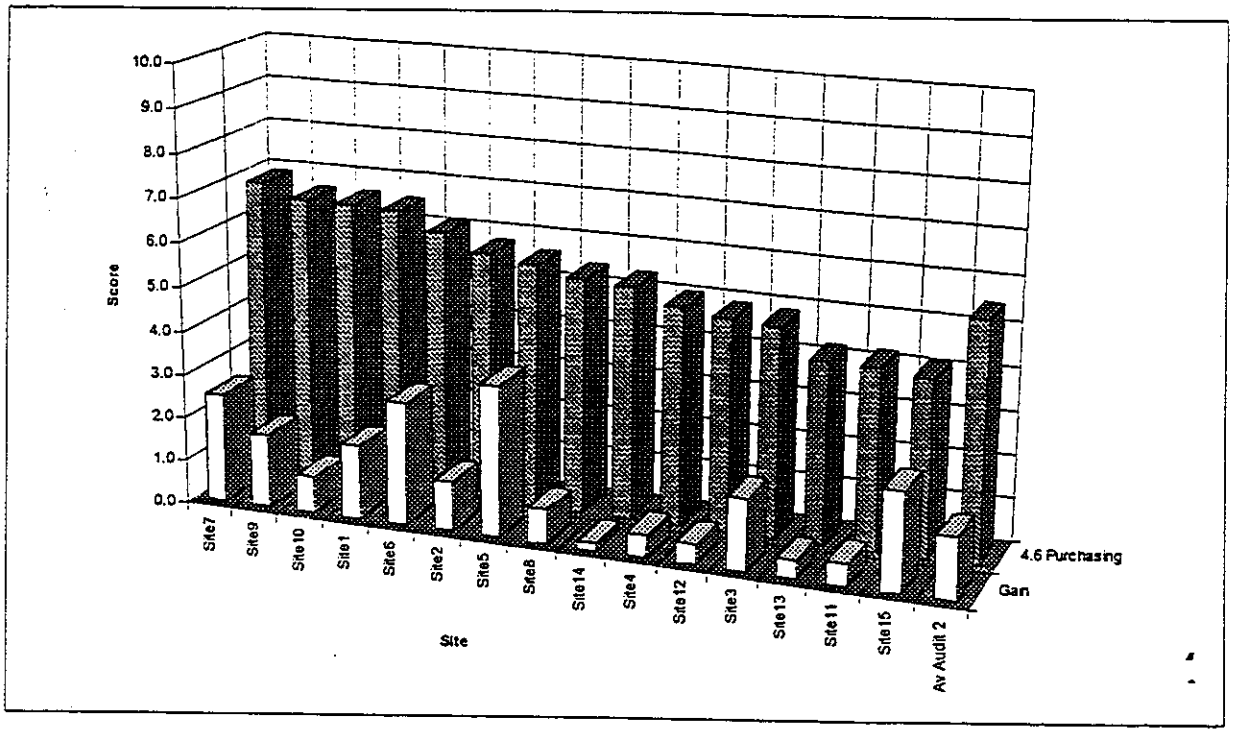
Weaknesses

- Purchasing documents were poorly controlled by half the sites
- Records of document changes had not been made at those sites still awaiting approval of their manual by the relevant authority.

Recommendations

- All sites should implement their documented system and run with it
- Regulators should not be pedantic about receipt of a "clean" document before they issue approval via a desk audit.

FIGURE 7 : ISO9002 ELEMENT 4.6 PURCHASING



The average score for Purchasing was 5.5 an increase of 1.4 since Audit 1. Site scores ranged from 4.1 to 6.9 compared with a range from 1.8 to 5.7 in Audit 1. Only five sites scored below 5.0 for this element (cf, 13 sites Audit 1).

Strengths

- All sites had a documented procedure which at least addressed material/chemical purchases.

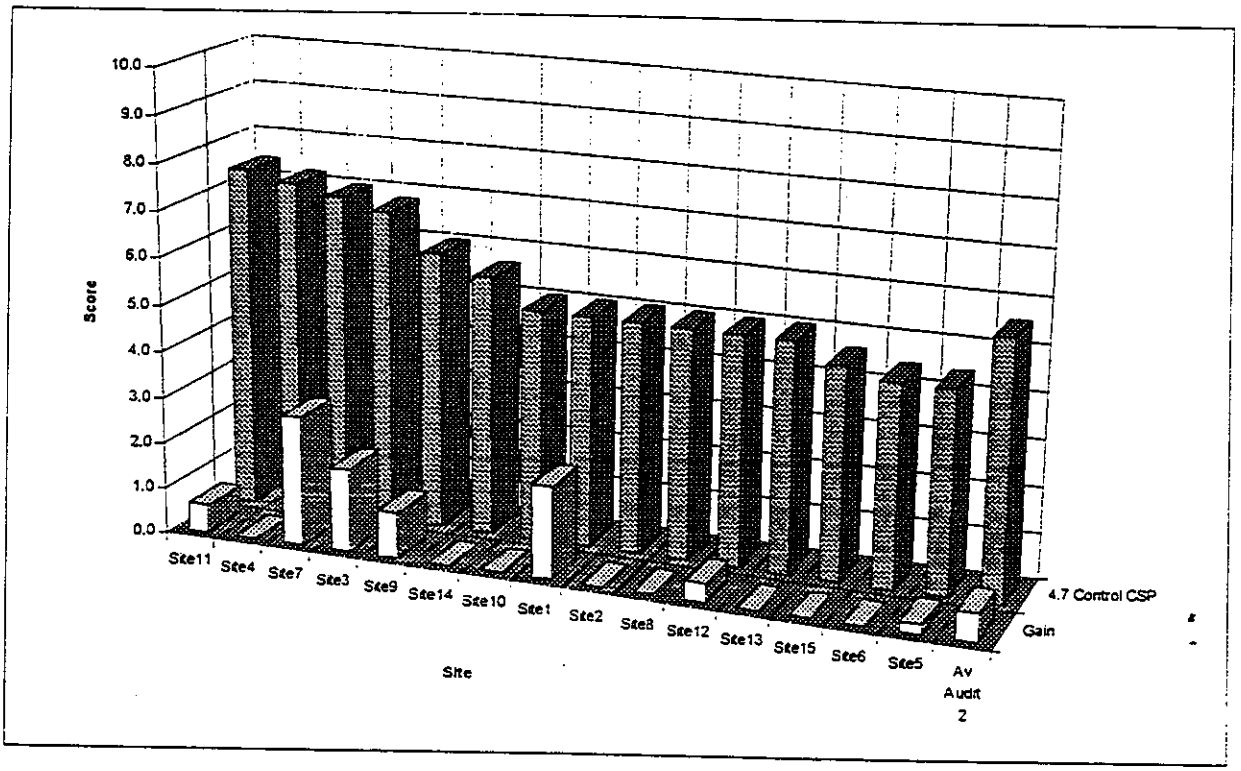
Weaknesses

- Livestock purchases were generally excluded from any quality system
- Supplier records rarely showed historical performance
- Limited evaluation of materials/chemicals was undertaken at their receival.

Recommendations

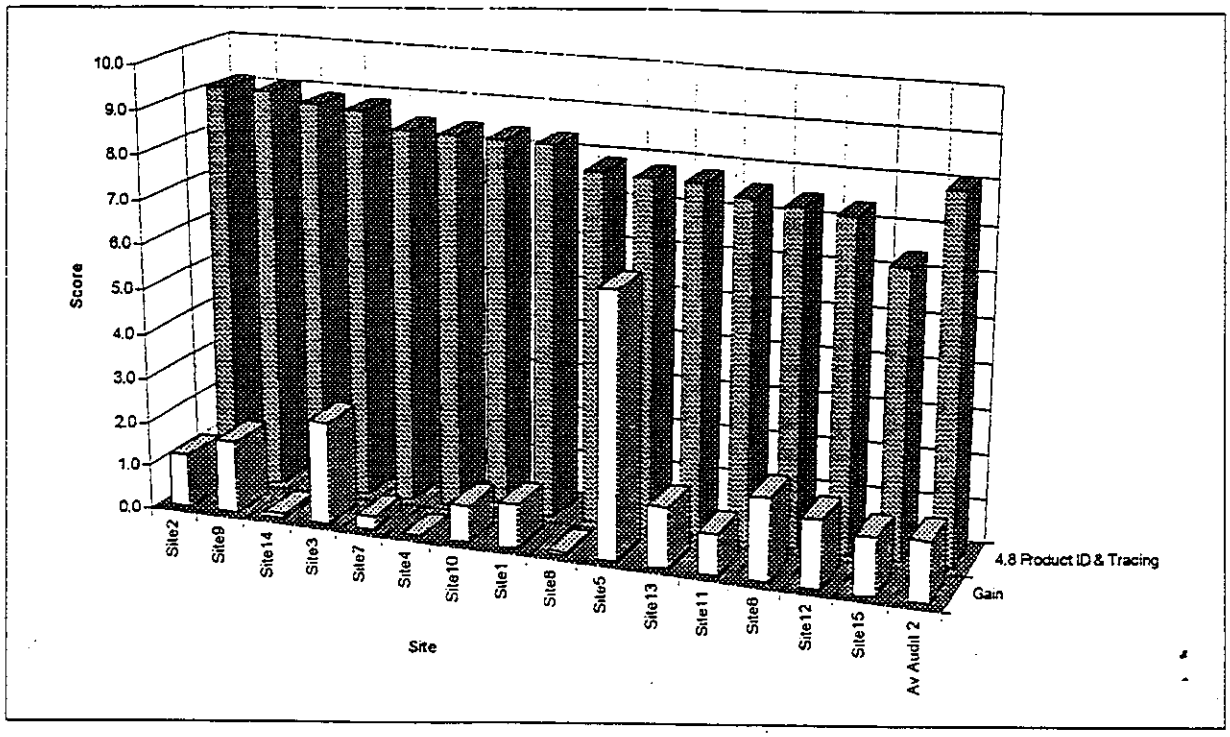
- All sites need to incorporate livestock purchasing as an integral component of their QA system. This may be assisted through industry adoption of producer QA systems such as Cattlecare and Flockcare.

FIGURE 8 : ISO9002 ELEMENT 4.7 CONTROL OF CUSTOMER SUPPLIED PRODUCT



The average score for Control of Customer Supplied Product (CSP) was 5.6 an increase of 0.6 since Audit 1. All but two sites had documented procedures for the control of CSP although the system in place at all sites appeared adequate.

FIGURE 9 : ISO9002 ELEMENT 4.8 PRODUCT IDENTIFICATION & TRACEABILITY



The average score for Product Identification and Traceability was 8.1 an increase of 1.4 since Audit 1. Site scores ranged from 6.4 to 9.1 compared with a range from 1.9 to 8.7 in Audit 1.

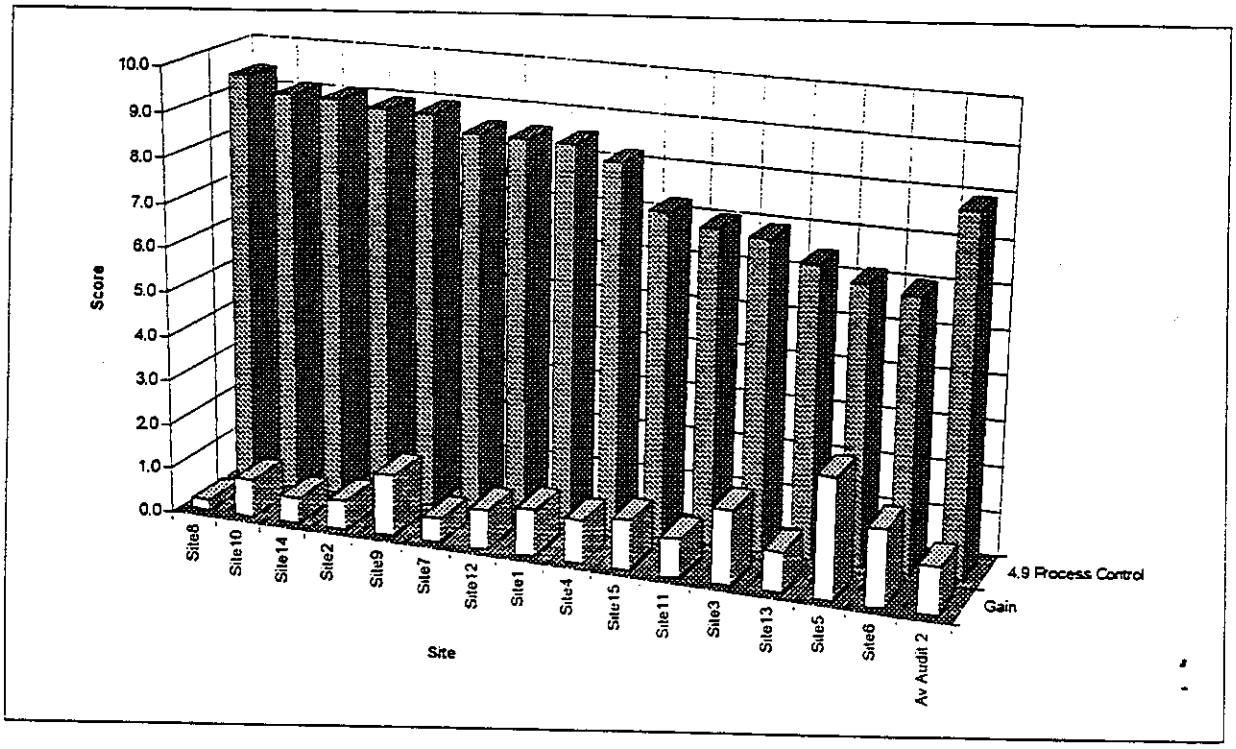
Strengths

- Systems provided for identification of product from livestock receival through to dispatch
- All but two sites had a documented system in place in the event of the need for a product recall.

Weaknesses

- At best the product identification systems provided for:
  - ⇒ carcases - lot basis for beef sides (sometimes quarters)
  - ⇒ offal - day of production for boxed product
  - ⇒ cartons - generally lot basis where individual carton identification or time stamp.

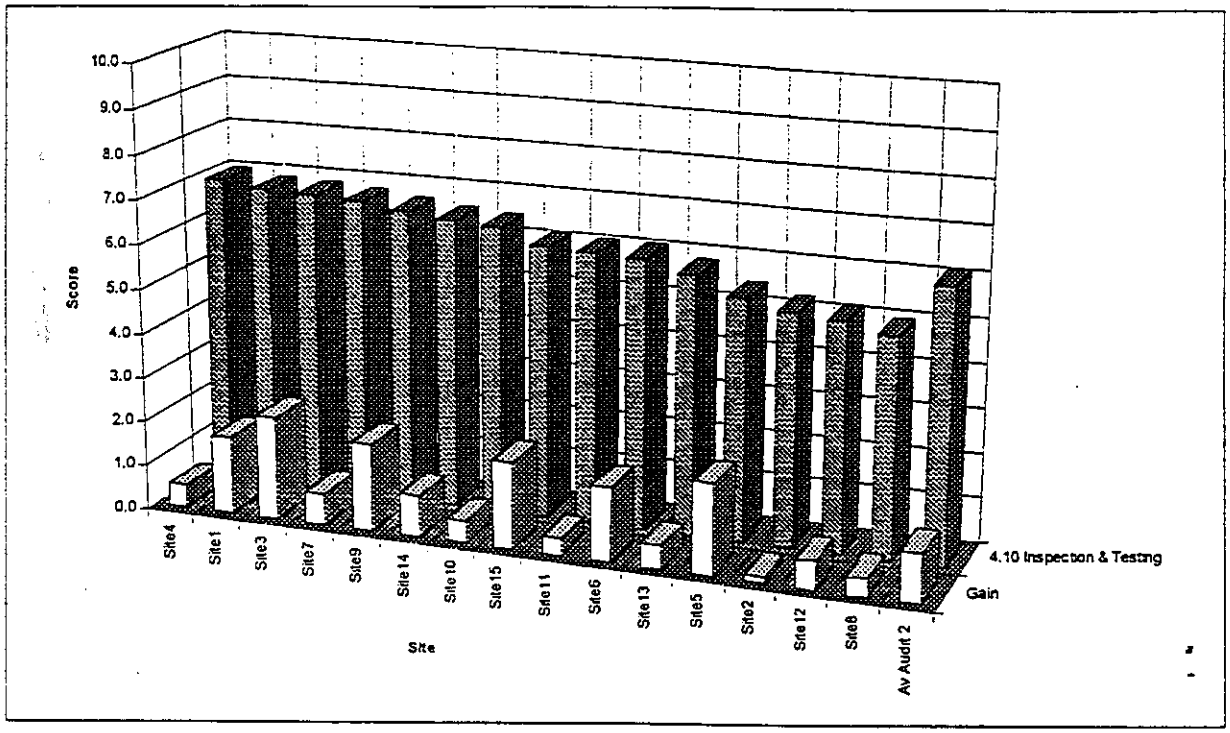
FIGURE 10 : ISO9002 ELEMENT 4.9 PROCESS CONTROL



A detailed examination of Process Control is provided in section 3.2. The main findings were:

- Average score was 7.9 an increase of 1.0 since Audit 1. Site scores ranged from 6.0 to 9.4 compared with a range from 3.5 to 9.2 in Audit 1
- Written work instructions were available at all sites, at least for some departments (eg, slaughterfloor, boning room, loadout)
- HACCP programs had been implemented at all sites although often only to meet a regulatory requirement.

FIGURE 11 : ISO9002 ELEMENT 4.10 INSPECTION & TESTING



The average score for Inspection and Testing was 6.1 an increase of 1.1 since Audit 1. Site scores ranged from 4.9 to 7.0 compared with a range from 3.4 to 6.5 in Audit 1. One site scored below 5.0 for this element (cf, seven sites Audit 1).

Strengths

- All but six sites had adequately documented procedures for receival inspection and testing
- All sites undertook antemortem inspection of livestock
- All but one site had documented procedures for in-process inspection and testing
- Final inspection and testing procedures were adequately documented at all but two sites
- Inspection records were up to date and available upon request.

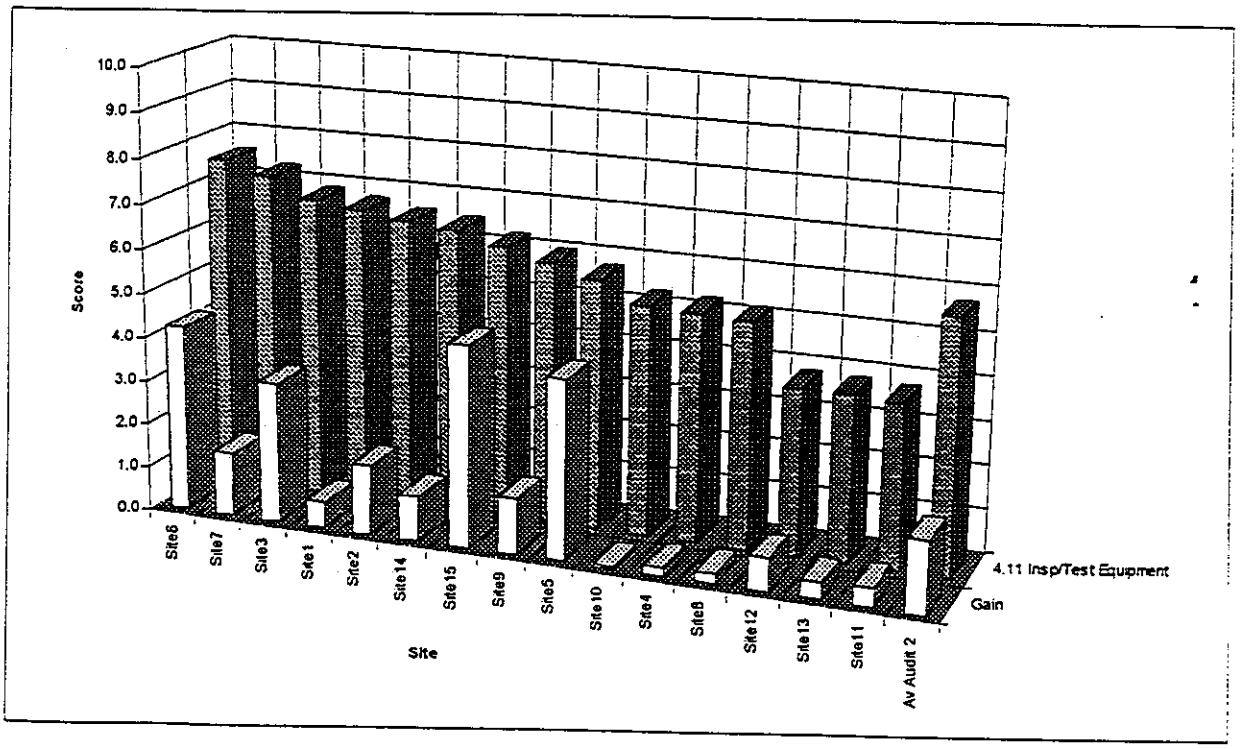
Weaknesses

- Few sites undertook any validation of incoming materials and consumables until they were presented for use
- In general, inspection instructions did not address the environmental conditions for inspection or any associated safety precautions although these were not considered very relevant by most sites (eg, lighting requirements for monitoring/inspection). Sampling instructions were only provided for some monitoring activities (eg, AQL scoring, AUS-MEAT checks), generally where these were provided by the controlling authority (eg, AQIS, ARMCANZ, AUS-MEAT)
- Most sites had not fully addressed their own in-house final inspection which was generally undertaken at loadout.

Recommendations

- All sites should concentrate on development of their own inspection and testing requirements which incorporate the regulatory requirements rather than simply follow regulated guidelines for inspection and testing
- Often this reflects the perceived/actual input being exercised by relevant regulatory authorities who are reluctant to allow sites to develop their own system and then audit that system and measure it against recognised industry standards on the basis of outcome.

FIGURE 12 : ISO9002 ELEMENT 4.11 CONTROL OF INSPECTION, MEASURING & TEST EQUIPMENT



The average score for Control of Inspection, Test & Measuring Equipment was 5.7 an increase of 1.6 since Audit 1. Site scores ranged from 3.7 to 7.3 compared with a range from 1.6 to 6.1 in Audit 1. This element was primarily associated with scales, thermometers (including chiller temperature recorders), fat depth measuring devices and chiller assessment equipment. The level of control exercised between sites, except for scales, continued to vary enormously with three sites still scoring below 5.0 for this element (cf, nine sites Audit 1).

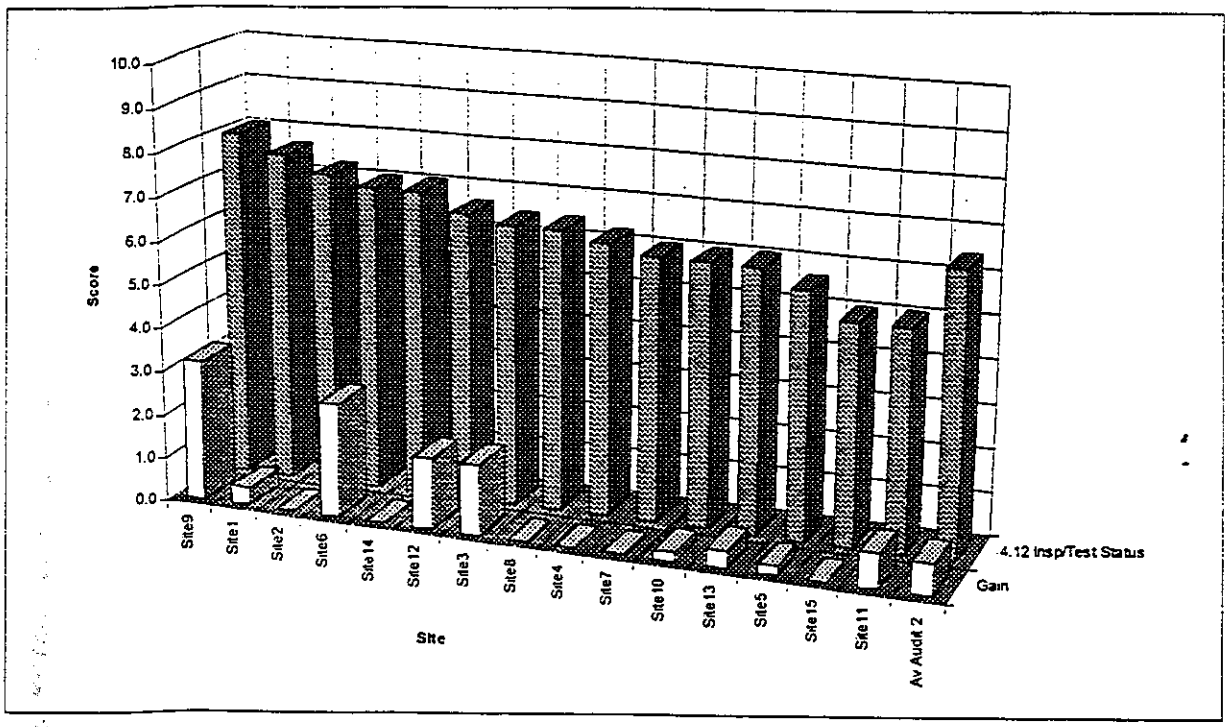
Weaknesses

- lack of identification of inspection, measuring and test equipment
- none, limited or incorrect calibration of equipment
- insufficient calibration records other than for scales
- no validation of previous inspection and test results when inspection, measuring or test equipment was found to be out of calibration although the practicalities of this in a meat processing environment are limited.

Recommendations

- All sites should ensure control of inspection, measuring and test equipment is adequately addressed in their quality system and the documented procedures followed.

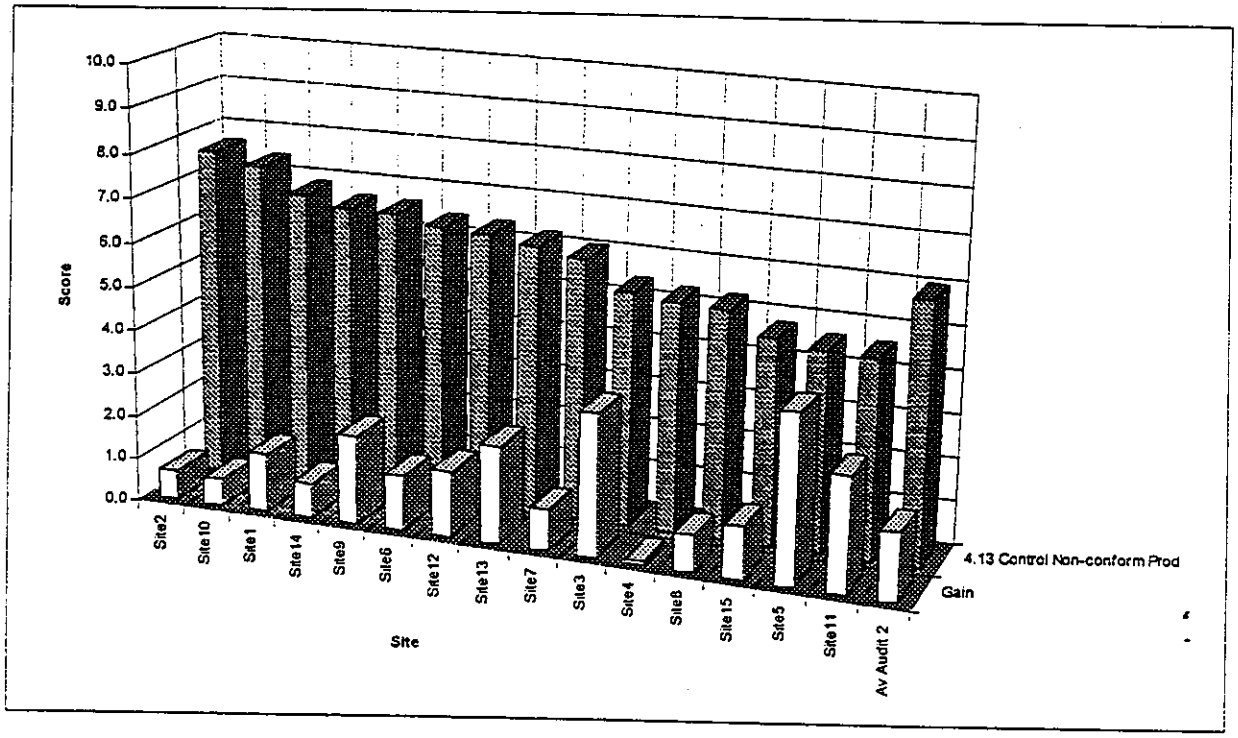
FIGURE 13 : ISO9002 ELEMENT 4.12 INSPECTION AND TEST STATUS



The average score for Inspection/Test Status was 6.4 an increase of 0.7 since Audit 1. Site scores ranged from 5.0 to 8.0 compared with a range from 4.2 to 7.2 in Audit 1.

In general this element was adequately addressed with non-conforming product generally being identified and all product being stamped, upon being passed fit for human consumption.

FIGURE 14 : ISO9002 ELEMENT 4.13 CONTROL OF NON-CONFORMING PRODUCT



The average score for Control of Non-conforming Product was 6.4 an increase of 2.0 since Audit 1. Site scores ranged from 4.6 to 7.6 compared with a range from 0.8 to 6.9 in Audit 1. Only three sites scored less than 5.0 for this element (cf, eight sites Audit 1).

Strengths

- All sites had documented procedures describing their actions to ensure non-conforming product was prevented from inadvertent use
- All sites had a clear method for identification of non-conforming product although in many cases action was taken immediately on-line.

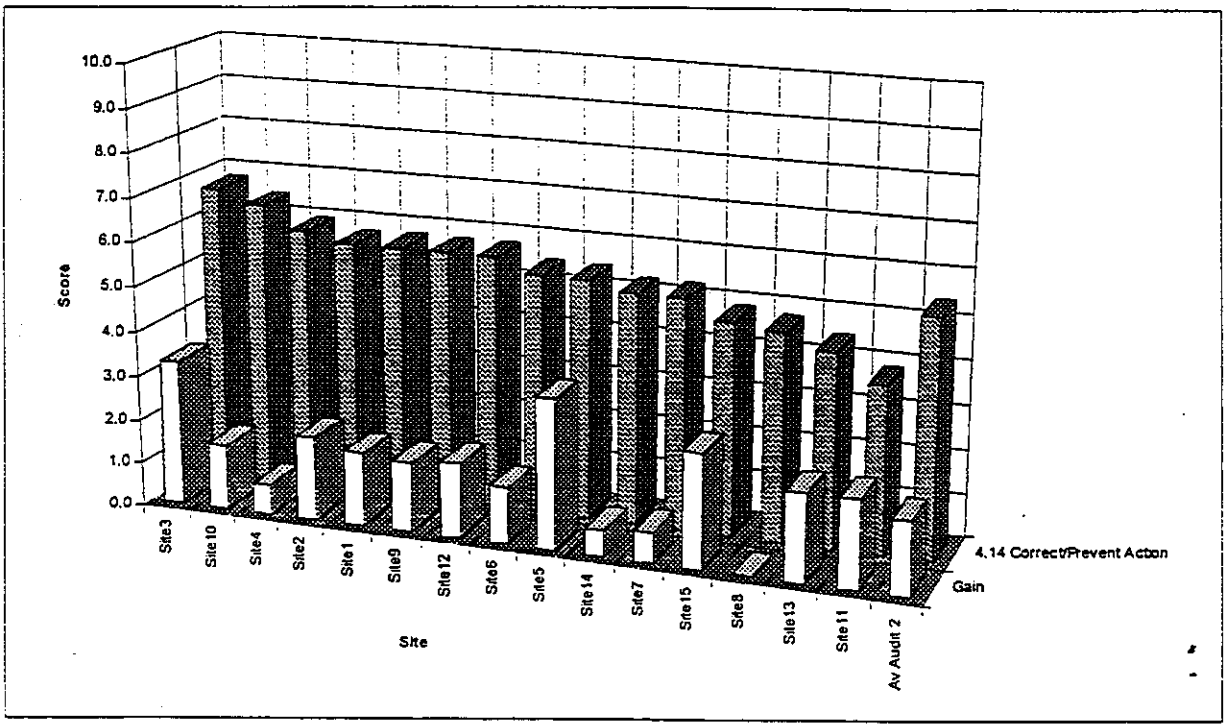
Weaknesses

- Records of the extent and frequency of non-conforming product by type of non-conformance were limited in most cases.

Recommendations

- Where appropriate, sites investigate systems for quantifying the type and extent of non-conforming product to assist in subsequent quality system reviews.

FIGURE 15 : ISO9002 ELEMENT 4.14 CORRECTIVE AND PREVENTIVE ACTION



The average score for Corrective and Preventive Action was 5.4 an increase of 1.7 since Audit 1. Site scores ranged from 3.8 to 6.7 compared with a range from 1.8 to 5.2 in Audit 1.

Strengths

- All but one site had a procedure for the implementation of corrective action
- All but two sites had amended procedures and/or work instructions as a result of instigating corrective action.

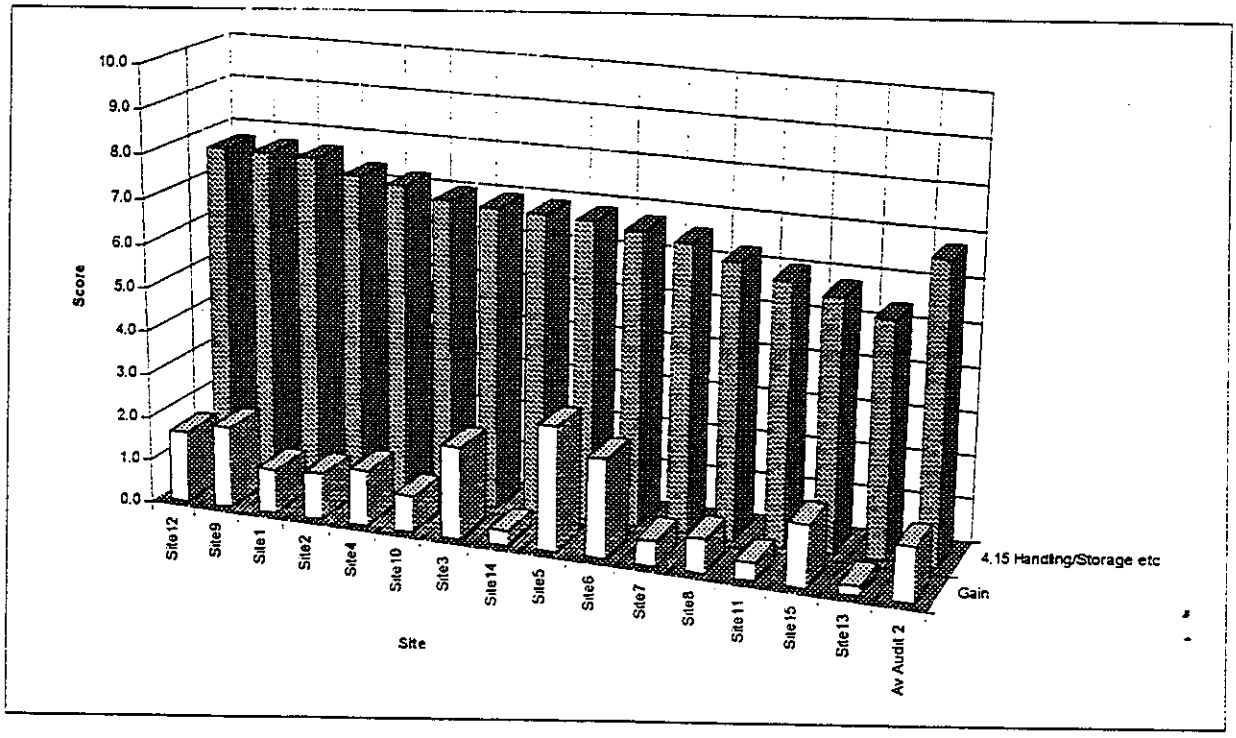
Weaknesses

- Few sites had analysed processes, records and customer feedback in an attempt to identify ways to improve their QA system
- Most sites appear constrained by current authorities with respect to the implementation of corrective and preventive action.

Recommendations

- All sites need to revisit their processes and analyse their records in an attempt to find ways to improve their system
- Regulators need to stand back and encourage each site to use the corrective process for all types of problems. The regulators should then audit outcomes of this process against their regulatory requirements
- Most sites could benefit from training in "root cause" problem identification and problem solving.

FIGURE 16 : ISO9002 ELEMENT 4.15 HANDLING, STORAGE, PACKAGING, PRESERVATION & DELIVERY



The average score for Handling, Storage, Packaging, Preservation & Delivery was 6.8 an increase of 1.2 since Audit 1. Site scores ranged from 5.4 to 7.7 compared with a range from 4.0 to 6.6 in Audit 1.

Strengths

- All but two sites had documented procedures for this element
- Sites with AUS-MEAT accreditation had suitable procedures covered within their AUS-MEAT manual and/or as per product specifications.

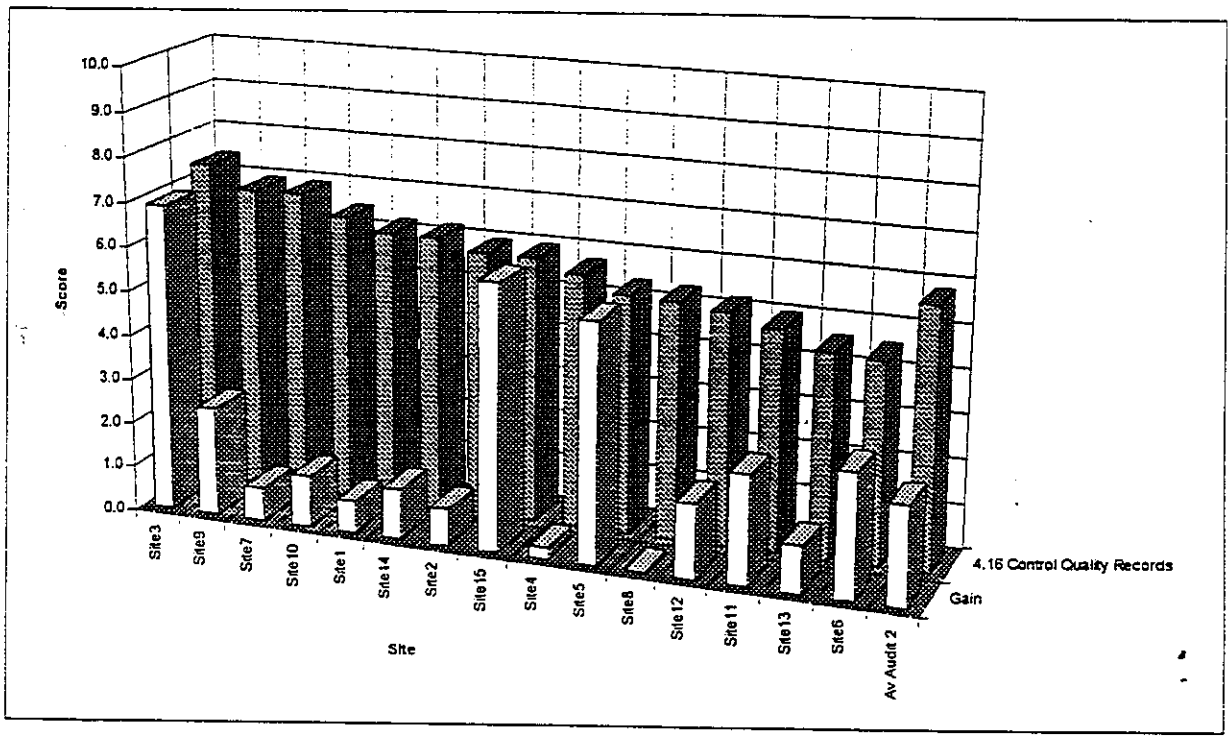
Weaknesses

- For sites with completely separate QA and AUS-MEAT systems, this element is either poorly cross-referenced or duplicated.

Recommendations

- All sites give consideration to incorporation of AUS-MEAT requirements into their overall QA system.

FIGURE 17 : ISO9002 ELEMENT 4.16 CONTROL OF QUALITY RECORDS



The average score for this element was 5.8 an increase of 2.2 since Audit 1. Site scores ranged from 4.5 to 7.4 compared with a range from 0 to 6.1 in Audit 1. Only three sites scored below 5.0 for this element (cf, eight sites Audit 1).

Strengths

- All sites demonstrated adequate control of quality records although the control system was not documented at three sites
- All sites at least met the requirements of the controlling authority with respect to quality records.

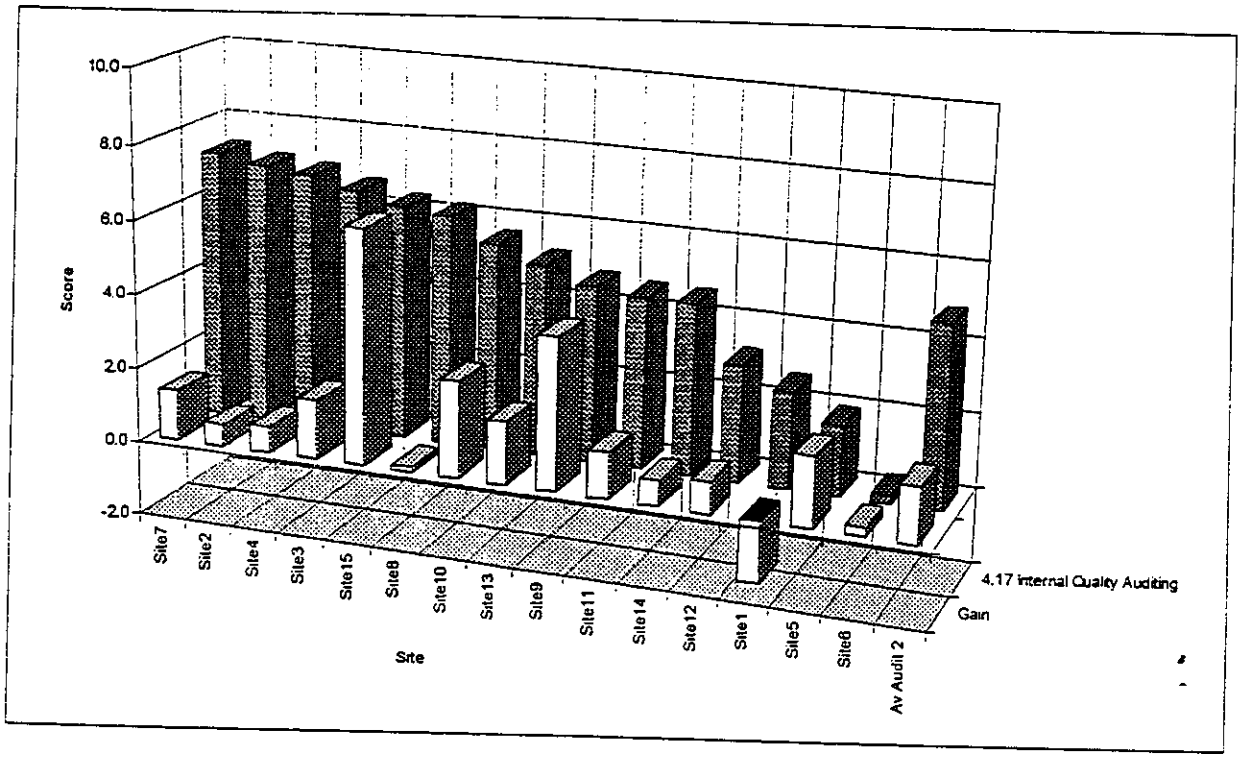
Weaknesses

- Preservation of records was limited at all sites (eg, few had fire preservation methods in place)
- Three sites had not fully addressed how obsolete records would be disposed.

Recommendations

- All sites should review the relative importance of all quality records and address preservation and disposition practices as appropriate.

FIGURE 18 : ISO9002 ELEMENT 4.17 INTERNAL QUALITY AUDITS



The average score for Internal Quality Audits was 4.8 an increase of 1.4 since Audit 1. Site scores ranged from 0.2 to 7.3 compared with a range from 0 to 6.5 in Audit 1. One site recorded a lower score for this element than at the first audit. The audit 1 score for this site had been inflated by the suggestion that unscheduled audits were being undertaken at that time.

Strengths

- All sites had a documented procedure to control internal audit activities
- All sites had undertaken or were scheduled to undertake internal auditor training with financial assistance from MIC.

Weaknesses

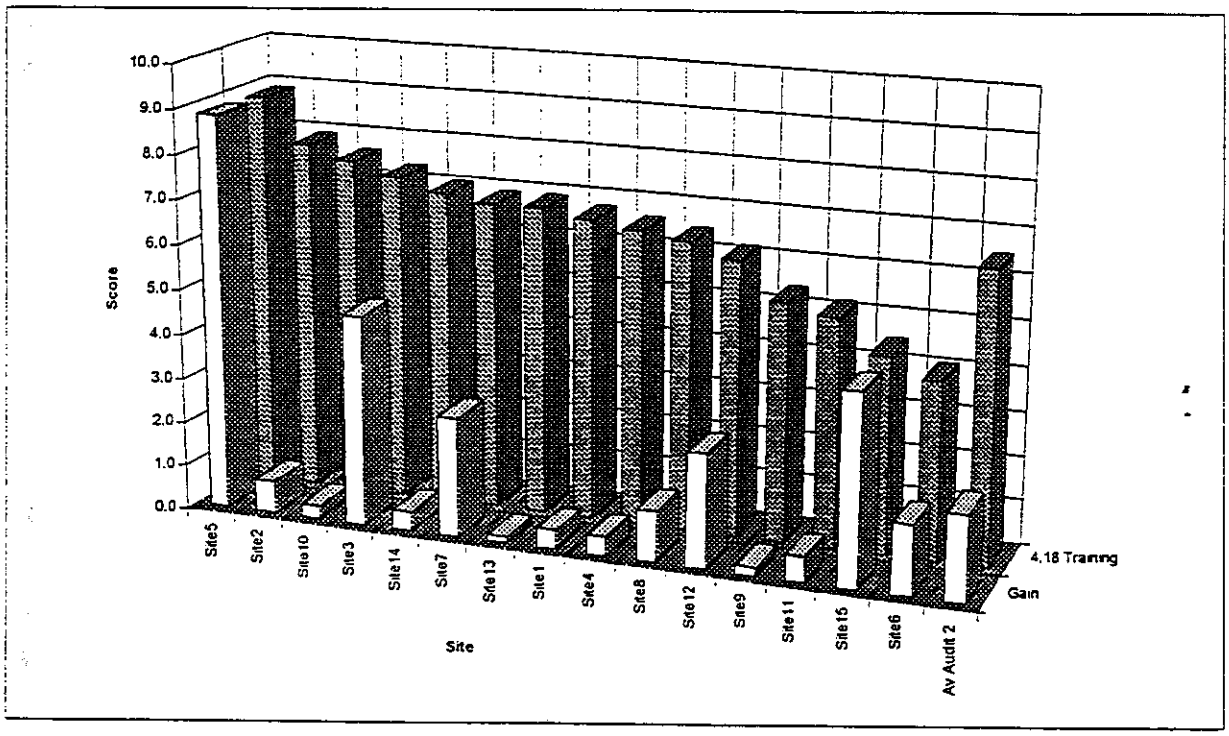
- While most sites recognised the need for scheduled and unscheduled audits, only five sites had formally addressed unscheduled audits within their relevant procedure
- Eight sites had not documented their audit schedule although in most cases this was likely to follow once they had undertaken their training
- As most sites were in the process of implementing their quality system few had actually undertaken internal quality audits which covered all aspects of the quality system.

Recommendations

- That all sites ensure they use independent internal auditors for each section of their quality system

- That a schedule be developed that covers all aspects of the quality system, including HACCP, with the respective audit frequency for each section reflecting the relative significance of that section and/or the frequency of compliance
- That all sites ensure that timely corrective action be undertaken for any deficiencies highlighted by the audits and that records show these have been closed out.

FIGURE 19 : ISO9002 ELEMENT 4.18 TRAINING



The average score for Training was 6.5 an increase of 2.0 since Audit 1. Site scores ranged from 4.0 to 8.9 compared with a range from 0 to 7.3 in Audit 1.

Strengths

- All sites recognised the need for an adequately trained workforce although the manner in which this was addressed varied between sites
- All sites had undertaken HACCP training for employees at least to supervisor level
- 11 sites had attempted to develop a skills matrix system for employees and/or maintained training records for all employees.

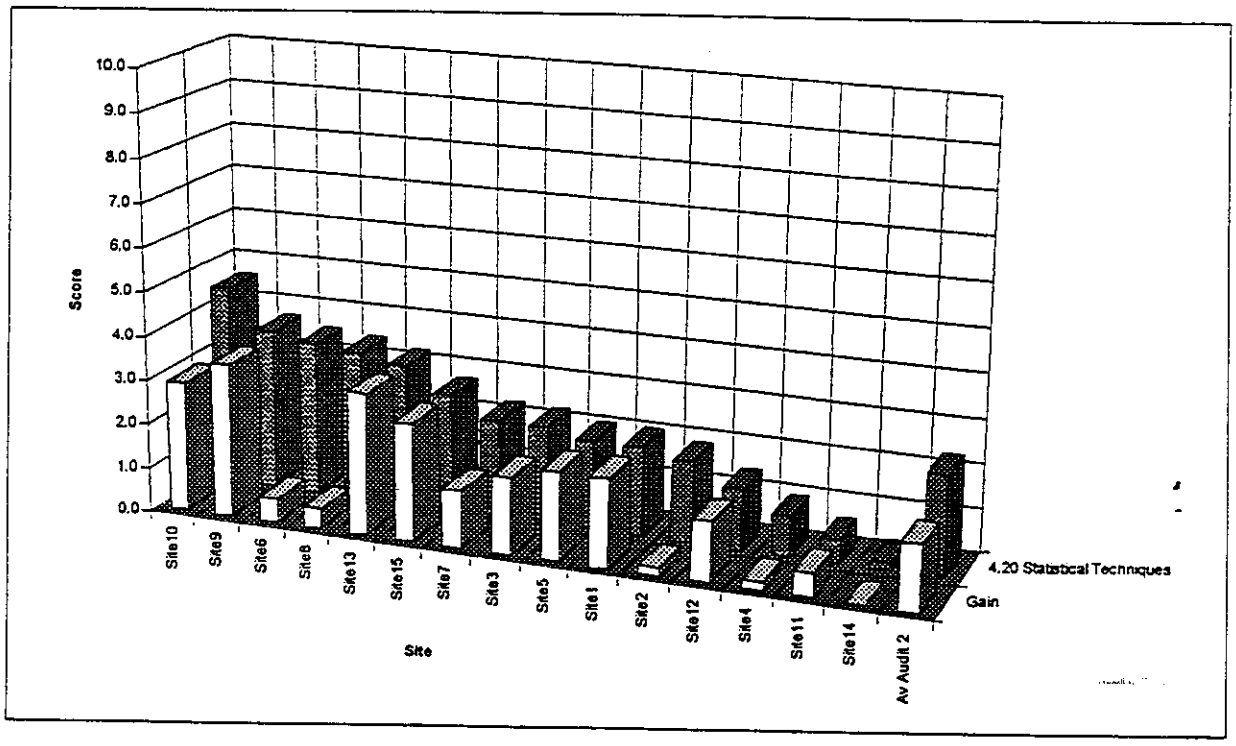
Weaknesses

- Few sites had clearly identified the skills and experience required to complete specific tasks other than in an adhoc manner for certificated AUS-MEAT requirements. Some sites had, however, initiated a certificate program for workers which assessed competency for various slaughtering/boning skills. In some cases this was being extended to enable employees to meet the requirements of MINTRAC.

Recommendations

- That all sites continue to work on or develop a skills matrix for all employees and attempt to document the skills/experience required for each specific task

FIGURE 20 : ISO9002 ELEMENT 4.20 STATISTICAL TECHNIQUES



The average score for Statistical Techniques was 2.3 an increase of 1.5 since Audit 1. Site scores ranged from 0.2 to 4.5 compared with a range from 0 to 2.9 in Audit 1

Strengths

- Most sites had implemented some charting of process and defect data.

Weaknesses

- Although all sites had received a copy of the HACCP Monitor software this had only been implemented at two sites.

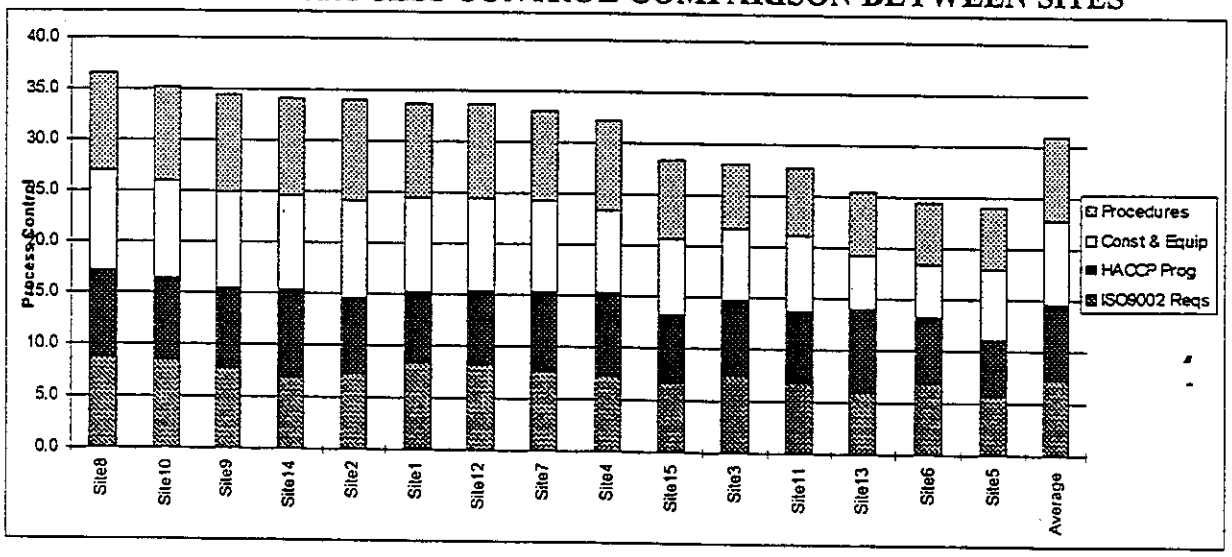
Recommendations

- Sites need to be encouraged to update their HACCP Monitor software to the latest version which does appear to address some of the limitations of the original version sent to all sites
- All sites could benefit from basic training in the use of statistical techniques which was specifically tailored to the meat processing industry.

3.2 PROCESS CONTROL/HACCP

Figure 21 provides a segmentation of process control into four areas; ISO9002 requirements, HACCP program, Construction and Equipment, and, Procedures. Each segment was scored using a 10 point scale so that a maximum score of 40 was possible. The average score for all sites was 31.0 an increase of 5.3 since Audit 1. Site scores ranged from 24.0 to 36.6 compared with a range from 12.5 to 34.4 in Audit 1.

FIGURE 21 : PROCESS CONTROL COMPARISON BETWEEN SITES



As shown in Figure 22, the highest scoring components were Procedures (8.2) and Construction & Equipment (8.2) although HACCP program had made the most dramatic improvement since Audit 1 (average score increase 2.1 to 7.3 in Audit 2). The individual components of Figure 22 are explored separately in Figures 23-26.

FIGURE 22 : AVERAGE PROCESS CONTROL COMPONENT SCORE AT AUDITS 1 & 2 RANKED BY AUDIT 2 SCORE

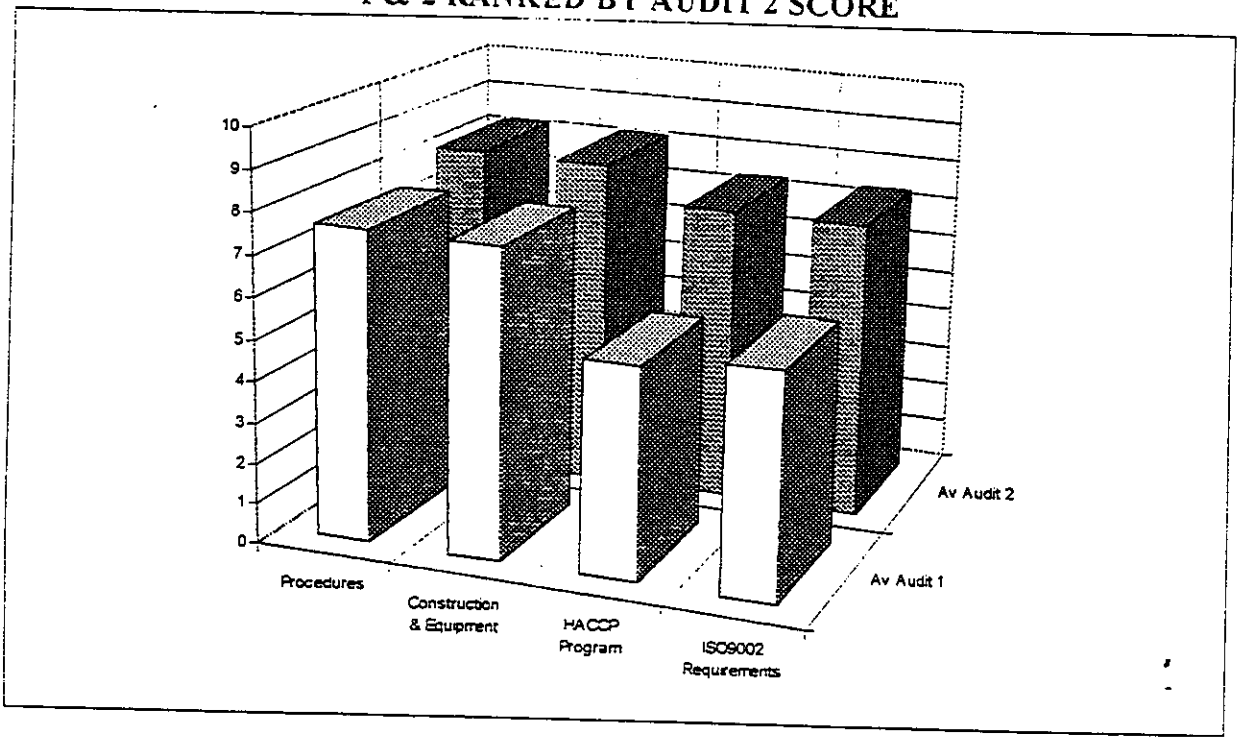
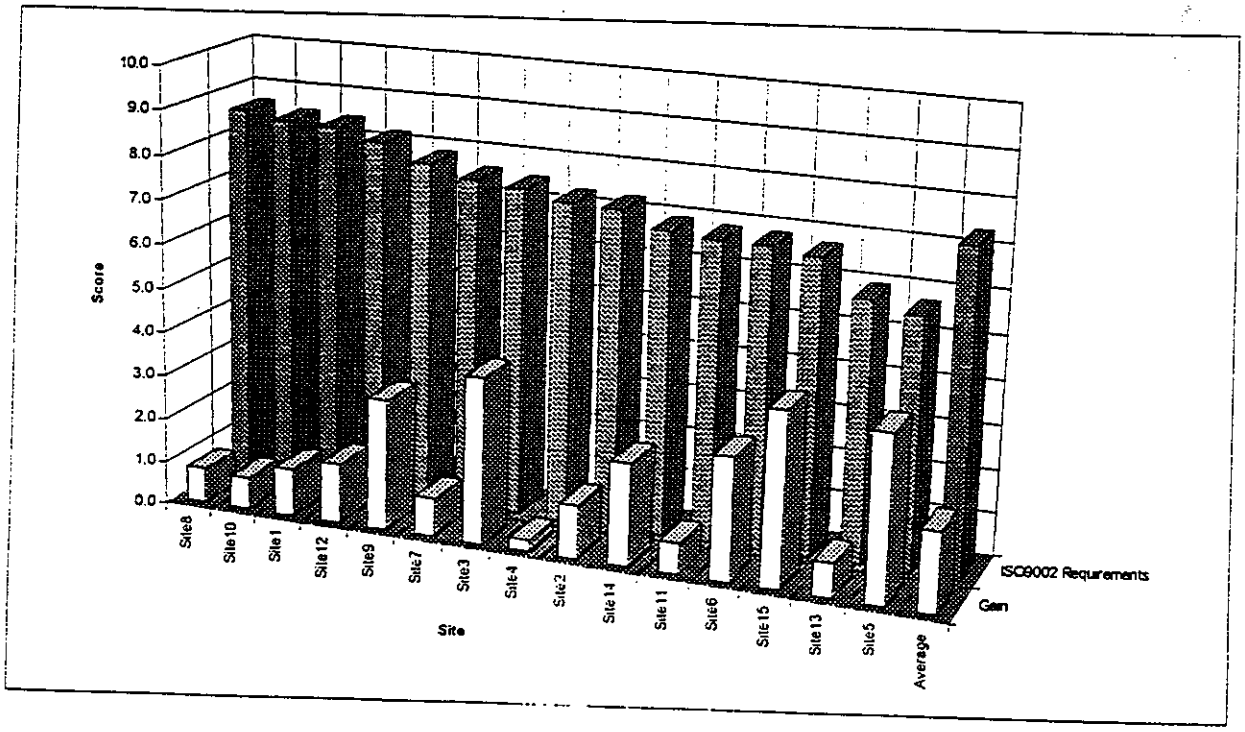


FIGURE 23 : PROCESS CONTROL ISO9002 REQUIREMENTS



The average score for ISO9002 Requirements was 7.3 an increase of 1.9 since Audit 1. Site scores ranged from 5.7 to 8.6 compared with a range from 1.9 to 7.8 in Audit 1. The main findings were:

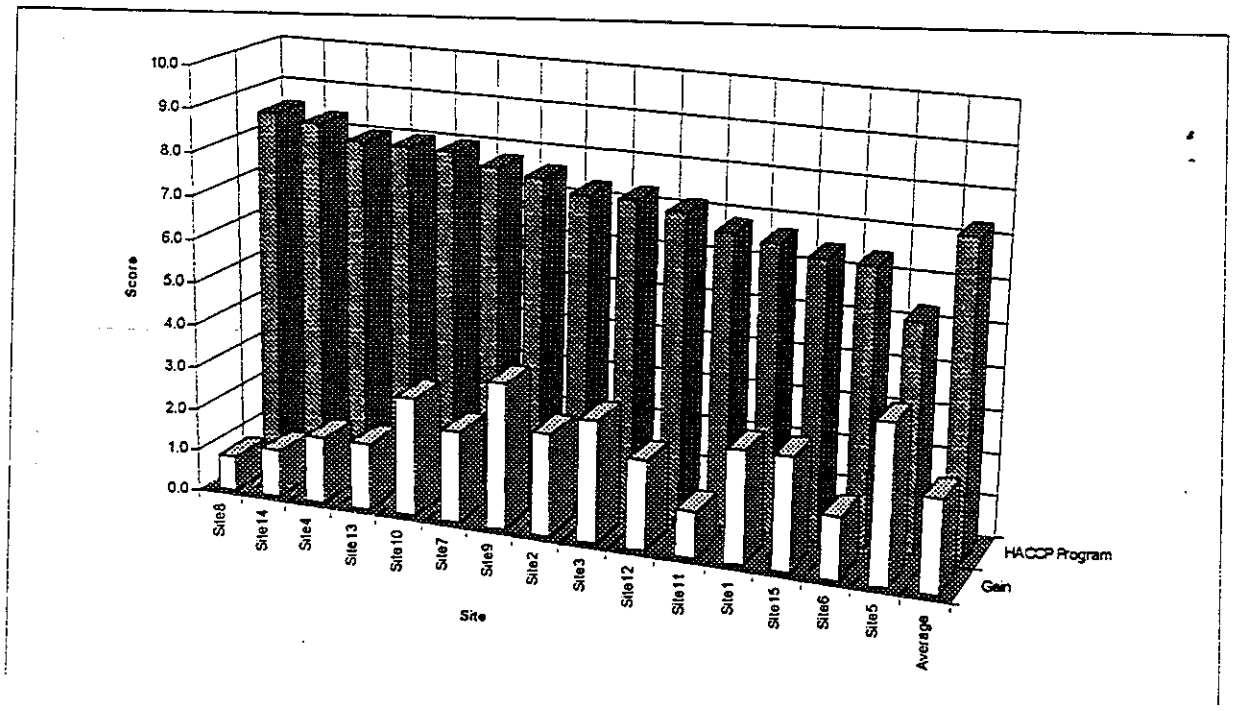
Strengths

- All sites now had a planned and documented production process
- All processes were carried out under controlled conditions with adequate control exercised over any materials used
- Workmanship standards for production and inspection personnel were now well defined in all but one case.

Weaknesses

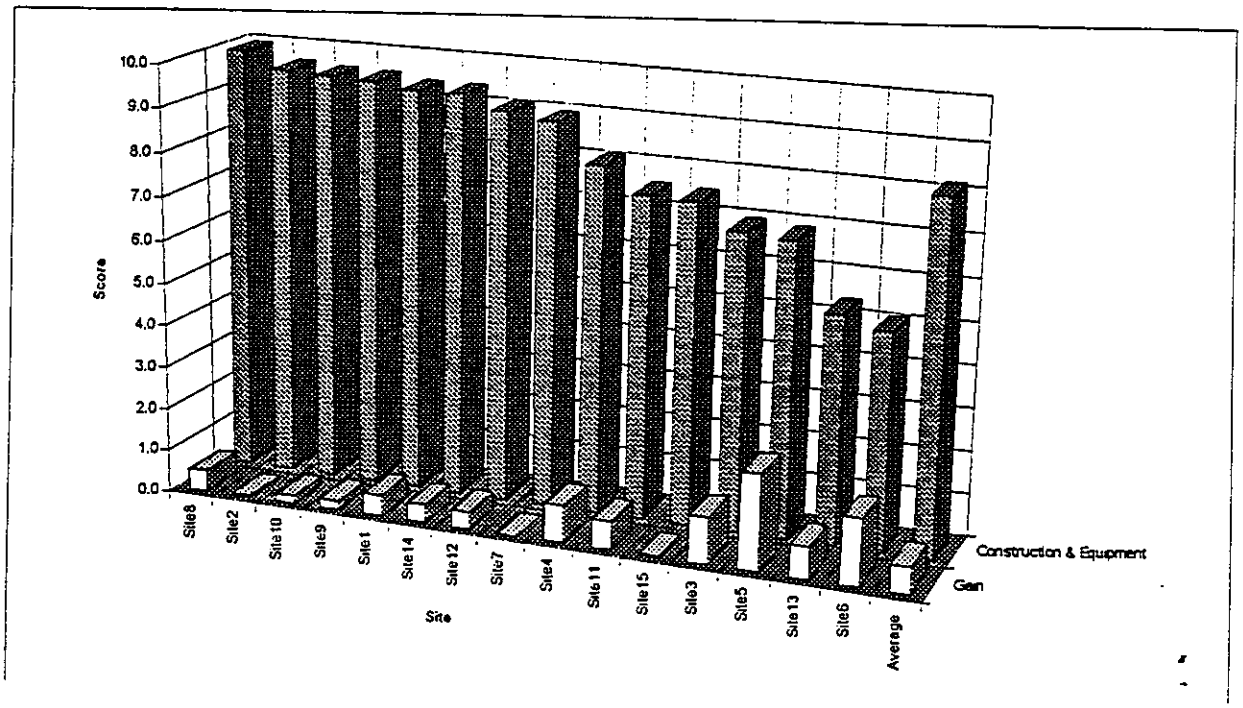
- The capabilities of process equipment were generally not well established
- Four sites had not made work instructions freely available to employees nor had them strategically displayed in the appropriate work areas.

FIGURE 24 : HACCP PROGRAM BY SITE



The average score for HACCP Program was 7.3 an increase of 2.1 since Audit 1. Site scores ranged from 5.3 to 8.5 compared with a range from 1.6 to 7.6 in Audit 1. This element examined the knowledge, skills and competency of personnel involved in the HACCP program and is further developed in section 3.3.

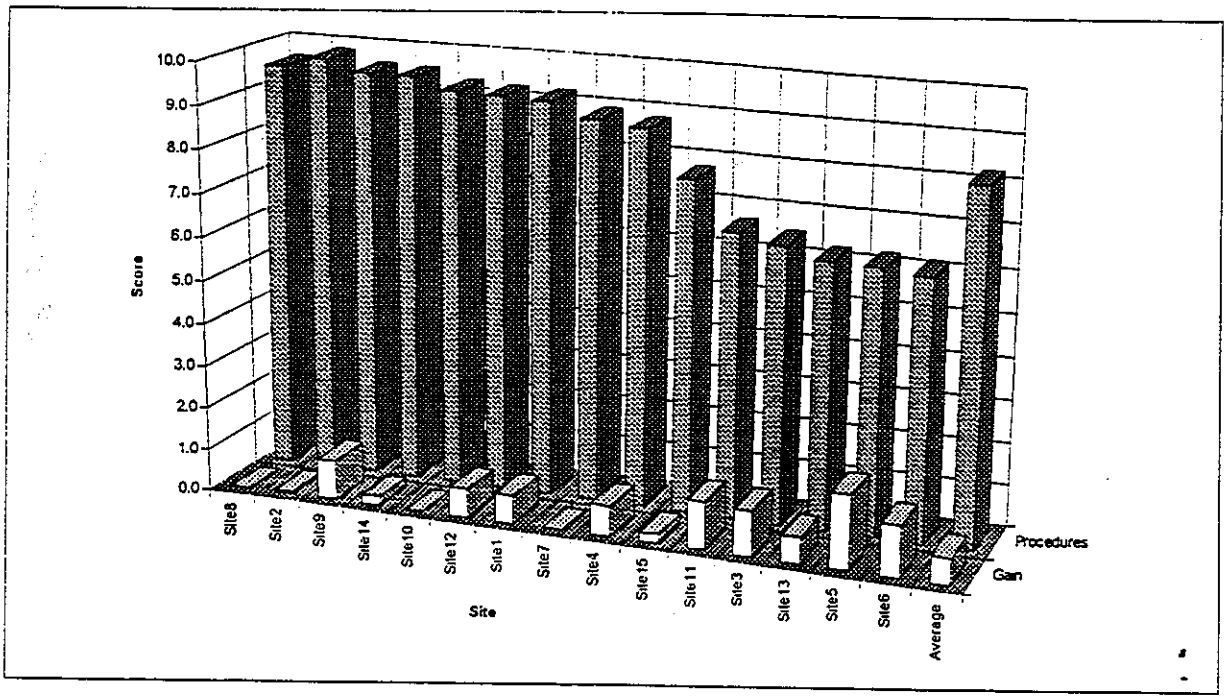
FIGURE 25 : CONSTRUCTION & EQUIPMENT



The average score for Construction and Equipment was 8.2 an increase of 0.7 since Audit 1. Site scores ranged from 5.1 to 9.9 compared with a range from 4.6 to 9.4 in Audit 1. The main areas of non-compliance (site scores less than 5) were:

- inadequate identification of pipelines (47% sites)
- inadequate storage of laundered garments/utensils and cleaning equipment (23%)
- no inedible product amenities (43%)
- inadequate lockers, toilets, showers and hand basins (27%)
- inadequate laboratory facilities and equipment (31%)
- no light meter readings or records kept (29%)
- back siphonage possible (33%)
- insufficient holding tank cleaning (30%)
- poor security of in-plant chlorination equipment (30%)
- inadequate chlorine monitoring (23%)
- poor construction sanitation (ie, flaking paint, rust, dust and overhead pipes) (27%)
- inadequate truck washing facilities (23%)

FIGURE 26 : PROCEDURE SCORE BY SITE

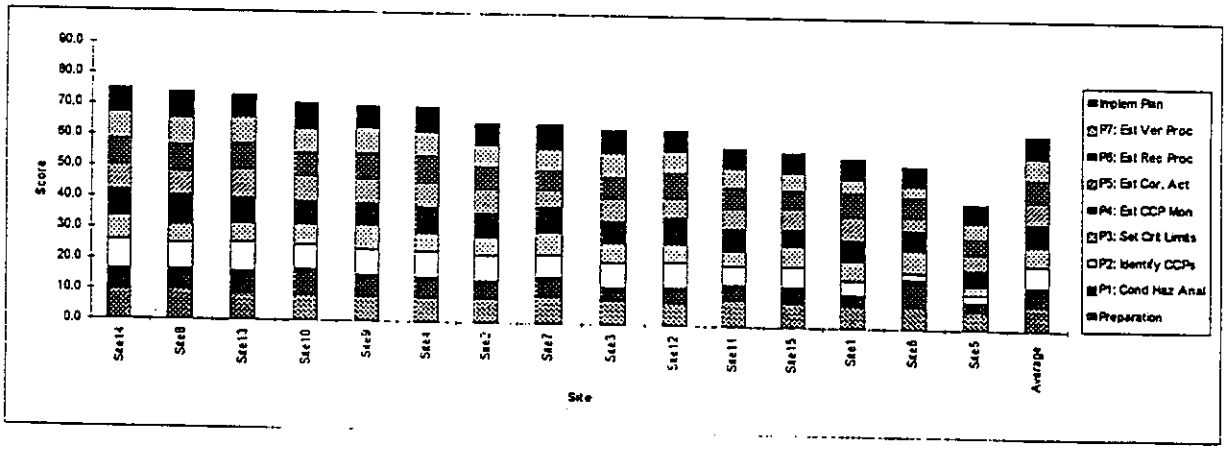


Procedures for all live animal handling, slaughter, boning and product handling work stations were examined from a food safety aspect. The average score for procedures was 8.2 an increase of 0.6 since Audit 1. Site scores ranged from 6.1 to 9.8 compared with a range from 4.4 to 9.7 in Audit 1. There were no procedures which on average scored less than 5.0.

3.3 HACCP PROGRAM

Figure 27 provides a breakdown of overall site HACCP score by demonstration of each site's preparation, knowledge and understanding of the seven HACCP principles and their implementation plan. The maximum score possible for this element was 90.

FIGURE 27 : HACCP PROGRAM SCORE BY SITE



The average score for the HACCP program was 63.6 an increase of 19.4 since Audit 1. Site scores ranged from 41.2 to 75.1 compared with a range from 9.4 to 66.2 in Audit 1. Figure 28 shows the average scores at Audits 1 and 2 for each component of HACCP. Each component contributing to the bars shown in Figure 28 is examined in more detail in Figures 29 to 37.

FIGURE 28 : AVERAGE HACCP COMPONENT SCORE AT AUDITS 1 & 2 RANKED BY AUDIT 2 SCORE

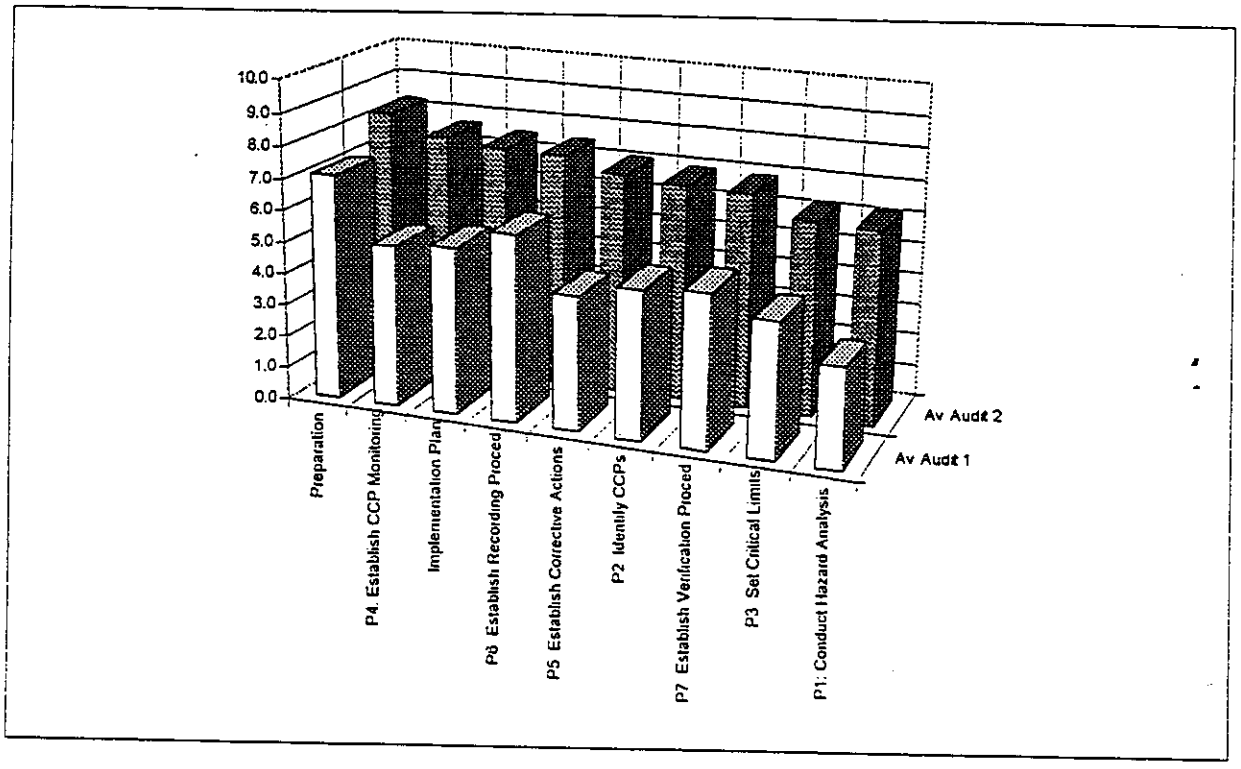
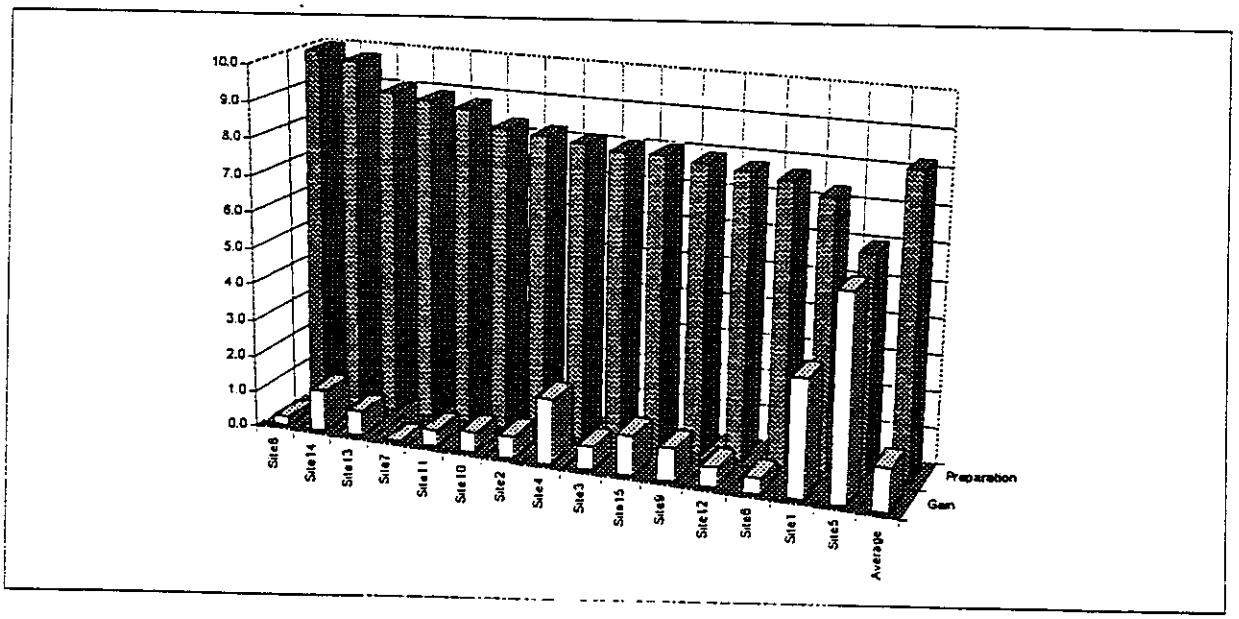
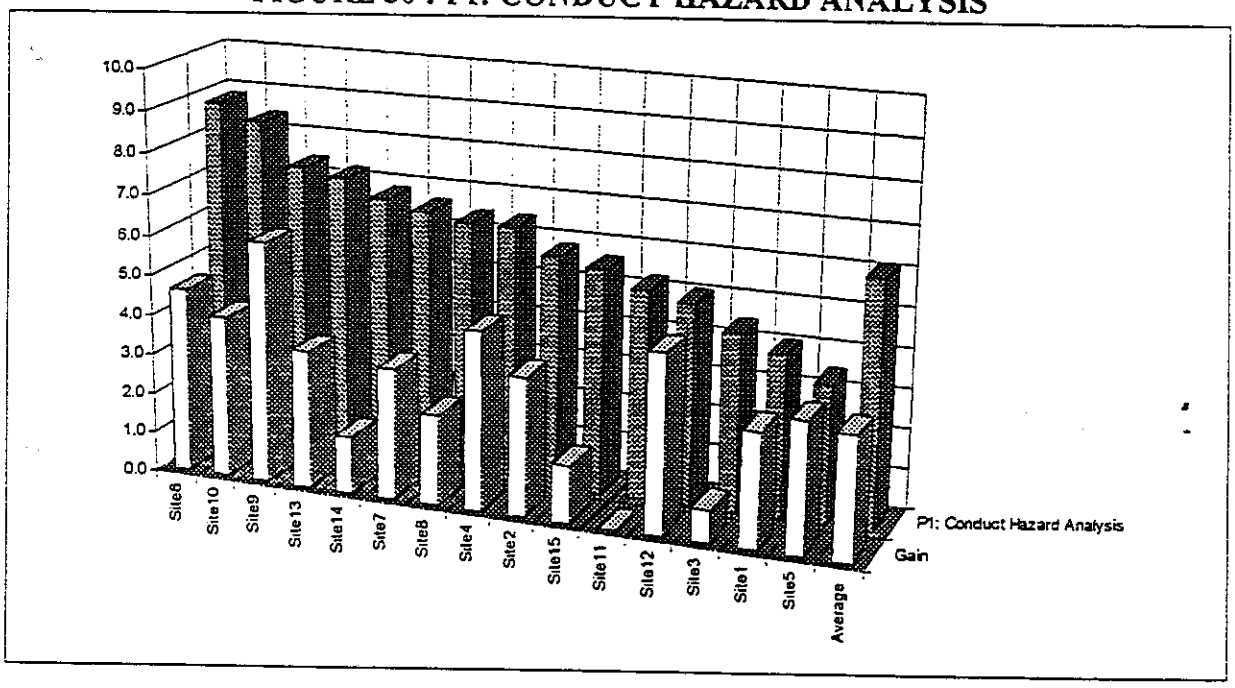


FIGURE 29: HACCP PREPARATION SCORE BY SITE



Preparation included selection of a HACCP team, HACCP team training, setting the scope, describing the product, construction and verification of a process flow diagram. The average score for HACCP preparation was 8.3 an increase of 1.2 since Audit 1. Site scores ranged from 6.0 to 10.0 compared with a range from 0.4 to 8.8 in Audit 1. All sites demonstrated at least a basic understanding of HACCP.

FIGURE 30 : P1: CONDUCT HAZARD ANALYSIS



The average score for Principle 1 was 6.1 an increase of 3.0 since audit 1. Site scores ranged from 3.4 to 8.8 compared with a range from 0.2 to 5.4 in Audit 1. On average this was again the lowest scoring component contributing to the overall HACCP program.

Strengths

- All sites were able to identify potential hazards at points where they entered the process
- All but two sites could explain and differentiate between significant and nonsignificant hazards
- Some sites had revisited their hazard analysis and conducted it in a formal manner while most sites had updated their potential hazards.

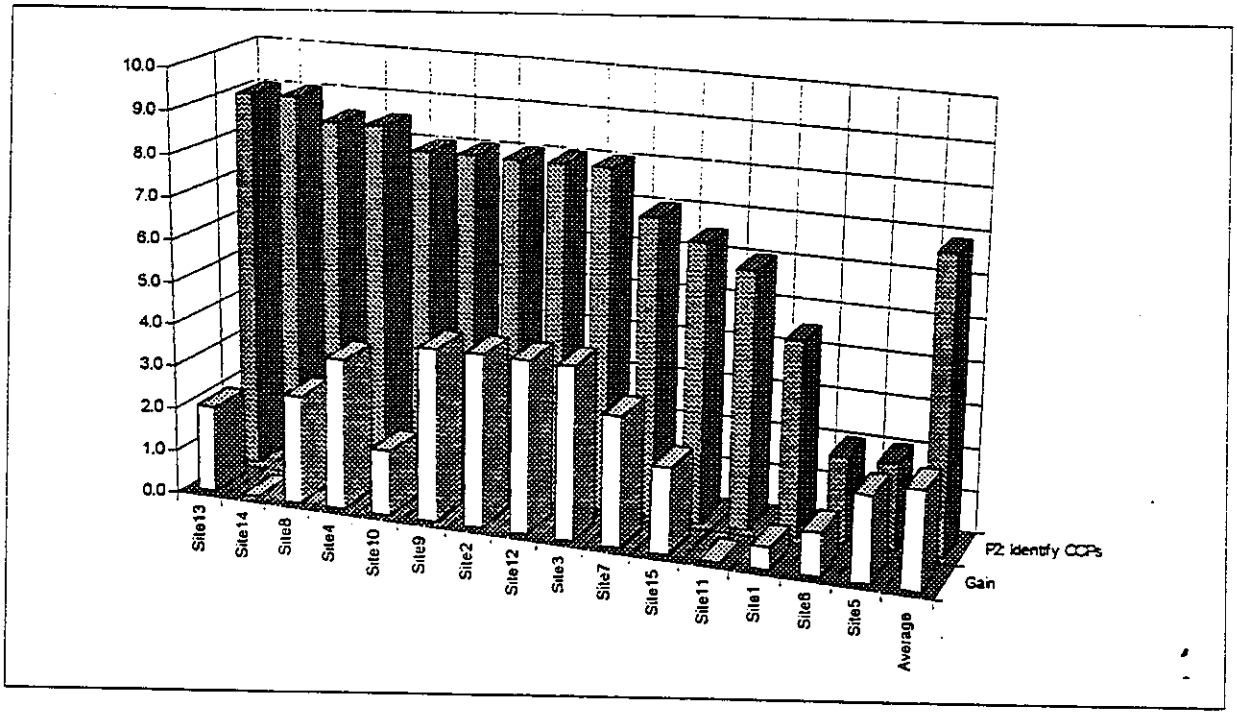
Weaknesses

- Five sites were unable to adequately evaluate the severity and risks of hazards
- Six sites had not documented their rationale for hazard selection.

Recommendations

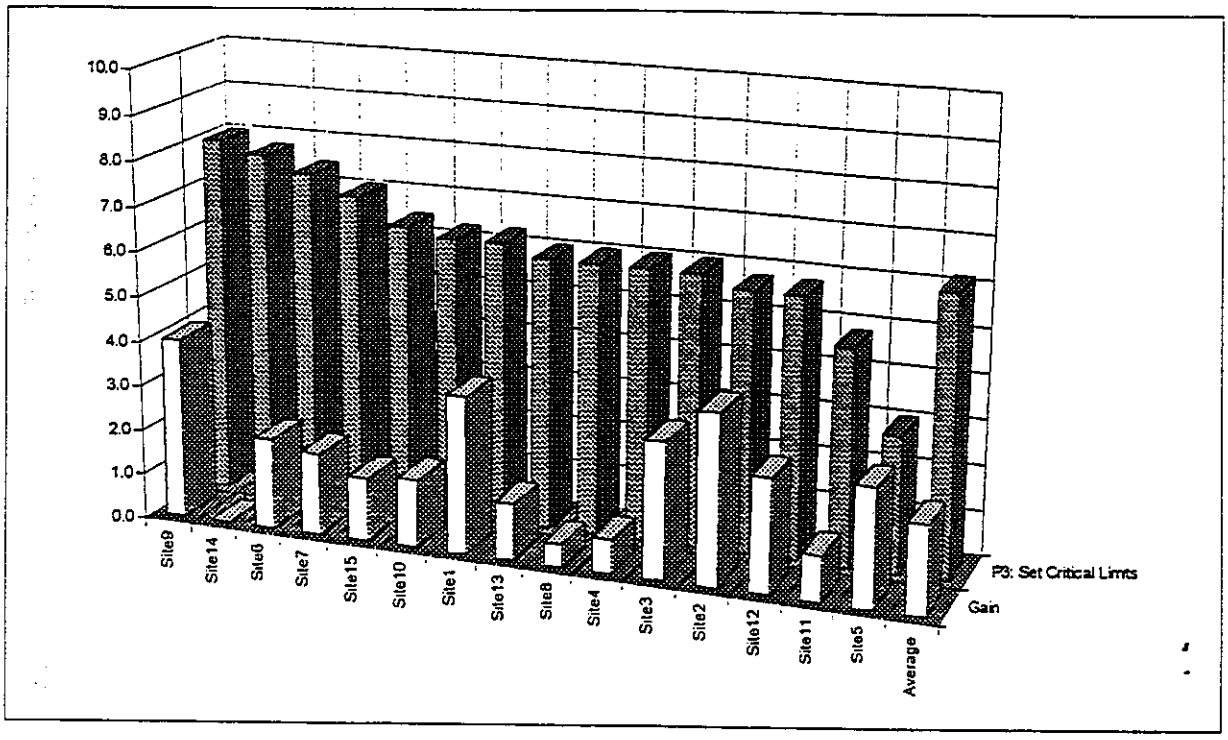
- All sites should keep documentation of their hazard analysis.

FIGURE 31 : P2: IDENTIFY CRITICAL CONTROL POINTS



The average score for Identification of CCPs was 6.9 an increase of 2.3 since Audit 1. Site scores ranged from 2.0 to 9.0 compared with a range from 0 to 9.0 in Audit 1. Only two sites were unable to adequately define control and CCPs. An additional two sites could not demonstrate how to identify CCPs using valid scientific criteria. The result was inclusion of many non-critical processes in their HACCP plans.

FIGURE 32 : P3: SET CRITICAL LIMITS



The average score for Principle 3 was 6.2 an increase of 2.0 since Audit 1. Site scores ranged from 3.0 to 8.0 compared with a range from 0.4 to 7.8 in Audit 1.

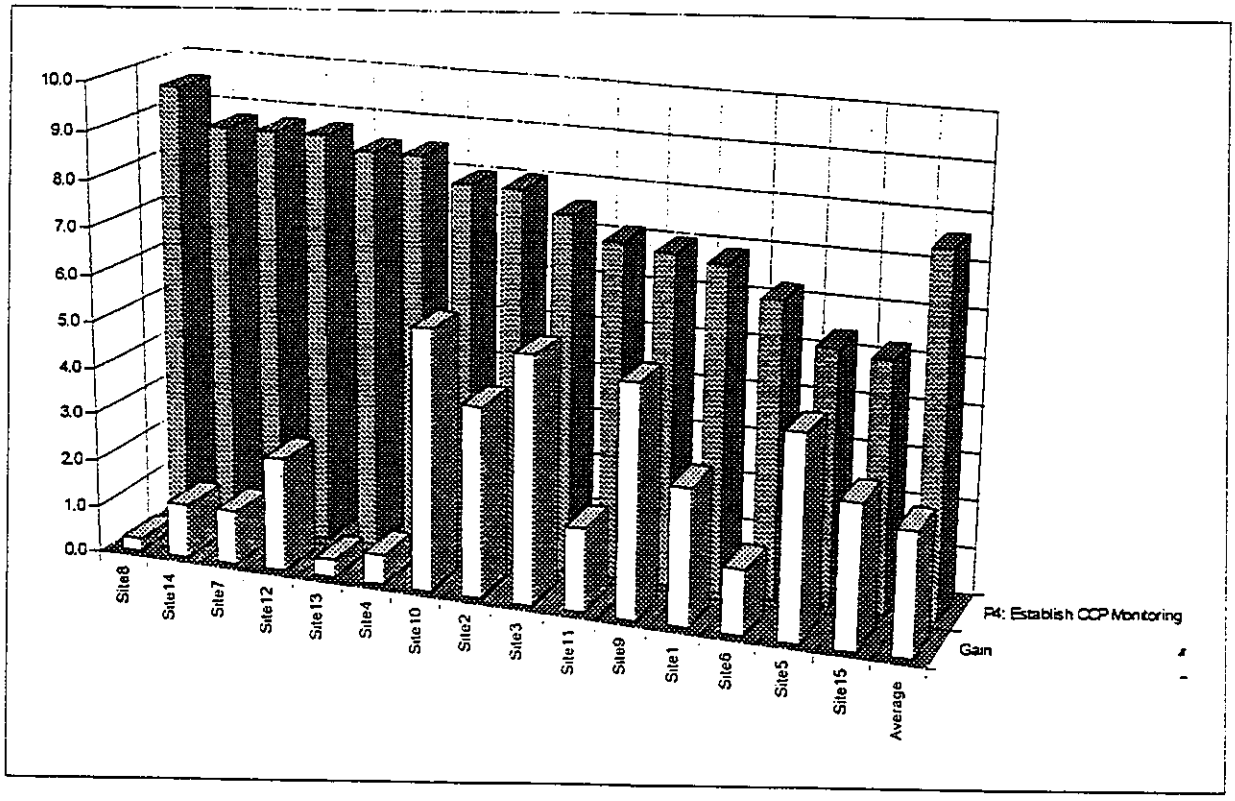
Strengths

- Most sites (80%) could define and determine both critical and operational limits
- All sites knew how to set critical limits relevant to product safety
- All but one site could provide an explanation of how critical limits were used to measure compliance within a HACCP plan.

Weaknesses

- Only five sites had documented their rationale for critical limit selection.

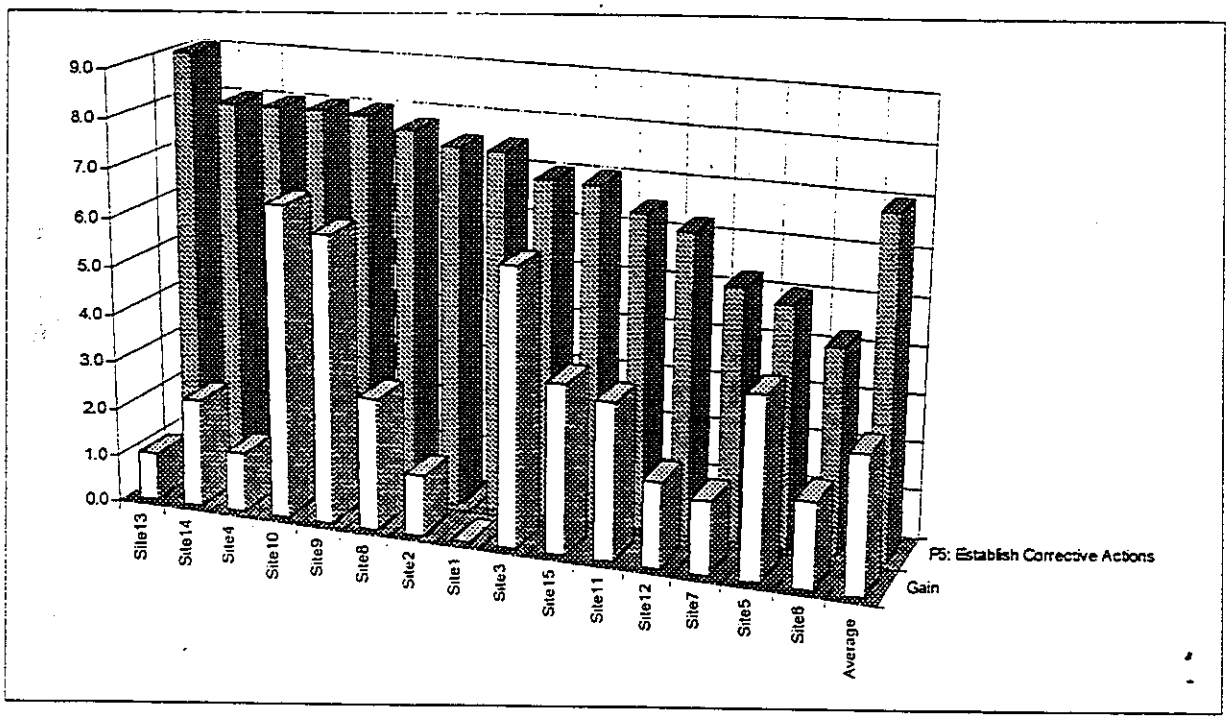
FIGURE 33 : P4: ESTABLISH CRITICAL CONTROL POINT MONITORING



The average score for Principle 4 was 7.6 an increase of 2.6 since Audit 1. Site scores ranged from 5.3 to 9.5 compared with a range from 1.1 to 9.3 in Audit 1.

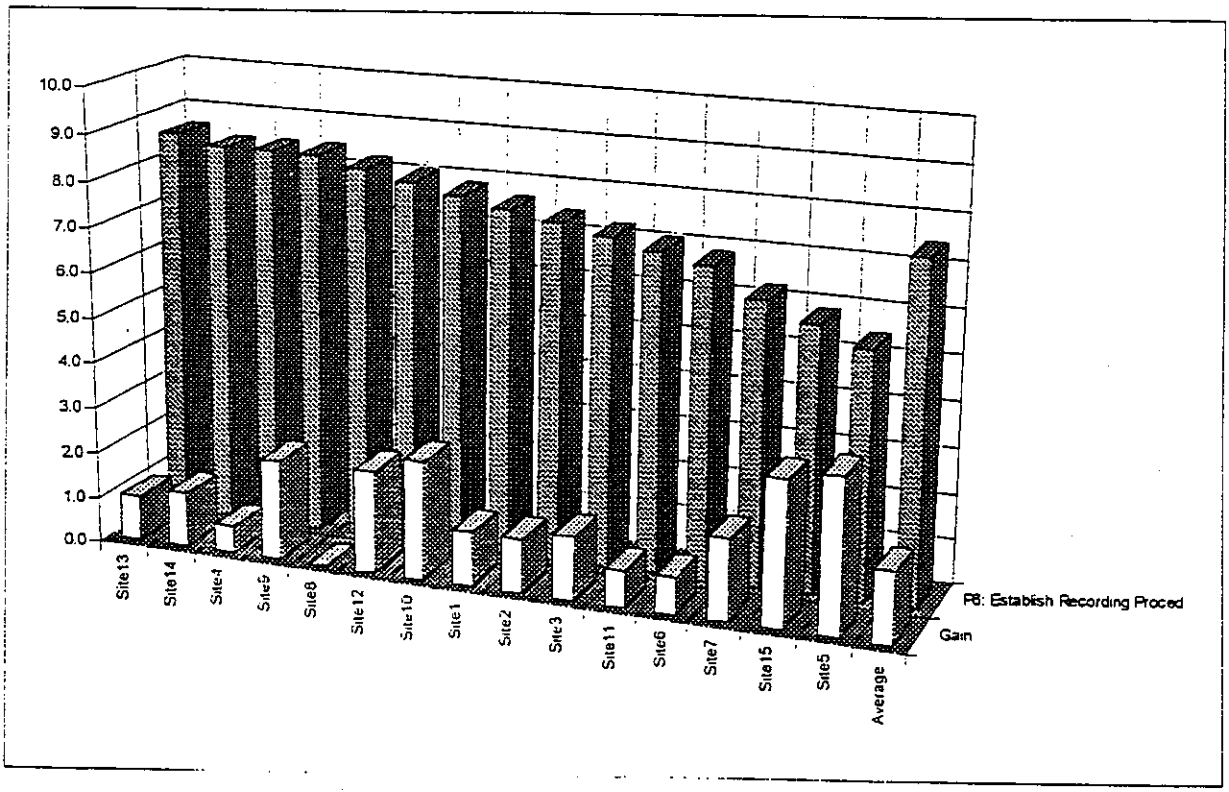
Overall monitoring was undertaken as per the Meat Hygiene Assessment or ARMCANZ requirements.

FIGURE 34 : P5: ESTABLISH CORRECTIVE ACTIONS



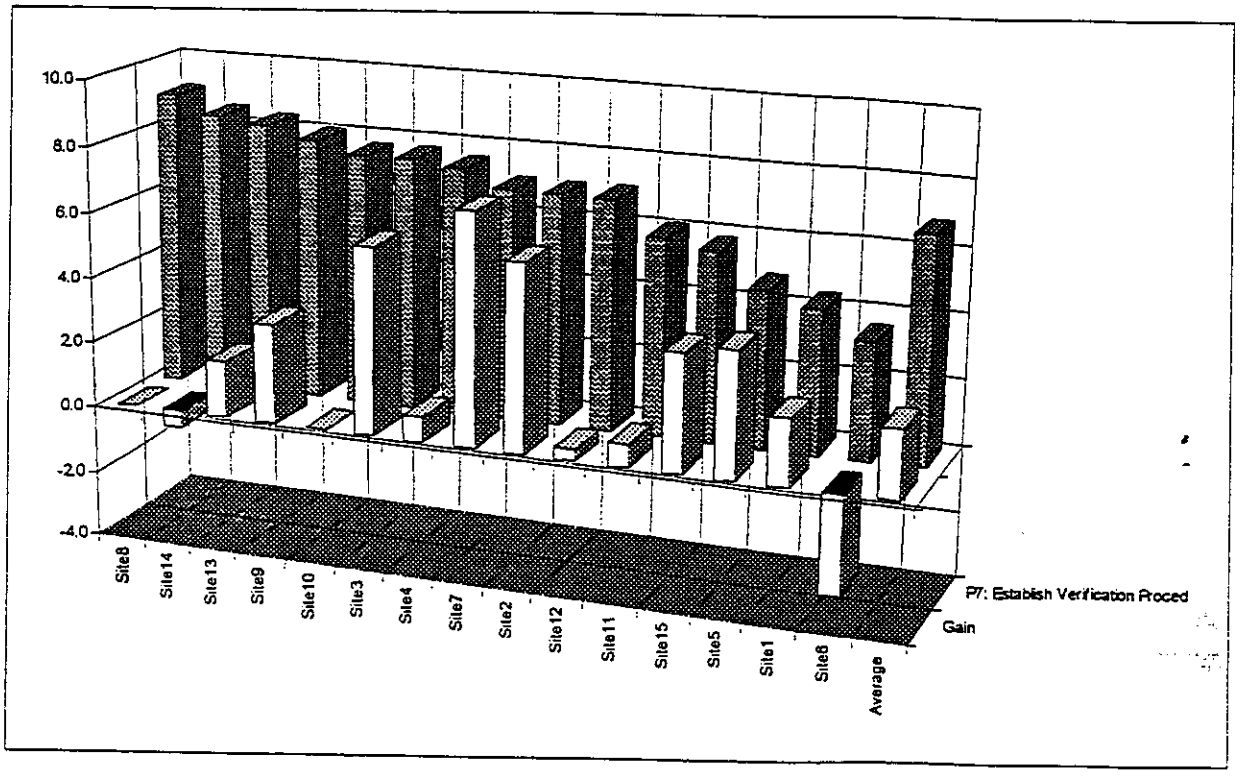
The average score for Principle 5 was 7.0 an increase of 2.8 since Audit 1. Site scores ranged from 4.3 to 9.0 compared with a range from 1.3 to 8.0 in Audit 1. Only one site had a limited grasp of this Principle.

FIGURE 35 : P6: ESTABLISH RECORDING PROCEDURES



The average score for Principle 6 was 7.4 an increase of 1.6 since Audit 1. Site scores ranged from 5.4 to 8.6 compared with a range from 2.0 to 8.2 in Audit 1. Only three sites could not demonstrate the development of records for documenting HACCP activities.

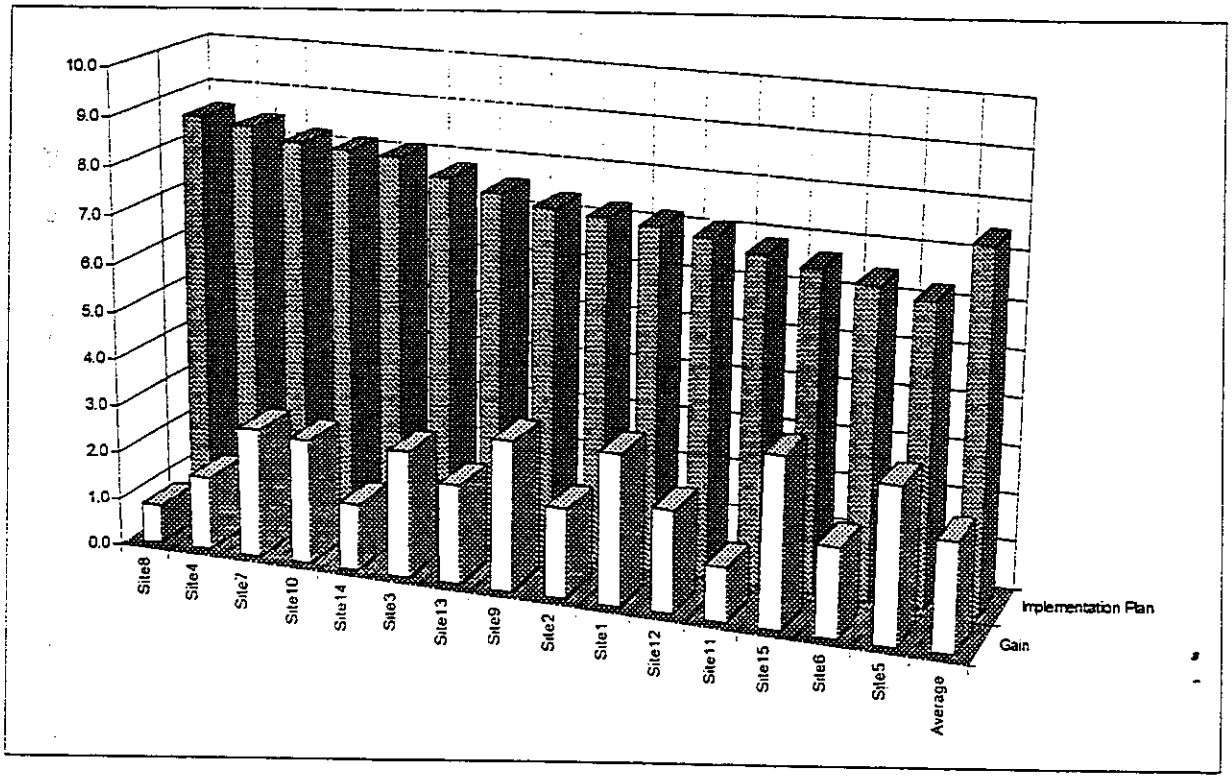
FIGURE 36 : P7: ESTABLISH VERIFICATION PROCEDURES



The average score for Principle 7 was 6.8 an increase of 2.0 since Audit 1. Site scores ranged from 3.5 to 9.0 compared with a range from 0 to 9.0 in Audit 1. Two sites recorded a lower score for this component than at the first audit. In both cases this reflected the respective understanding of new personnel in the HACCP team since Audit 1.

Four sites were unable to demonstrate the need for implementation of a HACCP plan review at regular intervals or when significant changes to the process had occurred. Only two sites had not yet implemented a program of microbiological testing either as a verification tool or to meet any regulatory requirement.

FIGURE 37 : HACCP IMPLEMENTATION PLAN



The average score for Implementation Plan was 7.5 an increase of 2.3 since Audit 1. Site scores ranged from 6.3 to 8.6 compared with a range from 3.0 to 7.8 in Audit 1.

Strengths

- Strong commitment to food safety exhibited from upper management at all sites
- All sites demonstrated a good understanding of what was required to implement a HACCP plan.

Weaknesses

- Although training programs for staff and the workforce were in place at most sites, six had not undertaken any staff training needs analysis
- Six sites had not evaluated the effectiveness of any training undertaken
- Five sites were unable to adequately identify change factors that could impact on their HACCP plans and require review of the system.

Recommendations

- Additional time is required before the success of implementation of QA and HACCP systems can be fully assessed.

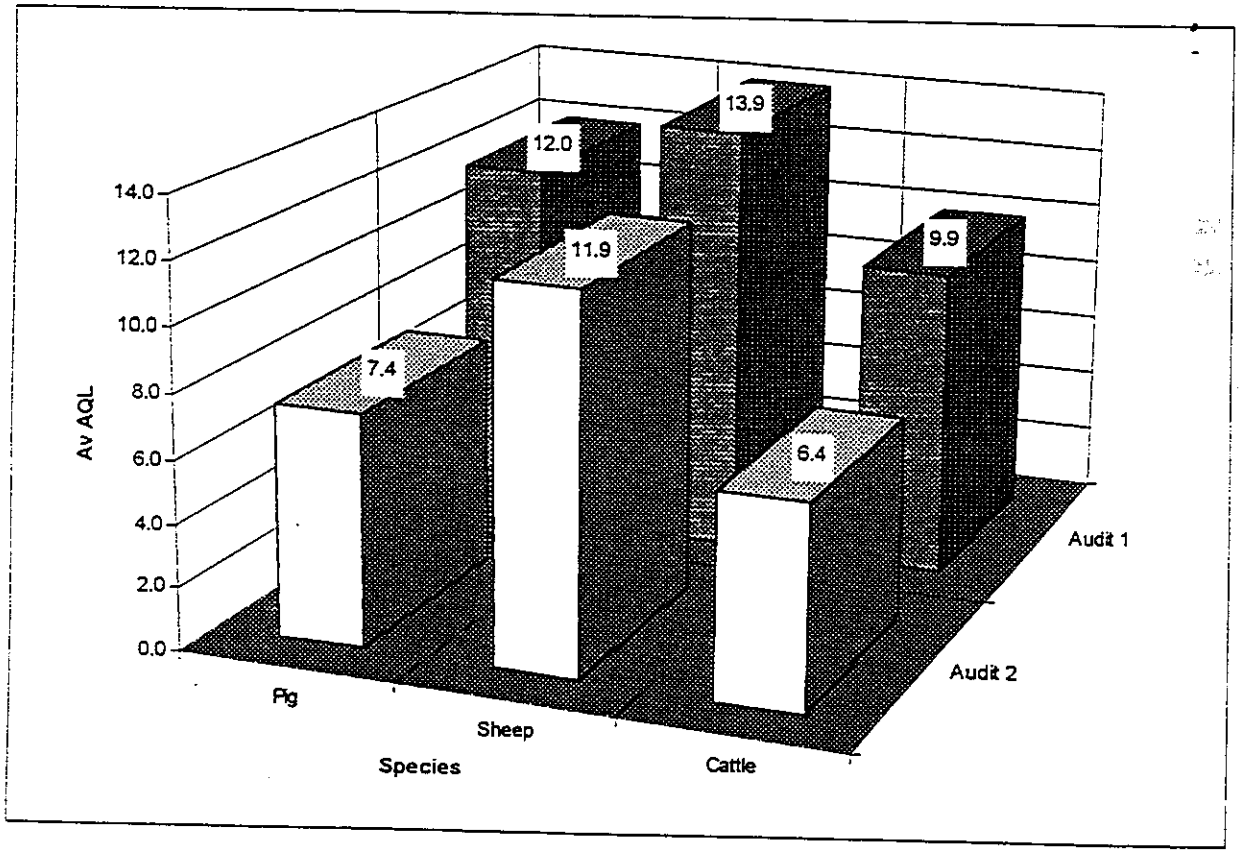
3.4 SLAUGHTERFLOOR AQL

AQLs were recorded for cattle, sheep and pigs prior to any corrective action (ie, trimming or carcase washing) on the slaughterfloor. The average result for each species is shown in Figure 38. Cattle data, recorded on sides, have been doubled in Figure 38 to provide for comparison with sheep and pig carcase data.

Average AQLs improved 39, 14 and 35% respectively for pigs, sheep and cattle from Audit 1 to Audit 2.

Between site comparisons are shown for each species in Figures 39 to 41. In all cases, the lower the AQL score the better the result. All sites have been randomly coded to maintain confidentiality of individual companies.

FIGURE 38 : AVERAGE CARCASE SLAUGHTERFLOOR AQL BY SPECIES AND AUDIT FOR ALL SITES

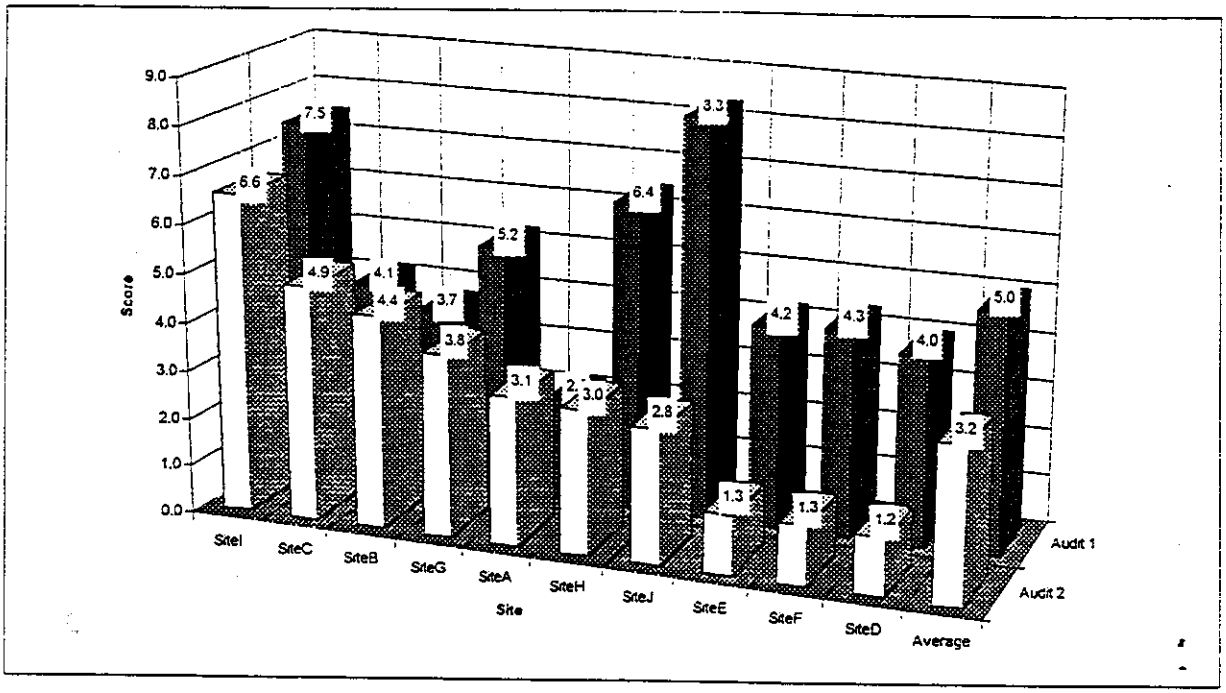


- Only one site was routinely recording AQLs prior to any corrective action

Recommendations

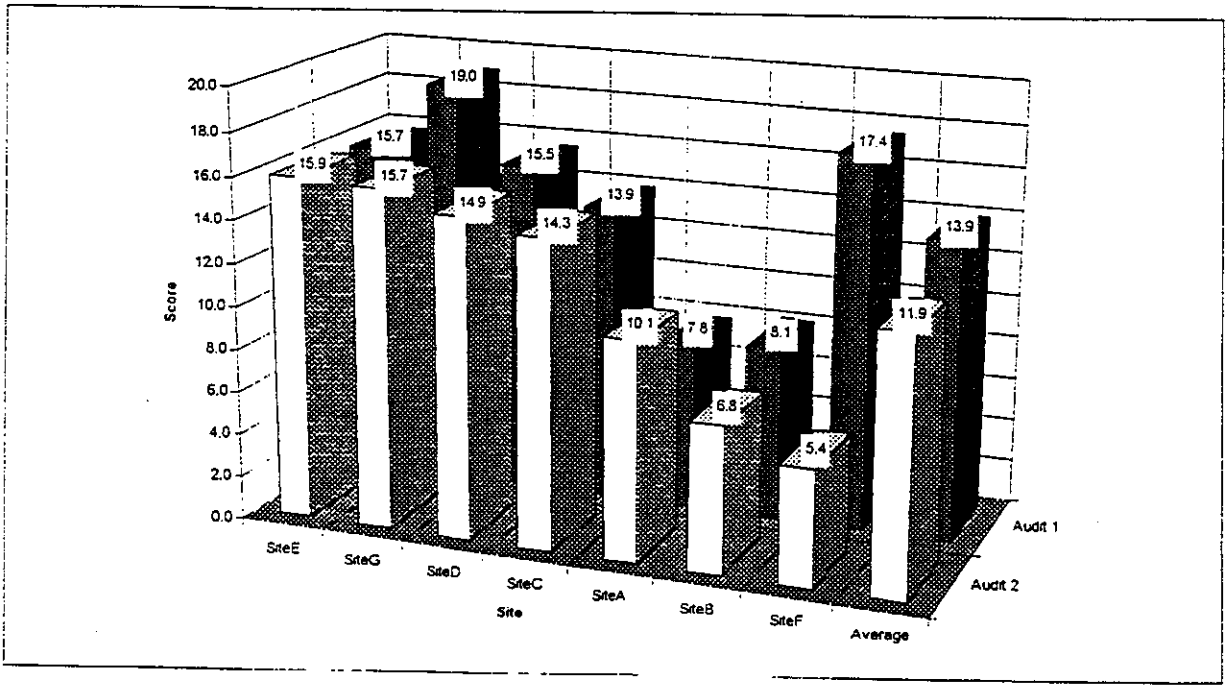
- Sites should consider routinely scoring AQLs on the slaughterfloor, prior to any trimming or washing, and chart the data collected to verify the outcome of their HACCP plan.

FIGURE 39 : BEEF SIDE SLAUGHTERFLOOR AQL BY SITE



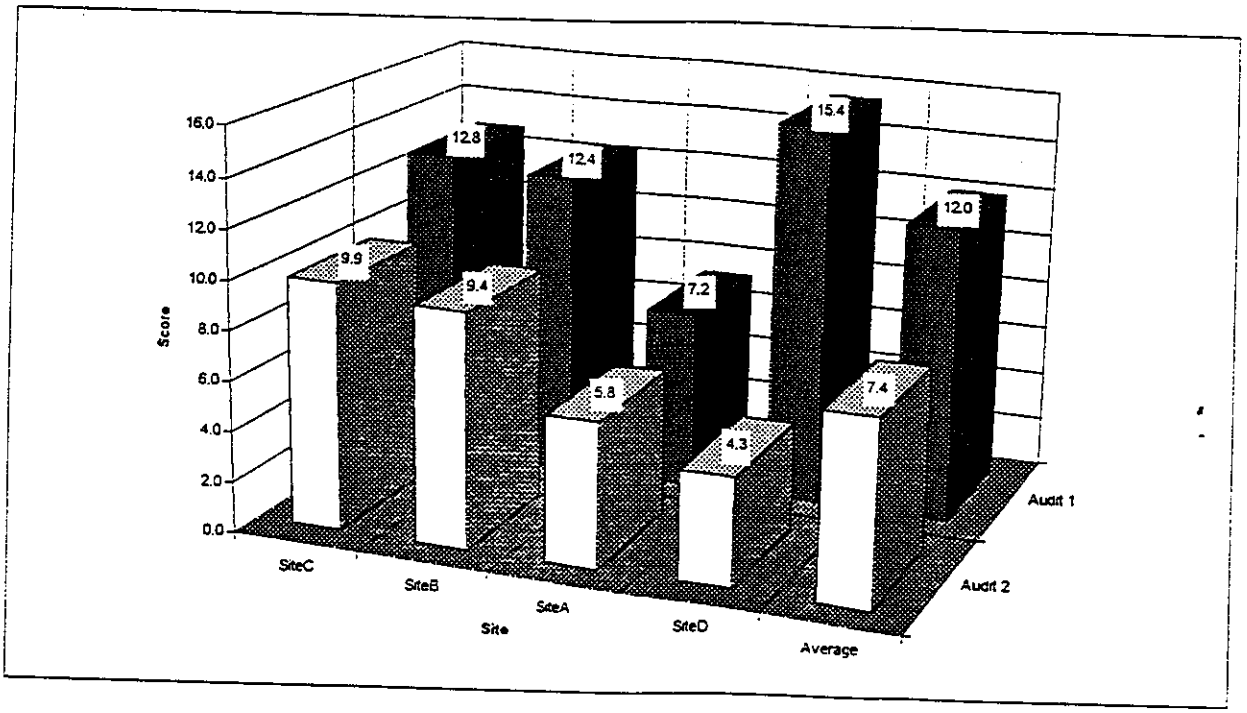
The average slaughterfloor AQL for all sites slaughtering cattle was 3.2 an improvement of 1.8 since the first audit. Site scores ranged from 1.2 to 6.6 compared with a range from 2.2 to 8.3 in Audit 1. Although these scores may be influenced by the type of cattle slaughtered on the day, they do suggest improvement has been made with 70% of all sites showing an improved score since the first audit.

FIGURE 40 : SHEEP SLAUGHTERFLOOR AQL BY SITE



The average slaughterfloor AQL for all sites slaughtering sheep was 11.9 an improvement of 2.0 since the first audit. Site scores ranged from 5.4 to 15.9 compared with a range from 7.8 to 19.0 in Audit 1. Although these scores may be influenced by the type of sheep slaughtered on the day, they do suggest improvement has been made with 57% of all sites showing an improved score since the first audit.

FIGURE 41 : PIG SLAUGHTERFLOOR AQL BY SITE

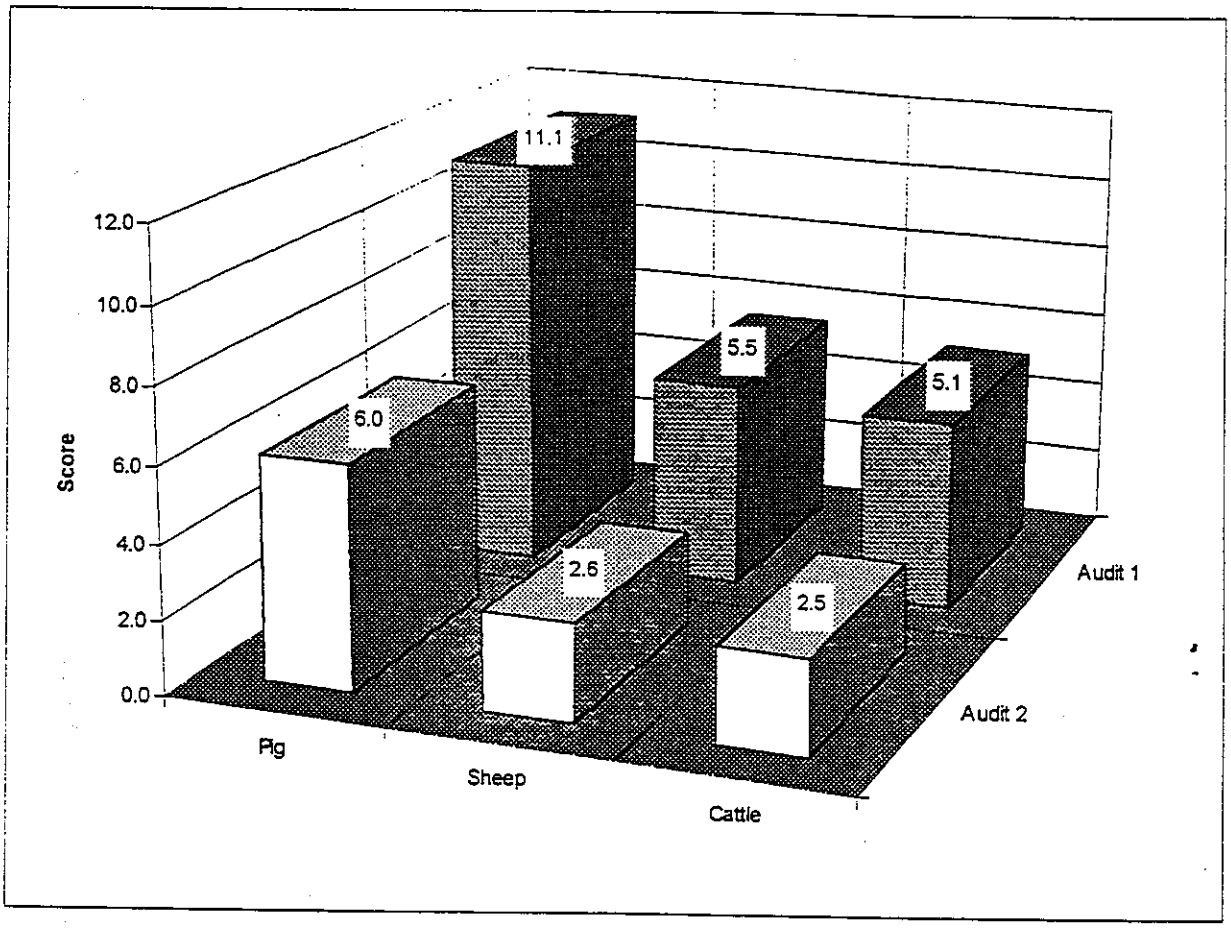


The average slaughterfloor AQL for all sites slaughtering pigs was 7.4 an improvement of 4.6 since Audit 1. Site scores ranged from 4.3 to 9.9 compared with a range from 7.2 to 15.4 in Audit 1. Although these scores may be influenced by the type of pigs slaughtered on the day, they do suggest improvement has been made with all sites showing an improved score since the first audit.

3.5 CHILLER AQL

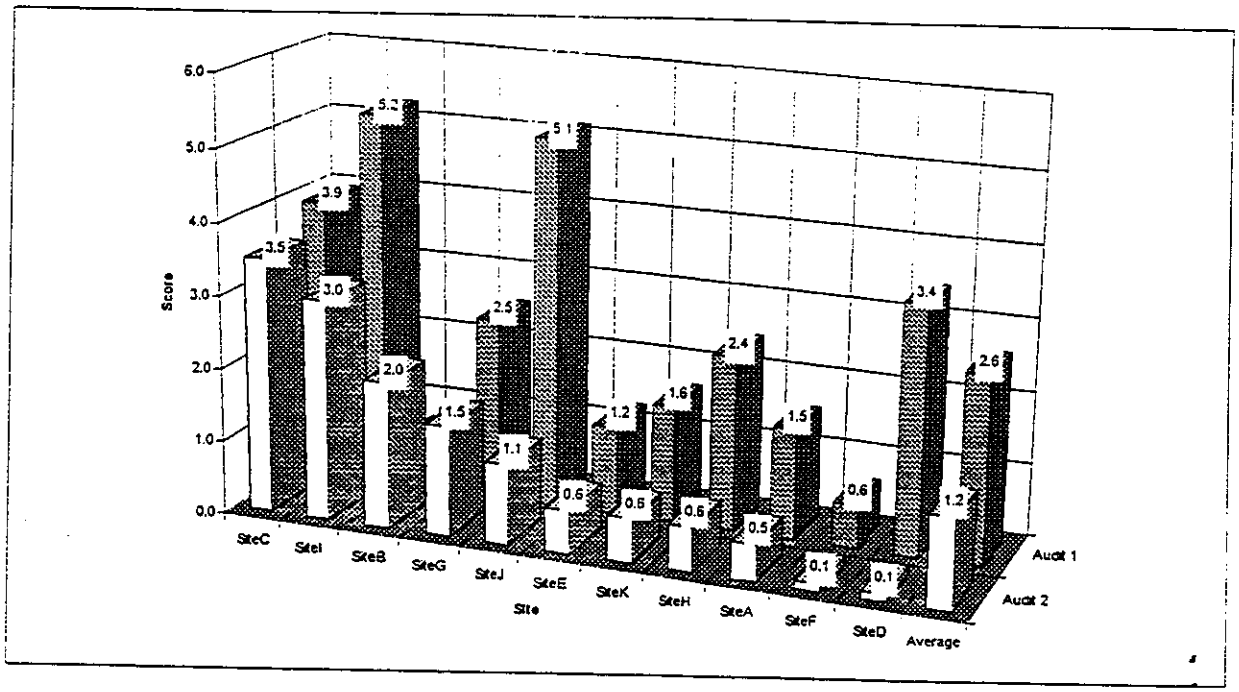
AQLs were recorded for cattle, sheep and pigs in the chiller after corrective action (ie, trimming and/or carcase washing) on the slaughterfloor. The average result for each species is shown in Figure 42. Cattle data, recorded on sides, have been doubled in Figure 42 to provide for comparison with sheep and pig carcase data. In all cases, the lower the AQL score the better the result.

FIGURE 42 : AVERAGE CARCASE CHILLER AQL BY SPECIES FOR ALL SITES



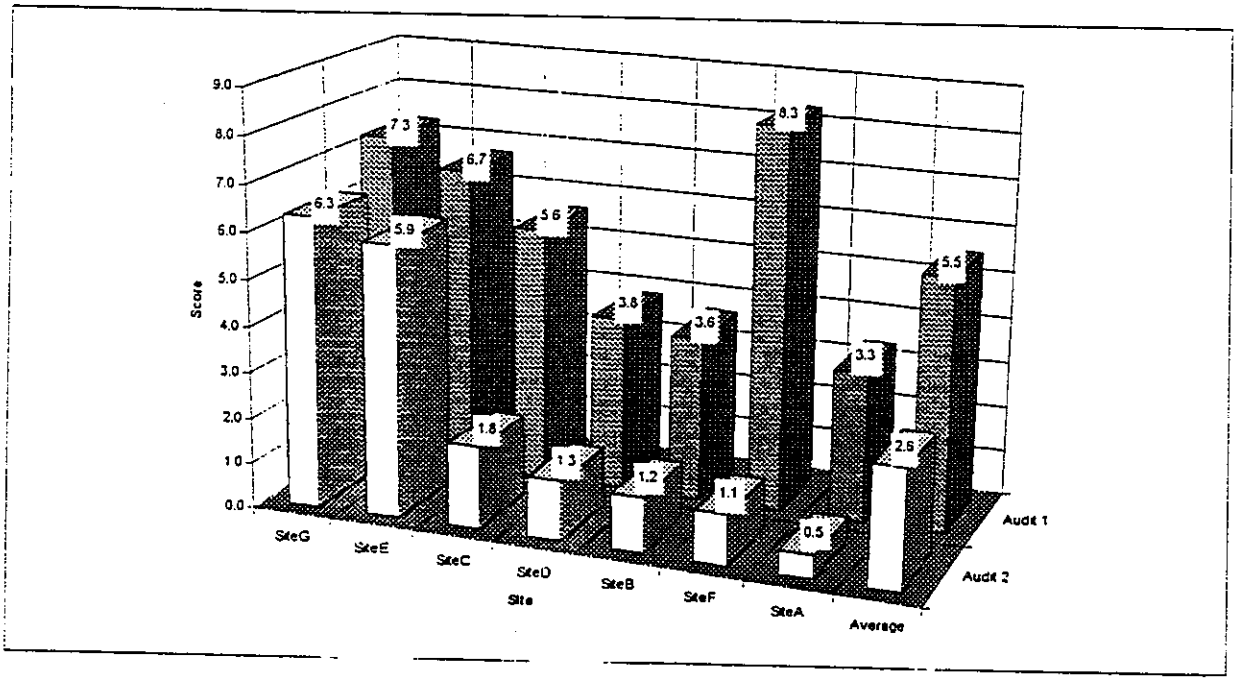
Compared with Figure 38, following corrective action, pig, sheep and beef AQLs were improved 7, 60 and 48% respectively in Audit 1 and 19, 78 and 61% respectively in Audit 2. Pigs scored poorly, pre and post corrective action, because of quantities of attached hair and scurf which remained on carcases into the chiller. Between site comparisons are shown for each species in Figures 43 to 45.

FIGURE 43 : BEEF CHILLER AQL BY SITE



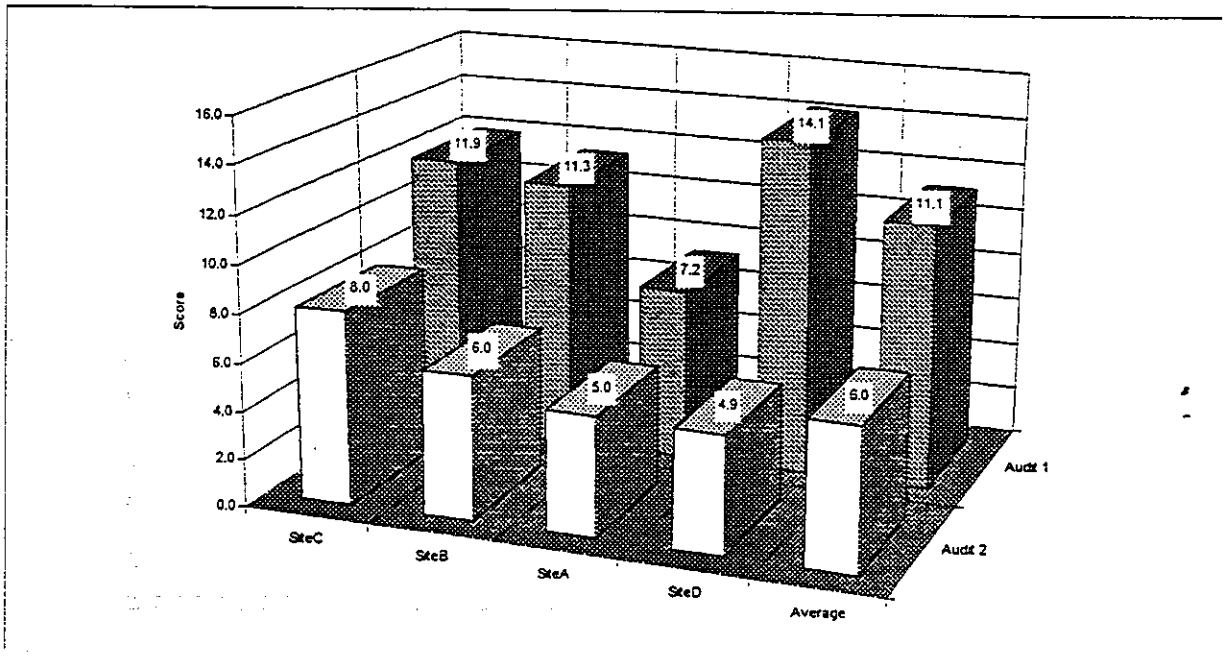
The average chiller AQL for all sites slaughtering cattle was 1.2 an improvement of 1.4 since Audit 1. Site scores ranged from 0.1 to 3.5 compared with a range from 0.6 to 5.2 in Audit 1. Although these scores may be influenced by the type of cattle slaughtered on the day, they do suggest improvement has been made with 70% of all sites showing an improved score since the first audit.

FIGURE 44 : SHEEP CHILLER AQL BY SITE



The average chiller AQL for all sites slaughtering sheep was 2.6 an improvement of 2.9 since Audit 1. Site scores ranged from 0.5 to 6.3 compared with a range from 3.3 to 8.3 in Audit 1. Although these scores may be influenced by the type of sheep slaughtered on the day, they do suggest improvement has been made with 57% of all sites showing an improved score since the first audit.

FIGURE 45 : PIG CHILLER AQL BY SITE



The average slaughterfloor AQL for all sites slaughtering pigs was 6.0 an improvement of 5.1 since Audit 1. Site scores ranged from 4.9 to 8.0 compared with a range from 7.2 to 14.1 in Audit 1. Although these scores may be influenced by the type of pigs slaughtered on the day, they do suggest improvement has been made with all sites showing an improved score since the first audit.

3.6 MICROBIOLOGICAL TESTING

The type of microbial testing being undertaken at the sites is summarised in Table 1.

TABLE 1 : MICROBIAL TESTING AT PROJECT 1 SITES

	Number of Sites undertaking testing					
Item Tested	**TVC**	**Coliforms**	***E.coli***	**Salmonella**	**In-house**	**Outside**
Contact Surf	13		1		13	1
Carcase Prod	8		10	8	12	6
Water	1	14	14		2	15

- All but two sites were routinely testing contact surfaces/personnel's equipment and carcase product

- All salmonella testing and most of the *E.coli* carcase product testing was undertaken to meet the Mega-Reg requirement
- Contact surface testing and some carcase product testing were being used to validate quality systems/HACCP plans
- Water testing was generally undertaken by another party eg, AQIS or the shire council.

Recommendations

- All sites should review their existing microbial testing programs to ensure they provide data which allows for validation/verification of existing and new processes and work practices.

Attachment B: Text of HACCP Implementation and Audit Guide (SCARM Report 60)

A GUIDE TO THE IMPLEMENTATION AND AUDITING OF HACCP

An initiative of ARMCANZ Steering Group 2

under the auspices of the Meat Industry Council

and supported by

The Department of Industry Science and Tourism Food Quality Program

and the

Meat Research Corporation Food Safety Key Program

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AUSTRALIAN STANDARDS

Most people in the meat industry are by now aware of the formulation of national minimum mandatory standards for the meat industry. The Agricultural Resource Management Council of Australia and New Zealand (ARMCANZ) has endorsed four standards which are now being implemented. They are:

* Australian Standard for Hygienic Production of Meat for Human Consumption
* Australian Standard for Construction of Premises Processing Animals for Human Consumption
* Australian Standard for Construction of Premises Processing Meat for Human Consumption
* Australian Standard for Transportation of Meat for Human Consumption

The ARMCANZ decisions mean that all establishments in Australia will be required to have HACCP based systems in place by the end of December 1996.

This package has been developed to assist meat, poultry, game and petfood processors develop company HACCP programs and to understand the perspective of auditors who are required to assess implementation and compliance. The ARMCANZ Steering Group 2 wish to acknowledge that part of the information contained in this package that has been adapted from the following sources:

* Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application. Codex Alimentarius Commission, 1996: Appendix II — ALINORM 97/13A, Pages 30-37.
* Training Considerations for the Application of the HACCP System to Food Processing and Manufacturing. World Health Organisation, 1993.

In addition, the following organisations' inputs need to be recognised:

* Australian Quarantine and Inspection Service
* New South Wales Meat Industry Authority
* Meat Hygiene Unit of the South Australian Department of Primary Industry
* The Queensland Livestock and Meat Authority
* The Victorian Meat Authority
* The Department of Primary Industries and Fisheries, Tasmania
* The Department of Health, Western Australia
* The Western Australian Meat Authority
* Food Operations Pty Ltd, Sydney

This guide is an overview of HACCP implementation and auditing only. For advice and more detailed guidelines, contact your State Authority or, in the case of export plants, AQIS. You should also seek specialist advice in carrying out training for HACCP implementation in your meat processing operation.

STEPS FOR DEVELOPING AND IMPLEMENTING HACCP PLAN

(1) Assemble the HACCP team and define the scope of the HACCP Plan

(2) Describe the Product and its distribution method

(3) Describe the intended use of the Product

(4) Construct a detailed Flow Diagram of the Process

(5) Conduct on-site verification of Flow Diagram

(6) List all potential hazards associated with each step, conduct a hazard analysis and consider any control measures to control hazards (Principle 1)

(7) Determine Critical Control Points (Principle 2)

(8) Establish Critical Limits for each CCP (Principle 3) - as per the Australian Standard where applicable

(9) Establish a monitoring system for each CCP (Principle 4)

(10) Establish Corrective Actions for CCP Deviations that may occur (Principle 5).

(11) Establish Verification Procedures (Principle 6).

(12) Establish Record Keeping & Documentation (Principle 7).

(13) Determine what training is needed for all staff including employees, supervisors and QA people so all understand what HACCP means to the premises and to them. Make sure people understand what the different terms used in the Australian Standard mean e.g. hazard analysis, critical control point, verification, quality assurance so that people are talking a common language.

(14) Start monitoring the CCPs using forms and evaluate the usefulness of the forms for improving the product and process control and providing trend analysis of the procedures.

(15) Gather information on tests associated with microbiological standards contained in the ARMCANZ requirements as a complement to verification activities identified in Step 11.

Note: Steps 1-12 above reflect the Codex format for the application of the 7 Principles of HACCP to develop a HACCP Plan for the nominated product. Steps 13-15 reflect the broad activities required to implement the HACCP Plan into a working system for control of food safety.

WHAT YOUR HACCP MANUAL SHOULD CONTAIN:

— AMENDMENT REGISTER (see Attachment B for an example)

— HACCP TEAM MEMBER REGISTER

— PRODUCT DESCRIPTION/INTENDED USE

— PROCESS FLOW CHART

— FACTORY FLOOR PLAN

— HAZARD ANALYSIS TABLE

— HACCP AUDIT TABLE

— CCP WORK INSTRUCTIONS

— CCP MONITORING FORMS

— ADDITIONAL MONITORING REQUIREMENTS (as per AQLs in the AUSTRALIAN STANDARDS)

— SUPPORTING HACCP PROGRAMS AND MONITORING SCHEDULES

- HYGIENE & SANITATION PROCEDURES (as per AUSTRALIAN STANDARDS)
- PERSONAL HYGIENE & GENERAL WORK INSTRUCTIONS (see Attachment E for an example)
- CLEANING & APPROVED CHEMICAL SCHEDULES
- CALIBRATION SCHEDULES & MONITORING FORMS (TEMP GAUGES, SCALES, ETC)
- PEST CONTROL PROGRAM SCHEDULE
- TRAINING
- PRODUCT IDENTIFICATION - RECALL PROCEDURE

WHAT AUDITORS WILL BE LOOKING FOR:

Attachment G gives a general list of questions which an auditor will need to answer when auditing a HACCP system. More detailed questions could well be asked by an auditor on particular aspects of your HACCP system and its application.

Auditors will be primarily looking to see that systems conform to the Codex requirements (Codex Alimentarius Commission, 1996: Appendix II — ALINORM 97/13A, Pages 30-37) in the application of the Principles and the following of the development steps. They will be looking to see documentation which shows this compliance.

Systems must show operation of procedures for

- control of non-conforming product
- corrective action
- preventive action

Hazard tables do not need to use terminology which is too complicated - the message is to keep it simple. Remember that the easier to follow a system is, the quicker and ultimately less expensive the audits will be.

Selecting CCPs

Your documentation needs to show how your CCPs were identified. This should be through the Hazard Analysis (Step 6 and 7 on pages 13-15 below) and may include the use of the Codex decision tree (see Attachment A on page 20).

Hazard analysis is an important part of the CCP selection process - the Hazard Analysis Chart (Step 6 below) provides a framework to document risk analysis and can be used in conjunction with the decision tree to identify CCPs.

What is an acceptable number of CCPs? There is some agreement that 4 CCPs are adequate on a slaughter floor: stun/stick, hide/skin removal, evisceration and final product. This fits well with using carcass AQLs as process control - inspections can be done at stick (process check), after evisceration (to check hide/skin removal and evisceration) and after the final wash (to check efficacy of trim/wash functions). However, the number of CCPs you choose will depend on your own analysis of your operation.

For slaughtering processes, carcass AQLs can be used very effectively to pinpoint which process areas may require correction, even if carried out remotely from the process step being controlled.

Critical operations (i.e. risky operations) can be combined into single CCPs. This allows multiple process steps (e.g. those involved in hide removal) to be combined into a single CCP at the end of hide removal (and monitored for

example by a carcass AQL following evisceration). Refer also to steps 8 to 12 below on pages 16-19.

The process, and not just the outcome, has to be monitored. Work Instructions therefore need to have a narrative describing that part of the process covered by the Work Instruction, so an auditor can observe the process and see if the Work Instruction is being followed.

Hazard Audit Table

The content of the Hazard Audit Table should follow the Codex example (shown at Step 8 to 12 on page 16). Presentation of material in the table needs to follow the logic flow:

Step or Operation (from flow chart)
↓
Potential Hazards
↓
Control Measures
↓
CCP yes/no (relate to step on flow chart)
↓
Critical Limits
↓
Monitoring Procedures (what, how, where, when, why)
↓
Corrective Action
↓
Records (must have to show compliance)
↓
Verification

AQIS requirements of Export Plants

AQIS will apply the requirements of the Export Meat Orders, as a system known to be equivalent in outcome to the Australian Standards. AQIS will also apply any importing country requirements for particular markets, including the US FSIS "mega-reg" requirements. AQIS will check the verification of your system, therefore documentation must exist to show how this verification is achieved.

AQIS will be looking to see that material presented in plans demonstrates that principles are applied and steps are followed as in the Codex requirements.

Scope of program audits

Most jurisdictions are moving towards regular partial audits of HACCP programs with 6 monthly or annual full audits. Check with your State Authority or with AQIS to find out details for your operation.

Step 1:
HACCP Team

TYPE OF PEOPLE - (General Manager, QA Manager, Inspector, Foreman and an Understudy (i.e. a motivated worker)

SIZE OF TEAM - Try and keep to a maximum of 5, but a minimum of 3 (obviously, small operators will be limited in the number of people available and outside assistance may be required). HACCP implementation training for your team should be provided.

HACCP Team Members should have a good knowledge of the product and process. They should have sufficient expertise to be able to:

- IDENTIFY POTENTIAL HAZARDS
- ASSIGN LEVELS OF SEVERITY AND RISK (LIKELIHOOD OF OCCURRENCE)
- IDENTIFY CRITICAL CONTROL POINTS, RECOMMEND CONTROL MEASURES, CRITICAL LIMITS AND PROCEDURES FOR MONITORING AND VERIFICATION
- RECOMMEND APPROPRIATE CORRECTIVE ACTIONS WHEN DEVIATIONS OCCUR
- RECOMMEND OR CONDUCT INVESTIGATIONS AND/OR RESEARCH RELATED TO THE HACCP PLAN (IF INFORMATION IS NOT AVAILABLE).

DETERMINATION OF SCOPE — The HACCP Team needs to define the boundaries of the HACCP Plan, both from a starting and finishing perspective, and from an inclusions perspective (does the HACCP Plan include quality aspects as defined by the finished product specification, or is it restricted to food safety — biological, chemical, physical Hazards?). The scope needs to be documented.

While you may include other requirements (e.g. AUS-MEAT) in your overall documentation, the priority of your HACCP program is food safety.

Steps 2 and 3:
Product description & intended use

ACE CARTON MEAT WHOLESALE
(EXAMPLE)

PRODUCT DESCRIPTION	BOXED MEAT
COMPOSITION	VACUUM PACKED PRIMALS PACKED IN NEW CARTONS
METHOD OF PRESERVATION	CHILLED @ 0-4°C
PACKAGING - PRIMARY	VACUUM BAGS
PACKAGING - SECONDARY	NEW CARDBOARD CARTONS
STORAGE CONDITIONS	HELD @ 0-2°C
DISTRIBUTION METHOD	REFRIGERATED VAN @ 0-4°C
SHELF LIFE	6 WEEKS @ 0-4°C
CUSTOMER REQUIREMENTS	DELIVERY @ 1°C IN CLEAN CARTONS
SENSITIVE CONSUMER?	NO - INTENDED FOR GENERAL CONSUMPTION
FINAL CUSTOMER PREPARATION	INTENDED TO BE COOKED

It is important to identify the product which is the subject of the HACCP program, in order to determine the hazards that may occur, and to aid in establishing critical limits.

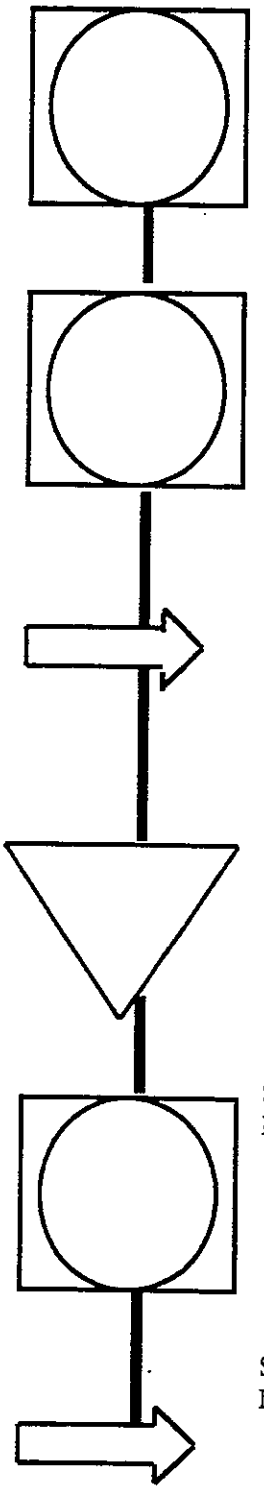
This basic information provides a clue to the obvious hazards which may occur in the above product:

1. Correct temperature control to restrict the growth of bacteria, which in turn effect the shelf life and customer expectations.
2. The type of the primary packaging is a factor in controlling bacterial growth, but may point to other potential hazards such as pathogens that are able to grow under anaerobic (vacuum) conditions.
3. The distribution method — there is little point in controlling the product at all stages during production and storage unless it is delivered to the customer in the same condition.
4. Customer preparation — your customers may have specific requirements such as time for delivery, temp requirements, max. quantities etc.
5. Sensitive population — in the food industry the sensitive population is generally accepted as the young, the elderly, pregnant women, immuno-compromised and the infirm. Operators supplying hospitals, nursing homes and institutions should be aware of this when setting critical limits.
6. Final customer preparation reinforces the importance of pre-pack handling: ready-to-eat meat products require special attention to minimise cross-contamination.

Steps 4 and 5: Flow charting

*The symbols in the example below are internationally recognised for process flow charting. However, alternate flow charting presentations are perfectly acceptable. Flow charting is done to ensure you have included **all** process steps.*

FLOW CHART (EXAMPLE: ACE CARTONED MEAT)



STEP ONE
RECEIVE AND INSPECT PRODUCT:

The cartoned meat is received into the premises and is inspected to ensure the cartons are not damaged, the meat is at 5 degrees or below and the supplier meets specifications e.g. State Meat Authority or Export registered, Kosher etc. This would be a CCP as meat over temperature or from an unapproved source could be a HAZARD.

STEP TWO
WEIGH PRODUCT:

The cartons are checked for correct number and weights, this does not constitute a CCP as it is a commercial aspect and has no bearing on the safety of the product.

STEP THREE
TRANSFER THE CARTONS TO THE CHILLER:

The cartons are then removed to the chiller for storage. This would be a Control Point as it should be done as soon as possible. However if there was a delay it is unlikely to unduly effect the product, but it makes sense to set a maximum delay time, or temperature rise at this Control Point to minimise risk.

STEP FOUR
STORAGE OF CARTONS IN CHILLER:

The storage of the product in this situation is a CCP and procedures are to be in place to monitor the temperature of the chiller and the product and to ensure rotation of stock. Procedures should also be in place to identify stock which does not comply with specifications

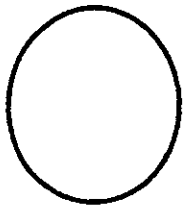
STEP FIVE
LOAD OUT/INSPECT

The cartons are sorted into orders and prepared for loading, weights/numbers and temperatures are checked. Checking temperatures at this point verifies procedures on the premises are correct. It also places the onus for maintaining the product temperature on the driver of the vehicle.

STEP SIX
DELIVERY OF CARTONS TO CLIENT:

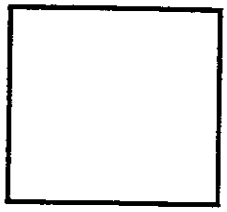
The inclusion of this operation in the HACCP program is only required if the delivery vehicles are owned and operated by the company operating the cold store otherwise it becomes part of the cartage contractor's program. The hazard involved is outgrowth of pathogens due to poor temperature control.

Steps 4 and 5: (Contd.)
Flow process chart symbols



OPERATION:

This symbol represents any kind of operation or group of operations which results in an intentional CHANGE in the form or arrangement of the material which brings it nearer to completion.

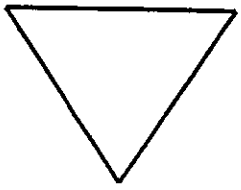


INSPECTION:

This symbol represents an inspection or decision. Material is examined for identification or is verified

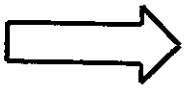
DELAY:

This symbol represents a delay to material when conditions do not permit the immediate performance of the next planned step. This does not include any planned change to its physical or chemical characteristics.



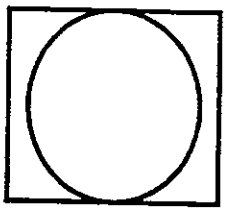
STORAGE:

A storage where material is kept in an unchanged form and protected against unauthorised removal.



TRANSPORT

A transportation occurs when a material is moved from one place to another, EXCEPT when such movements are part of an operation, or are caused by an operator at a workstation during an operation or inspection.



COMBINED ACTIVITY:

When it is desired to show activities performed either concurrently or by the same operator at the same work station, the symbols for these activities are combined as shown for a combined operation and inspection by the circle within the square.

Step 6 and 7: List potential hazards, conduct a hazard analysis, identify the CCPs.

ACE CARTONED MEAT WHOLESALE

This table is one way to present the information from your hazard analysis, which your auditor will want to see. The decision tree approach presented in Attachment A can assist in identifying CCPs. Where both the risk and significance of the hazard are high, the process step is a CCP (see pp 16 to 19 for details of transferring steps to the Hazard Audit Table). The same Hazard Analysis approach can be used for analysis of quality issues for conformance with the finished product specification.

HAZARD ANALYSIS: Cartoned Meat

STEP	INPUT[1]	HAZARDS[2]	SIGNIFICANCE[3]			CONTROL MEASURE[4]
			Severity	Risk	Signif.	
1. RECEIVAL & INSPECTION	CHILLED MEAT	M = Pathogen growth	H	H	H	Maintain temp 0-5°C
		C = Chemical	H	H	H	Source from an Approved Supplier
	LOAD-IN AREA	residues				Cleaning procedure
	CARTONS	PM = Dust & dirt	L	L	L	Inspect load
		PM = Dirty - leaking	L	L	L	
2. WEIGH PRODUCT	SCALES	Q = Inaccurate weight	H	L	L	Calibrate scales (not a safety CCP)
3. TRANSFER PRODUCT	WALLS/DOOR/SEALS	M = bacterial x-contam	H	L	L	Cleaning procedure (not CCP)
4. STORAGE	CHILLER	M = Bacterial growth	H	H	H	Maintain temperature
						Rotate stock
		M = X-contamination	H	L	L	Cleaning procedure
5. LOADOUT	LOAD-OUT AREA	M = Bacterial growth	H	L	L	Cleaning procedure
		PM = Dust & dirt	L	L	L	Cleaning procedure

KEY: M = Microbial Hazard P = Physical Hazard C = Chemical Hazard PM = combined Physical/Micro Hazard

[1, 2, 3, 4] Refer to the Explanatory Notes on page 14 for each column.

Hazard analysis chart - explanatory notes

For each step in your FLOW PROCESS CHART the following questions should be asked in the preparation of your HAZARD ANALYSIS CHART. The development of this information is vital to the development of an effective HACCP plan needed to control the identified hazards — poor hazard analysis results in a poor HACCP plan.

1. WHAT EXISTS AT THIS STEP AND WHAT INPUTS HAVE I INTRODUCED INTO THE PROCESS WHICH COULD CAUSE A HAZARD?

   In the above example at step 1, the existing element is the physical structure of the load-in facilities and what has been introduced is the consignment of carton meat.

2. WHAT TYPE OF HAZARD IS PRESENTED BY THE INTRODUCTION OF THIS THESE INPUTS?

   Hazards need to be classified into three categories, BIOLOGICAL (including bacterial pathogens, viruses), PHYSICAL or CHEMICAL and assessed systematically. In this example, the meat could be physically contaminated by the structure of the premises (dust and dirt), chemical hazards in the form of residues e.g. pesticides, could pose a hazard, and the presence and the outgrowth of bacteria is constantly present.

3. WHAT IS THE SEVERITY OF THE HAZARD IN QUESTION AND WHAT IS THE POSSIBILITY THAT IT WILL OCCUR AT THIS STEP? (WHAT IS THE SIGNIFICANCE OF THE IDENTIFIED HAZARD TO THE PRODUCT?)

   These two questions are critical to the outcome of the Hazard Analysis. The severity aspect of an identified hazard relates to its capacity to cause harm to the consumer. In the case of pathogens such as E. coli 0157, the severity is high. Chemical residues exceeding established Maximum Residue Limits (MRL) similarly have a high level of severity. Pieces of carton liners (Physical Hazard) may be assessed to be a low-to-medium severity. The risk aspect of an identified hazard relates to the probability or likelihood of the hazard occurring at the step, taking into account the premises specific conditions. Answers to these critical questions require sound understanding of the product and its processes by the HACCP team (refer Attachment B).

4. WHAT CONTROL MEASURES NEED TO BE TAKEN TO PREVENT, REDUCE OR ELIMINATE THE HAZARD?

   Control measures (also known as preventive measures) will vary on the type of hazard and obviously their significance, however in the above example the control measures centre around sourcing the product from approved suppliers, keeping it at the correct temperature and maintaining the premises to an acceptable standard of hygiene. In some cases, there will be more than one control measure for an identified hazard, and conversely, more than one hazard may be controlled by a specified control measure. In certain instances, control measures may not be required due to the absence of any significant hazards at that step.

5 WILL A SUBSEQUENT STEP IN YOUR PROCESS ELIMINATE OR REDUCE THE HAZARD TO AN ACCEPTABLE LEVEL?

If a subsequent step in your process eliminates or reduces a hazard, then a CCP at the original hazard point is not required e.g. a cooking or sterilisation step to eliminate bacteria. The number of CCPs required for control can thus be minimised.

Steps 8 to 12:
HACCP audit table

STEP[1]	HAZARD[2]	CONTROL MEASURES[3]	CCP[4]	CRITICAL LIMIT[5]	MONITORING[6]	CORRECTIVE ACTION[7]	RECORDS[8]
1. Receival	Pathogen outgrowth	Maintain correct temperature	CCP	Not to exceed 5°C	*what:* Product (Deep Muscle)	REJECT: temperature above 7°C	Record temp, number cartons and supplier on Receival Monitoring Form
(Chilled Product)					*how:* Temp Gauge (refer Test Method 01)	ACCEPT: Temp below 5°	
					where: At receival dock	RETAIN: Temp between 5° and 7° Isolate product and chill to below 5° within 4 hours	
					when: Before unloading each load		
					who: Receival Clerk	ADVISE: Supplier of temp violation	
1. Receival	Excess Chemical Residue	Source from an approved (licensed) supplier	CCP	Supplier to be licensed (Yes/No)	*what:* Suppliers delivery note and approved (licensed) list.	REJECT: Product	Delivery Note
(Product Origin)					*how:* Observation (visual)	ADVISE: State Meat Authority of unlicensed premise	
					where: At receival dock.		
					when: Before unloading each load		
					who: Receival Clerk		

[1, 2, 3, 4, 5, 6, 7, 8] Refer to the HACCP Audit Table Explanatory Notes.

NB A separate schedule of Verification Activities needs to be developed to ensure that the HACCP Plan is effective, the CCPs are appropriate, and that the Critical Limits for each CCP adequately maintain control against the identified hazard. (See Explanatory Notes for additional detail). Alternatively, verification activity can be shown as an additional column in this table. This table will be the primary information source for auditors, and may be also referred to as HACCP Table or HACCP Program Summary.

HACCP audit table — explanatory notes

*For each column in your **HACCP Audit Table**, the following information should be included, and the following layout should be adopted for consistency of interpretation:*

1. STEP NUMBER AND NAME
   Each process step identified in the Process Flow Chart needs to be transferred to the HACCP Audit Table, whether it is a CCP, CP, or —, and numbered and named in the same sequence as the Flow Chart. This is to ensure that all aspects of the process are visible and controlled, not just the CCP's. In addition to the complete audit table, it is acceptable to produce a separate abridged HACCP Audit Table with only the CCPs entered, that may simplify the audit process.

2. HAZARD DESCRIPTION
   This column summarises the significant hazards identified in the Hazard Analysis process, at each step in the process. It needs to be noted that for each significant hazard there will be at least one Control Measure. Each Control Measure needs to be separated because there will be different monitoring requirements (see the following Explanatory Notes), and therefore each hazard at a step needs to be separated on the HACCP Audit Table.

3. CONTROL MEASURES
   The Control Measure(s) developed for each hazard identified in the Hazard Analysis Chart is transferred to this column. As noted above, each Control Measure needs to be separated in the HACCP Audit Table for monitoring purpose.

4. CCP
   The importance of each control measure is indicated in this column. A Critical Control Point ("CCP") is a "must do" control measure, determined by the high significance rating from the Hazard Analysis Chart. If you have included steps other than CCPs in your Hazard Audit Table, then you will also show CPs and "—" in this column. A Control Point ("CP") is where the significance of the hazard is not rated as high, but it makes good sense to have a control measure in place. Where there is no control measure indicated (because there are no significant hazards at the step), then a "—" may be placed in this column.

5. CRITICAL LIMITS
   The Critical Limit(s) for each Control Measure represents the boundaries of control, and therefore the boundaries for food safety. Where a Control Measure has more than one Critical Limit, each Critical Limit must be separated in the HACCP Audit Table, to ensure correct monitoring. For example, if the Control Measure is "effective chlorination" of wash water to control pathogens, then up to 4 Critical Limits may be defined to ensure control is in place: concentration of free residual chlorine (in parts per million), minimum contact time (in minutes), pH range of the water (in pH units), and maximum temperature (in degrees C). Each of these limits is monitored in a different manner. It must be remembered that each Critical Limit must be directly related to the Control Measure — if not, then either the control measure needs to be reconsidered, or the critical limit redetermined.

6. MONITORING

Monitoring of Critical Limits by either observation and/or tests determines whether the process at that step is in control or out of control. There are five key aspects that need to be defined for each Critical Limit (refer also to HACCP Audit Table (Attachment F))

(i) What? This defines the target of our Control Measure. It should be clearly defined to eliminate any confusion. If the control measure is "maintain correct (meat) temperature range" at the point of receival to minimise outgrowth of pathogens, and the Critical Limit is less than 5°C, then is it the air temperature of the truck, carton surface temperature or the product core temperature that is the target of the Control Measure? Let's define it as "product (deep muscle)".

(ii) How? This defines the method by which the what? is going to be measured. In this example, it is using a "Temperature Gauge" in accordance with an identified procedure. In some cases, the How? may be "visual' (inspection steps, monitoring of staff).

(iii) Where? This defines the location for undertaking the How? and What? When measuring temperature of chiller this needs to be specific: air intake to the condensers, at the door, or a series of identified points in that room?

(iv) When? This defines the timing and/or frequency of the How? and What? The target for HACCP is 100% (continuously) if this can be achieved, but if not, then defined times.

(v) Who? The allocation of responsibility for undertaking the monitoring must be clear, and understood by that designated person when implementing the Monitoring function of the HACCP Plan.

7. CORRECTIVE ACTION

There are three key aspects that need to occur when the Monitoring function defects a situation outside the Critical Limits:

(i) Disposition of the affected product — what to do with the product when it has been detected to be "out of control" and therefore: there is a risk that the hazard identified in column 2 of the HACCP Audit Table may have occurred. For example "REJECT: temperature above 7°C".

(ii) Correction of the Process — this addresses the activity that needs to occur to prevent the process failure from occurring again.

(iii) Documentation of the Event — records need to be kept (most practically on the monitoring form) that describe the outcome of the corrective action, particularly at CCPs. This is for review purposes, and to prove that the appropriate corrective action relating to the product have been taken.

8. RECORDS

This column describes the name of the form used to collect the data resulting from the Monitoring activities. In certain instances, it may make sense to include who completes the form (particularly if this is not the who? indicated in the Monitoring column), and where the completed records are to be found. Wherever a CCP has been identified in the HACCP Audit Table, there must be records available to demonstrate that control has been maintained (either the product met the critical limits, or appropriate corrective action was taken). It is up to the HACCP Team to determine whether records need to be maintained for CPs.

9. VERIFICATION

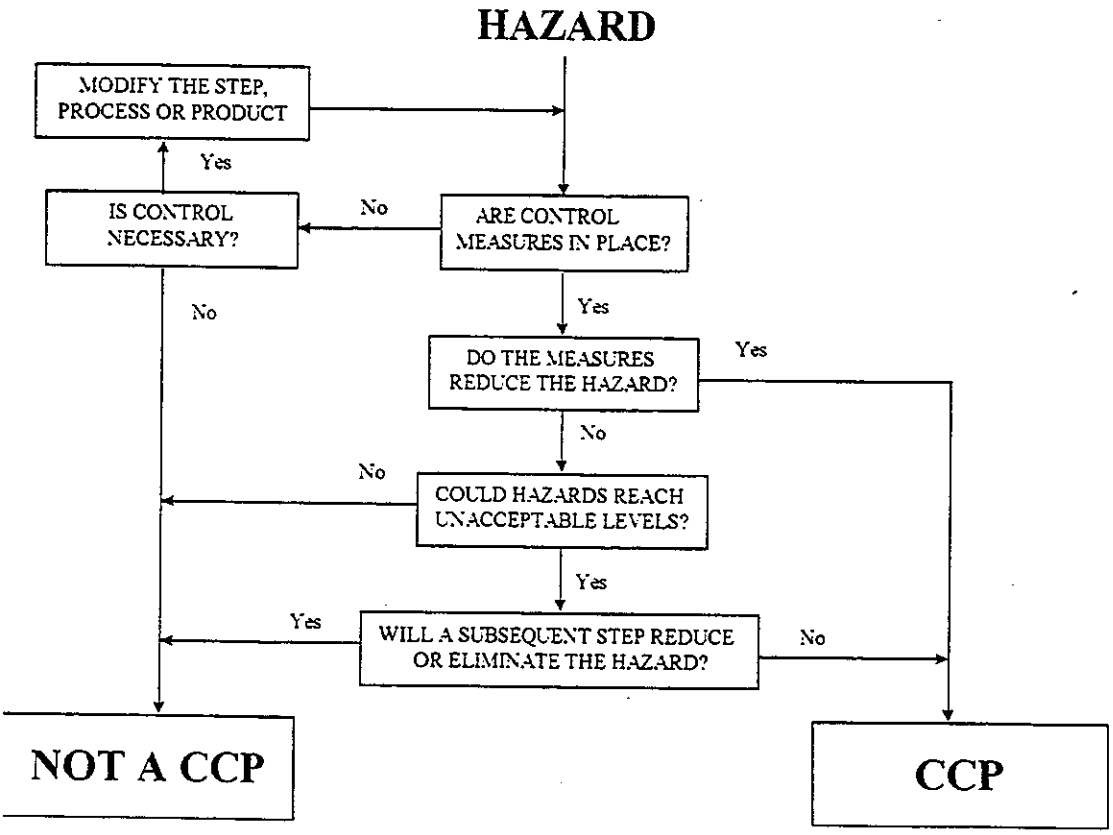
Verification is a program separate from monitoring, to ensure that the HACCP Plan is achieving the food safety performance expected: not that there simply is a flow chart and a HACCP Audit Table. It is the company responsibility to develop a schedule of activities that evaluate the following:

- the adequacy of the overall HACCP Plan,
- that the CCPs are appropriate (not just that they have been identified), and
- that the Critical Limits are appropriate for the control measures.

It will be the responsibility of auditing agencies to ensure that verification activities are being undertaken.

Attachment A: CCP Decision Tree

The decision tree below provides a method for determining whether a hazard identified at a process step requires a Critical Control Point to be established at that step.



Note however that the Codex document (Alinorm 97/13A) specifically says of decision trees that they are "not specific to all food operations, e.g. slaughter, and therefore should be used in conjunction with professional judgement, and modified in some cases".

Attachment B: HACCP Manual Amendment Register

Code Number	Date	Subject	Sub-section or Page No:	Approval	Comments

Explanatory Notes: Document and data control is basically about making sure that any document used (internal: such as procedures and work instructions, and external: such as statutory regulations, Standards, codes and specifications) is the latest approved issue. The same principle is required for control of forms which are used for general of records the result of some monitoring activity as defined in the HACCP Plan.

Attachment C:
CCP Work Instruction (example)

Where a CCP has been identified in a HACCP Plan, the question needs to be asked: "Do I need to have a Work Instruction prepared to ensure that the control measures will be correctly undertaken?" In most instances, the answer will be Yes.

RECEIVAL CLERK:

* Take delivery of all incoming stock.
* When delivery truck arrives take random temperatures of load
    - ◊ All product above 7°C is to be rejected. On rejection of product the number of cartons, delivery docket and the supplier is to be recorded in the Works Diary.
    - ◊ Product at or below 5°C is to be checked for weights and transferred to the cool room without delay. Receival temperatures are to be recorded on the Receival Monitoring Forms.
    - ◊ Product found to be above 5°C but below 7°C is to be isolated in the coolroom and reduced to 5°C as soon as possible. Details of the load are to be recorded on "Receival Monitoring Forms" or a Works Diary.
    - ◊ All violations of the temperature requirements are to be drawn to the attention of the manager.
* All loads are to be observed for the existence of Government stamps or license numbers to ensure the product has been prepared in licensed premises.
    - ◊ Product which cannot be confirmed as originating from licensed premises is to be rejected. The details of the rejected product are to be recorded in "Receival Monitoring Forms" or a Work Diary and drawn to the attention of the manager.
* All loads are to be examined to ensure the cartons are in a clean and sound condition and do not pose a potential threat to the wholesomeness of the product.
    - ◊ Cartons which are not acceptable for further delivery but pose no threat to the product are to be isolated in the coolroom and identified for broken orders. Details of these cartons are to be recorded in the "Receival Monitoring Forms" or a Works Diary and reported to the Manager.
    - ◊ Cartons delivered in a grossly contaminated or unsound state are not to be accepted. Details of the rejected loads together with the name of the supplier are to be recorded in the "Receival Monitoring Sheet" or Works Diary.
* At the commencement of each shift the scales are to be checked by weighing a "Known" 25 kilo weight and recording the results in the "Scales Calibration Monitoring Sheet" or Works Diary.
* Operating temperature of the coolroom as indicated by the external temperature gauge is to be recorded in the "Chiller Temp Monitoring Sheet" or Works Diary at the commencement of each shift and at four hourly intervals thereafter.

Attachment D:
CCP Monitoring Forms (example)

When it is impossible to monitor the *Critical Limit* at a CCP on a continuous basis, it is necessary to establish a monitoring schedule that will be reliable enough to indicate that the hazard is under control.

For further information regarding the monitoring schedule, please refer to the Acceptable Quality Limits (AQLs) as contained in the Australian Standard for the Hygienic Production of Meat for Human Consumption.

RECEIVAL — TEMPERATURE MONITORING SHEET

DATE	TIME	CARRIER (VAN REGO)	PRODUCT DESCRIPTION	TEMPERATURE SAMPLE RESULT	CORRECTIVE ACTION	RECEIVED BY (SIGNATURE)

Attachment E:
Supporting HACCP Programs & Schedules That Need To Be Documented

GENERAL AND PERSONAL HYGIENE INSTRUCTIONS FOR ALL EMPLOYEES (EXAMPLE)

1. **Protective clothing:** Start each shift with clean company-provided protective clothing (including boots) which completely covers your street clothes, and put it on without getting it dirty from the floor.
2. **Hand washing:** Always wash your hands after the toilet and every time you enter (or re-enter) your work area, and any time your hands touch anything unclean while working on product.
3. **Gloves:** Where your job involves gloves, start each shift with company cleaned (or new) mesh or rubber gloves. Always rinse your gloves in a steriliser or special sanitiser bath before going on breaks, and do not take gloves out of work area until end of shift.
4. **Aprons:** Where your job involves wearing an apron, start each day with a new disposable or a clean apron. Rinse off your apron at breaks and leave in your work area (or get a new disposable apron).
5. **Knives, pouches, chains and steels:** During breaks, this equipment must be hung up in the work area if knives are not being sharpened. Sanitation of equipment during breaks will vary for different jobs. See your supervisor or *Work Instruction* for any special details.
6. **Hair covering:** Always wear company-provided cap or disposable hat in your work area, and tuck long hair under the cap or wear a hairnet as well as the cap.
7. **Bandages, jewellery, watches, etc.:** If you have a sore or cut on a hand or exposed arm that needs a bandage, go to the first aid officer and let them put on a special waterproof bandage. Jewellery, watches, etc. generally must not be worn, but if rings are difficult to remove, a glove can be worn on that hand.
8. **Boot washing:** Boots must always be washed on entry to your work area, either by hand sprays, mechanical washer or by wading through a sanitiser bath.
9. **Locker hygiene:** Keep your locker free of dirty protective clothing, food scraps, or anything else that will attract pests.

APPROVED CHEMICAL LIST

* List all chemicals and indicate evidence of their approval status.
* For each chemical indicate what it's to be used for. As part of the Work Instruction for the cleaners, describe the dilution and application methods. This applies especially to dangerous toxic chemicals which could contaminate the product and be detected as a residue.

PEST CONTROL

* Indicate the system of feedback from production/cleaning staff observations to the pest controller.
* Explain the methods to be used for pest problems which occur during production, e.g. fly control.
* Give details of the contractors (or works) program and chemicals used, including diagrams of bait stations.
* Include an example of the reports produced and indicate who will take action when problems are discovered.

CALIBRATION CONTROL

* Records must be kept on the dates of calibration of equipment, such as scales, thermographs, automatic chlorine controller/recorders, all thermometers (portable and fixed) etc.
  - Where calibration is not by an approved laboratory, such as NATA-accredited, the method of calibration must be described.
  - Also describe the frequency of routine recalibration for key units of equipment and their back-up units.
  - It is recommended that the methodology and frequency of calibrating thermometers described in the CSIRO Meat Research newsletter No. 91/2 be followed.
* Identify the staff positions responsible for ensuring that each key piece of test equipment is giving accurate results.

TRAINING

* Records must be kept of training activities identifying the training description, the date undertaken, and signed off by the trainee with the corresponding date. A register or matrix of employees, and the training requirements for the business should be developed, and maintained.

PRODUCT IDENTIFICATION

* Clear guidelines/procedures need to be established to ensure that all product is correctly labelled (product description, packer ID, packed-on date/use-by date (as dictated by customer and regulatory requirements), batch coding if required, and any other information as prescribed.
* Work-in-progress needs to be clearly identified with appropriate coding that allows traceability back to production records.
* isolated/detained/quarantined/held-out Product must be clearly identified, with a procedure developed to ensure that such product is not unwittingly returned into the main production stream.

These aspects are essential for product traceability and control.

Attachment F:
Glossary of Definitions

The following definitions have been taken from the Codex Alimentarius Commission Alinorm 97/13: Annex 1 to Appendix 2. It should be noted that these definitions are in the final stages of adoption by Codex.

AQL: Acceptable Quality Level of a sample lot measured by inspection and test against predetermined objective criteria (see Critical Limits).

Control (verb): To take all necessary actions to ensure and maintain compliance with criteria established in the HACCP Plan.

Control (noun): The state wherein correct procedures are being followed and criteria are being met.

Control measures: Actions and activities that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Corrective Actions: Actions to be taken when the results of monitoring at the CCP indicate a loss of control.

Critical Control Point (CCP): A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Critical Limit: A criterion which separates acceptability from unacceptability.

HACCP: A system which identifies, evaluates, and controls hazards which are significant for food safety.

HACCP Plan: A document prepared in accordance with the principles of HACCP to ensure control of hazards which are significant for food safety in the segment of the food chain under consideration.

Hazard: A biological, chemical or physical agent or factor with the potential to cause an adverse health effect.

Hazard Analysis: The process of collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for food safety and therefore should be addressed in the HACCP plan.

Monitor: The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control.

Step: A point, procedure, operation or stage in the food chain including raw materials, from primary production to final consumption.

Verification: The application of methods, procedures, and tests, in addition to those used in monitoring to determine compliance with the HACCP plan, and/or whether the HACCP plan needs modification.

Attachment G:
HACCP Plan Audit Checklist

Date of Audit		Audit File No:
Company being audited:		
Address		
Reviewer:		
Phone/fax		
Contact:		
Products:		
Company representatives		
No Employees		
Technical resources		

Requirement	Comments
HACCP Team	
Has a HACCP coordinator been appointed?	
Has a HACCP team been selected?	
What are the skills and experience of the team and are they appropriate?	
Are external resources being used to augment knowledge of skills? (details)	
Has a product description/product specification been prepared for each product?	
* composition	
* packaging (inner/outer)	
* method of preservation/storage conditions	
* distribution conditions	
Has the intended use been specified? (Y/N)	
* consumers (general, specific)	
* sensitive populations (aged, children, sick , allergenic)	

Requirement	Comments
* method of preparation	
Has a flow diagram been prepared for each product? (Y/N)	
Is the flow diagram complete? (Y/N)	
* all unit operations included?	
* major inputs identified?	
Has the flow diagram been verified? When?	
Principle 1 - Hazard Analysis	
Have all reasonable biological, chemical or physical hazards been identified at each step?	
Have the hazards been assessed for significance? (Y/N)	
Have control measures been developed and implemented for the control of those hazards?	
Principle 2 - Critical Control Points	
Have the Critical Control Points for each significant hazard been identified and transferred to the Hazard Audit Table? (Y/N)	
Are they essential for the control of the nominated hazard? (Y/N)	
Have Work Instructions been completed for each Critical Control Point?	
Principle 3 - Critical Limits	
Have critical limits been established for each preventative measure?	
Is the relationship between the hazard and the critical limit correct?	
How were the limits determined?	
* experimental evidence?	
* published results?	
Principle 4 - Monitoring procedures	
Have monitoring procedures been developed for each preventative measure?	
Do the monitoring procedures specify what, when, how, where and who?	

Requirement	Comments
Is the frequency of monitoring sufficient to provide a high level of assurance that the process is under control?	
Are monitoring records kept and reviewed by the appropriate personnel?	
Have examples of monitoring forms been provided in the manual?	
Principle 5 - Corrective Action	
Have corrective actions been developed for each critical control point?	
Do the corrective actions ensure that the CCP is brought under control?	
Do the corrective actions cover product, process and prevention of recurrence?	
Principle 6 - Verification Procedures	
Have verification procedures been put in place to demonstrate that the HACCP program is effective?	
Have the critical limits been validated?	
Do the verification activities demonstrate that the CCPs are under control?	
Do verification activities demonstrate that the HACCP program is effective?	
Principle 7 - Record Keeping	
Have records been maintained for all monitoring procedures?	
Have all critical limits been adhered to?	
Have records been maintained for all corrective actions?	
Have records been maintained of all HACCP verification activities?	
Documentation	
Is there a Quality Manual?	
Quality Policy?	
Procedures, work instructions forms and specifications identified?	
Are all referenced documents controlled?	

Good manufacturing practice	
Has a GMP policy been defined?	
Is there a system for auditing the GMP?	
Is corrective action taken in response to Good Manufacturing Practice nonconformance?	
Is GMP being practised?	
Cleaning Procedures	
Have cleaning procedures been developed?	
Have verification procedures for effective cleaning been developed and implemented?	
Is corrective action documented?	
Pest Control	
Have pest control procedures been developed and documented?	
Is there a verification procedure for effective pest control?	
Does the procedure include corrective action?	
Training	
Are there records of training?	
Are training needs reviewed on a regular basis?	
Is there a training plan to provide identified training needs?	
Calibration	
Has the calibration status measuring equipment been identified?	
Are there documented procedures for calibration?	
Are there procedures for reviewing material produced while equipment was out of calibration?	
Product identification	
Have procedures for product identification been developed and documented?	
Is "heldout" product identified?	

Overall Comments:

Audited by: _____ **Date:** _____

Accepted by _____ **Date:** _____

Attachment C: Generic best practice prerequisite programs, with an explanation of the use of such programs in HACCP systems

HACCP PREREQUISITE PROGRAMS

FOR

BEEF, SHEEP AND LAMB AND PIG SLAUGHTER AND DRESSING

prepared by

Australian Meat Technology

for the Meat Industry Council

July 1997

Supported by the DIST Food Quality Program and the MRC Food Safety Key Program

CONTENTS

Prerequisite Programs and Dressing Procedures

The use of prerequisite programs in HACCP based process control in the meat industry could be expanded to cover some of the essential elements of production of meat carcases. In particular, issues to do with animal welfare can be contained in prerequisite programs and not in HACCP plans, unless the issues involve food safety. Prerequisite programs for animal welfare based on codes of practice and regulations would still result in work instruction for operators, monitoring procedures, corrective actions and verification.

Many of the procedures involved in slaughtering and dressing could also be dealt with in a prerequisite program. Slaughter practices are based largely on the regulations contained in Meat Export Orders and the Australian Standard for Hygienic Production of Meat for Human Consumption. These documents contain many essential requirements for meat production which could be incorporated into a prerequisite program. With regulatory requirements and other essential procedures dealt with in a prerequisite program, the HACCP plan can be simplified and focussed on preventing and correcting the unacceptable food safety risks.

Prerequisite programs for personal hygiene good manufacturing practices (GMP), cleaning and sanitation GMPs, beef slaughter and dressing GMPs and sheep and lamb slaughter and dressing GMPs have been prepared. These documents can form part of a HACCP based process control program and the procedures in the documents used in work instructions. The procedures and specifications in these documents need not be reproduced in HACCP plans except where they are identified through the HACCP process as preventive measures, critical control points or critical limits for significant potential hazards. The accompanying GMPs should be used as examples. More effective and efficient procedures will be appropriate in the different circumstances found in meatworks.

Other Prerequisite Programs

Other prerequisite programs which should be considered as part of a HACCP based process control program are:

- Raw materials and ingredients including the specifications for raw materials, approval of suppliers, sampling and testing procedures.
- Receival of materials including cleanliness of receiving conditions, time and/or temperature conditions involved in receival and records of receivals.
- Storage of material including cleanliness and hygiene in storage, time and temperature controls, stock rotation, controlled chemical storage.
- Preventive maintenance including identification and scheduling of maintenance, records, cleanliness and hygiene in maintenance procedures.
- Hold and release procedures including identifying when to hold product, how to identify held product, how to decide disposition of held product, and records.
- Calibration of control devices including lists of control devices, schedules of calibration, calibration procedures and records of calibration.
- Packaging including storage of packing materials, specification of packing materials and hygiene of packing materials.

USE OF PREREQUISITE PROGRAMS IN HACCP BASED PROCESS CONTROL

Introduction

Hazard analysis critical control point (HACCP) plans are intended to guarantee as far as possible that food products are safe. HACCP focuses on significant potential hazards to food safety. Critical control points (CCP) have to be assigned to eliminate or reduce the risk of every significant potential hazard to an acceptable level. Critical limits are used to assure through monitoring that the necessary control is being exercised at CCPs.

An axiom of HACCP is that if a critical limit is breached, the breach must be interpreted as meaning the necessary control is not exercised at the CCP and consequently product has been produced with an unacceptable risk of a food safety hazard. Obviously, such product cannot be released for consumption until the hazard to food safety is eliminated or reduced to an acceptable level.

In production of carcase meat there are many operations and procedures which must be carried out because of regulatory, animal welfare, occupational health and safety, customer or management requirements. An unacceptable risk of occurrence of a food safety hazard does not necessarily result if these procedures are not followed. It may be essential to follow these procedures but they do not have to be incorporated into a HACCP plan.

One way to maintain the focus of the HACCP plan on the critical aspects of food safety so that product with an unacceptable food safety risk can be clearly recognised and dealt with, is to incorporate many of the other essential procedures into prerequisite programs.

Prerequisite programs are procedures that must be carried out in conjunction with HACCP plans. They must be monitored, corrective action taken when they are out of specification and are subject to verification. The distinction of the prerequisite programs is that they do not have to be developed through the HACCP procedures, they can be based on good manufacturing practices, regulations, customer requirement and other sources.

In working through the principles of HACCP for a production process, it may be decided that some prerequisite programs or parts of prerequisite programs are critical control points. In this case a critical limit would be set and an unacceptable food safety risk acknowledged if the critical limit is breached.

Examples of Prerequisite Programs

There are several examples of prerequisite programs in HACCP based process control plans in the meat industry. Cleaning and sanitation programs, personal hygiene procedures, pest and vermin control programs are all prerequisites that are essential to achieve satisfactory food safety outcomes. However, if these programs can be shown to operate effectively through monitoring and verification, they would not be incorporated in the HACCP plan unless parts of the programs are identified as CCPs for significant potential hazards.

HACCP plans and prerequisite programs can be merged at the level of work instructions. Work instructions must incorporate any preventive measures identified in the HACCP and can also incorporate instructions derived from the prerequisite programs.

- End product testing including sampling procedures for product testing, methods of testing, reporting of tests and disposition of product awaiting test results.
- Maintenance of premises including building exteriors, drainage, roadways, pest exclusion, building interior construction and maintenance, lighting, ventilation, sanitary, facilities, water, steam and ice supply.
- Training procedures
- Pest control.
- Meat Hygiene Assessment procedures.
- Microbiological testing procedures.
- Pesticide testing.
- Animal welfare.
- Waste disposal.
- Product traceability and product recall.

Many of these prerequisite programs are in use in conjunction with HACCP plans in the meat industry. It is clear that the programs contain procedure that are essential and which relate to food safety. However, these programs can work well without being repeated through the HACCP plan.

PERSONAL HYGIENE

1. PURPOSE

This procedure establishes uniform hygiene practices designed to protect the health of staff and to minimise the risk of contamination of product via people who handle and prepare the product.

2. BACKGROUND

The human and animal populations are both sources of disease-causing microbial contamination. Food products can be directly contaminated from human sources or can be contaminated from other sources, including animals, via food handlers. Similarly, people working in food preparation can be infected by microbes carried on the food or ingredients.

A high standard of personal hygiene is required to prevent the transfer of microbes to meat via people and to prevent contamination of people from microbes associated with livestock and meat.

3. SCOPE

This procedure applies to all areas of the establishment. It applies to all people who enter the establishment including all staff, visitors and contractors.

4. DEFINITIONS

Clean:	Condition of surfaces after a specified cleaning procedure and implying that the surface is free from visible contamination.
Detergent:	Chemical or blend of chemicals that is added to water to assist removal o soils.
Infectious disease:	An illness that can be passed between people by direct or indirect contact
Liquid soap:	A hand cleaning detergent approved by AQIS.
Sanitise	A treatment that reduces the number of microorganisms on a clean surfac to an acceptable level.

1. RESPONSIBILITIES

Plant Manager	• Supports a work place culture that accepts good personal hygiene practices by setting examples. • Provides resources for training and implementation of the personal hygiene culture. • Takes part in management reviews.
Quality Assurance Staff and Supervisors	• Set an example of personal hygiene practices. • Monitor personal health and practices of staff. • Monitor and report requirement for resources.

	• Initiate corrective action and check effectiveness. • Train new employees. • Take part in management reviews.
Food plant employees	• Perform all duties in accordance with personal hygiene procedures. • Report deficiencies in resources required for full compliance with personal hygiene procedures.

2. PROCEDURES AND ACTIONS

2.1 General

All prospective employees undergo an induction training program which includes an explanation of personal hygiene requirements.

2.2 Personal Health

- Employees must not work as food handlers if they carry any infectious disease.
- If any person suffers from:

  severe cold or flu symptoms,

  stomach cramps, diarrhoea or vomiting,

  contagious or infectious diseases,

  infected wounds,

  sores, dermatitis, rashes or skin irritation,

they must consult a doctor or the first aid officer before commencing work. They may be assigned to appropriate duties.

- Cuts and abrasions received at work must be reported immediately.
- Cuts and abrasions must be dressed and covered with a waterproof bandage or fitting.
- Cuts and abrasions must be assessed and treated by the first aid officer each day before work until they have healed.
- Employees must report for a medical examination if required.

2.3 Protective Clothing

- Clean protective clothing is issued to employees working in edible processing areas every day. Employees must change into clean trousers and top before they start work and must wear a new hair net, and a beard net if required. Employees are issued with boots which they must wear and maintain in a clean condition.
- If protective clothing is excessively soiled during the day, employees will be issued with clean clothing.

- At the end of a shift, employees must place dirty clothing in the laundry bin.

2.4 Lockers

Employees must keep their lockers in a clean and tidy condition. Stale food must not be kept in lockers.

2.5 Hand-washing

- Employees are provided with handwash stations serviced with warm water and liquid soap at their workstation if required, at the toilets and entry and at the exit to processing areas.
- Employees must wash their hands by thoroughly rubbing or scrubbing hands for at least 15 seconds with soap and water. Hands must be rinsed in running water and dried on a clean paper towel.
  - Before the start of every shift.
  - Immediately after using the toilet.
  - On leaving and entering production areas.
  - After handling any type of contaminated material.
  - After coughing or sneezing into hands, wiping nose, scratching head or face.
- Employees involved in carcase dressing must wash their hands and arms between carcases if required, whenever their hands are become contaminated, when changing knife hands and as directed by an authorised officer.

2.6 Personal Equipment

- Personal equipment includes knives, steels, pouches, boots, gloves and aprons.
- All personal equipment must be cleaned and sanitised at the end of each shift and must be sanitised with 82°C water before starting work.
- Pouches must be disassembled for cleaning. All equipment must be cleaned by scrubbing it with the detergent provided and dipping or rinsing it with 82°C water or sanitiser solution for at least 10 seconds. Personal equipment must be hung up to dry.
- Boots must be cleaned at the boot-wash station whenever entering or leaving a production area.
- Equipment must be washed and sanitised at regular intervals during production and when contaminated.
- Knives and implements must be washed and sanitised in 82°C water:
  - after each hide opening cut.
  - between carcases before they pass the point of final inspection.
  - after steeling.
  - after removal from the pouch.

- Personal equipment must not be used outside production areas.

2.7 Jewellery and Cosmetics

All jewellery including watches, earrings and sleepers, must be removed before entering a processing area. Rings that cannot be removed must be covered with an impervious dressing or glove.

Nail polish, heavily scented creams and other cosmetics that could contaminate food products must be removed.

2.8 Other Hygiene Practices

- Employees in one production may not visit employees in another area.
- Spitting, eating, chewing, smoking or throwing meat in edible production areas is prohibited.
- Eating and smoking is only permitted in designated areas.
- Product that is accidentally coughed or sneezed on must be treated as dropped meat and the dropped meat procedures must be followed.

3. MONITORING

- Department supervisors and QA Officers are responsible for ensuring that personal hygiene procedures are observed by all people entering their department. Breaches of personal hygiene procedures should be noted on the personal hygiene monitoring form.
- Personal equipment is inspected for visual cleanliness by a QA Officer twice a day during the pre-operational hygiene inspection and at lunch breaks. Ten kits including knives, steels, pouches, gloves and aprons are inspected. Results are recorded on the personal hygiene monitoring sheet.
- Personal equipment is sampled and tested for microbiological condition twice a week, according to the procedure for microbiological sampling and testing of surfaces.
- A member of the QA Department and a Union Representative will conduct a locker inspection once per week. Results are recorded on the locker inspection monitoring form.

4. CORRECTIVE ACTION

- Corrective action will follow the standard operating procedure for corrective action.
- Breaches of personal hygiene relating to cleanliness of employees or equipment are immediately rectified by cleaning equipment or replacing clothing.
- Employees who breach personal hygiene procedures will be informed of the breach and will be monitored for adherence to procedures twice in the following week.
- If product has been affected by a breach in personal hygiene practices it will be retained pending a decision on disposition.

5. VERIFICATION

- The QA Manager conducts a weekly review of personal hygiene monitoring documentation to ensure that breaches and corrective actions are recorded and follow-up monitoring indicates that corrective action is effective.
- Hygiene of personal equipment is verified by microbiological testing.
- Personal hygiene procedures and documents are subject to internal audit.
- Personal hygiene procedures are subject to management review.

6. REFERENCES

Australian Standard for Consumption of Meat for Human Consumption.

Pre-operational Hygiene Inspection procedure.

Sampling and testing procedures for microbiological testing.

Locker inspection procedures.

Cleaning and sanitation procedures.

Induction handbook.

Dropped meat procedure.

Management review procedures.

7. DOCUMENTS

Personal hygiene monitoring form.

Locker inspection form.

Microbiological test reports.

CLEANING AND SANITATION

1. PURPOSE

These procedures provide instructions on cleaning and sanitation methods. The work environment, product contact surfaces and equipment can be a major source of contamination of meat. The objective of these procedures is to ensure that the work environment and equipment is cleaned according to a schedule so that the risk of contamination of product is controlled.

2. BACKGROUND

Effective cleaning and sanitation procedures are needed to maintain or restore the cleanliness of the work environment.

All surfaces in edible processing areas must be thoroughly cleaned and sanitised to prevent the growth of microorganisms that could contaminate food. Good housekeeping in ancillary area is necessary to reduce the risk of contamination in food preparation areas and helps to control vermin. Cleaning methods must be designed according to the types of soil that have to be removed and the nature of the surface being cleaned. As far as possible, processing facilities should be designed to make cleaning easy and efficient. Chemicals used must be approved for their specific purpose and must be used according to manufacturers instruction to prevent the risk of contamination of product with chemical residues.

Cleaning procedures are necessary during production to prevent gross build up of soil and contamination of product.

3. SCOPE

This procedure identifies the type and frequency of cleaning both before operations start and during normal operations. The work environment including meat contact surface, facilities, equipment and utensils in edible processing, storage areas, non-edible processing, amenities, and building surrounds are covered by this procedure.

4. RESPONSIBILITIES

Works Manager	• Ensures that resources are available to carry out the cleaning and sanitation procedures and participates in reviews of the procedures. • Takes part in management reviews.
Quality Assurance Manager	• Reviews hygiene reports and corrective actions. • Takes part in management reviews. • Arranges for repairs and maintenance relevant to cleanliness and housekeeping. • Reviews and updates cleaning procedures.

Quality Assurance Officer	• Conducts pre-operational and daily hygiene inspections. • Ensures that cleanliness standards are maintained. • Notifies supervisors of the need for corrective action. • Notifies the QA Manager of maintenance and repair requirements.
Supervisors	• Initiate corrective action. • Ensure appropriate distribution and use of cleaning materials. • Ensure that their departments and areas of responsibility are satisfactorily clean.
Cleaning operators	• Perform all duties in accordance with cleaning and sanitation procedures. • Report deficiencies in resources and materials required for satisfactory cleaning.

5. DEFINITIONS

Clean:	Condition of surfaces after a specified cleaning procedure and implying that the surface is free from visible contamination.
Detergent:	Chemical or blend of chemicals that is added to water to assist removal of soils.
Liquid soap:	A hand cleaning detergent approved by AQIS.
Sanitise	A treatment that reduces the number of microorganisms on a clean surface to an acceptable level.

6. PROCEDURES AND ACTIONS

Cleaning procedures are carried out according to the following schedules.

6.1 Use of Chemicals

All chemicals used for cleaning and sanitising are approved by AQIS. In general the chemicals used are:

- Alkaline detergent for all localised cleaning of fat and blood residues by hand.
- Foaming alkaline detergent for widespread cleaning of areas soiled with fat and protein.
- Quaternary ammonium compound sanitiser applied by spray.
- Sodium hypochlorite solution for bleaching cutting boards.

- Acid detergent for removing scale, and for floor and drain cleaning.
- Heavy duty acid and alkali detergent for gear cleaning and dewatering lubricant for gear cleaning.
- Hand cleaners.

Chemicals are purchased from suppliers who will supply documentation attesting that the chemicals are approved.

The suppliers will also provide product data sheets and clear instructions about the use of the chemicals including:

- Recommended temperature for application of the chemical.
- Recommended contact time for the chemical.
- Instructions for rinsing of the chemical.

These details are issued to all persons responsible for cleaning.

The procedure for storage and handling chemicals must be followed in all handling and dispensing of chemicals.

Current chemicals in use are listed on the chemical register.

6.2 Operational Cleaning

- Operational cleaning is done continuously and intermittently during production. The areas and items to be cleaned are:

Area/Item	Frequency	Person Responsible
Stockyards	As pens are emptied	Stockman
Slaughter floors:		
Personal equipment	As required according to paragraph 6.2.1	User of equipment
Floors and drains	As required and at smoko and lunch breaks	Slaughter floor labourer
Viscera table	Continuously	Slaughter floor foreman
Chillers	Between loading and unloading	Chiller hands
Boning Room:		
Personal equipment	As required according to paragraph 6.2.1	User of equipment
Hooks and gear	After every use	Gear cleaning operator

6.2.1 *Cleaning Methods*

The methods of operational cleaning are:

Personal equipment

At all tasks on the slaughter floor before carcases pass final inspection, knives, other hand tools, mesh gloves, saws and other equipment must be rinsed in 82°C water between each carcase.

If equipment is contaminated with faeces, ingesta or abscess material or grossly contaminated with blood, fat, meat or hair it should be washed by rinsing in warm water to remove the contaminants before being treated with 82°C water.

Knives must be cleaned in 82°C water whenever they are taken out of a scabbard or steeled.

In the boning room, knives, mesh gloves, hooks, and other personal equipment must be cleaned by rinsing in warm water followed by 82°C water whenever the equipment comes in contact with faecal matter, ingesta, abscesses, dropped meat, or the equipment is dropped.

Floors and drains

During any break, scraps of fat and meat must be swept up and placed in an inedible product tub or inedible conveyor. Floors and lower walls must be hosed with warm water. Staff must avoid splashing carcases and meat when hosing.

During processing, inedible materials must be removed from the slaughter floor and boning room and gross contamination must be picked up off the floor and put into inedible product containers.

Viscera table

The viscera table is cleaned by a sequence of cold, hot (82°C) and cold water sprays.

Hooks and gear

Overhead gear is returned to the hook cleaning room after every use. Gear is cleaned in a five stage process of dipping in alkali detergent for 10 minutes at 80°C, dipping in a cold water rinse, dipping in acid detergent for 5 minutes, dipping in cold water rinse and dipping in lubricant/rust inhibitor for 4 minutes.

Yards

Yards must be hosed with cold water to remove faecal matter after they are emptied of stock.

Chillers

Between unloading and loading, scraps of meat and fat on the chiller floor must be picked up and put in an inedible product bin. Chillers must be hosed out with cold water to remove blood on the floor and lower walls. Hot water my be used to remove fat on the floor but hot water must be used sparingly to avoid condensation.

Any condensation in chillers at any time must be removed by mopping with a sponge held specifically for this purpose

6.3 Pre-operational Cleaning

Pre-operational cleaning is carried out in all food processing areas between each days operations. Areas and items subject to pre-operational cleaning are:

Area/Item	Person Responsible
Slaughter floors	Cleaning gang supervisor
Slaughter floor equipment	Cleaning gang supervisor
Chiller doors	Cleaning gang supervisor
Passage between slaughter floor and chillers	Cleaning gang supervisor
Offal room	Cleaning gang supervisor
Tripe room	Cleaning gang supervisor
Paunch room	Cleaning gang supervisor
Petfood room	Cleaning gang supervisor
Boning room	Cleaning gang supervisor
All personal equipment	Owners of equipment

6.3.1 Cleaning Methods

6.3.1.1 General

The general cleaning method for all pre-operational cleaning is:

- Moveable equipment such as tubs, cutting boards, personal equipment and other small items of equipment are removed to a designated area for cleaning.
- Covers should be placed over sensitive equipment such as keyboards and packaging machines.
- Equipment such as saws should be disassembled to allow access for cleaning.
- As far as possible meat scraps and fat on the floor and on equipment should be picked up, swept, shovelled or scraped up, put into inedible product bins and removed.
- All surfaces including walls, stands, equipment hand basins and floors are pre-rinsed by hosing with warm water. Hosing should start at the high sites and work down to floor level.
- After the pre-rinse, equipment that is heavily coated with fat is hosed with hot water at 82°C to remove some of the fat residue.
- Solids on drain gratings are picked up, put into inedible product bins and removed.
- A foaming detergent is applied to walls, equipment and floors. The foam is dispensed through a mixer unit and delivered through a hose. The mixer unit must be set according to the manufacturers instructions to give the required dosage of detergent.

- The foam is left in contact with the surfaces for the amount of time specified by the detergent manufacturer.
- All surfaces are scrubbed manually with scouring pads or with mechanical cleaning aids.
- The detergent and soil are rinsed off all surfaces with water. Water at 82°C should be used to rinse product contact surfaces.
- Surfaces should be allowed to drain as much as possible and a sanitiser approved for use without rinsing applied to all product contact surfaces by spraying.

6.3.1.2 Personal Equipment

- Personal equipment is cleaned by scrubbing with a solution of detergent provided for the purpose. Pouches must be disassembled for cleaning.
- Equipment must be rinsed in warm water and dipped in sanitiser solution or 82°C water for at least 10 seconds and hung up in the designated area.

6.3.1.3 Moveable Equipment

- Equipment such as barrows, tubs and cutting boards is collected in a central area for cleaning.
- The equipment is cleaned using the general procedures except that cutting boards are scrubbed in a tank of detergent, and after rinsing are soaked in a tank of sanitiser for at least 20 minutes.
- Tubs and boards are placed in racks to drain after they are sanitised.
- No equipment may be placed on the floor after cleaning.

6.4 Other Cleaning Schedules

Cleaning other than operational and pre-operational is done as follows:

Area/Item	Frequency	Person Responsible
Chillers - full clean	At least once per week	Chiller foreman
Chiller evaporator units	Six months	Engineer
Slaughter floor, boning room and chiller overheads	Completed on a monthly rotation	Cleaning gang supervisor
Clothes store	Daily	Clothes store staff
Storeroom	Daily	Storeperson
Amenities	Daily	Cleaning gang supervisor
Offices	Daily	Cleaning gang supervisor
Outside areas:		
Chemical store	Weekly	Outside maintenance staff
Surrounds	Daily	Outside maintenance staff
Rubbish bins	Daily	Outside maintenance staff
Loadout	Weekly	Loadout supervisor
Freezers	Weekly	Freezer supervisor
Ageing chiller	Weekly	Freezer supervisor
Marshalling area	Daily	Freezer supervisor
Packing store	Daily	Boning room supervisor
Gear room	Daily	Gear cleaning operator

6.4.1 Cleaning Methods

6.4.1.1 Chillers

- Chillers are cleaned with detergent foam and sanitised once per week when empty.
- Scraps of meat and fat are picked up, put into inedible product tubs and removed.
- The detergent foam is dispensed through a mixer and delivered through a hose to the walls, floors and doors and ceiling.
- The walls, floors, doors and door seals are scrubbed with a brush.
- The detergent is rinsed off with warm water.
- A sanitising solution is sprayed into the walls and floor.
- Evaporator units are cleaned at six month intervals by spraying them with an alkaline detergent, leaving the detergent in place for at least 20 minutes and hosing with high pressure hot water. The procedure is repeated until the rinse water runs clear. This procedure is under the supervision of the engineer.

6.4.1.2 Overheads

- Rails and overheads are cleaned by scrubbing with scouring pads and alkaline detergent solution.

- Detergent is rinsed off with warm water and the excess water blown off with compressed air.
- Rails are re-oiled and excess oil wiped off.

6.4.1.3 Chutes

Chutes are cleaned according to the general procedures but after application of foam detergent for the specified time they are scrubbed by pulling a brush through the chute.

6.4.1.4 Clothes Store and Storeroom

The rubbish bins are emptied and the floor swept.

6.4.1.5 Amenities

- Rubbish is removed and floors swept. Locker tops are dusted.
- The floor in the toilet and shower area is washed with a sanitiser solution and squeegeed dry.
- Toilet, urinals, showers and wash basins are cleaned with a detergent sanitiser.

6.4.1.6 Offices

- Offices are vacuum cleaned and rubbish removed.

6.4.1.7 Outside Areas

- The chemical store is cleaned by sweeping the floor and wiping down benches and containers with a clean sponge.
- Rubbish bins are emptied, hosed out and rinsed with sanitiser solution.

6.4.1.8 Loadout, ageing chiller and freezer

- Any rubbish from broken pallets or cartons is removed.
- The floor of the loadout area is hosed down.

6.4.1.9 Marshalling area and packing store

- All rubbish is picked up and removed.
- The floor is vacuum cleaned.

6.4.1.10 Gear room

The floor is hosed down

7. MONITORING

- Operational cleaning is monitored by department supervisors and QA staff. Supervisors monitor cleanliness frequently during all production periods. QA staff monitor

cleanliness once in each production period and record results on the daily operational hygiene ispection checklist.

- Pre-operational cleaning is monitored by QA officers. All items required to be cleaned are examined for cleanliness and results recorded on the pre-operational hygiene checklist.
- All other areas including amenities, offices, store rooms, freezers, ageing chillers and outside areas are monitored daily by QA staff. Results of monitoring are recorded on the daily hygiene monitoring checklist.

8. CORRECTIVE ACTION

- The person responsible is notified of any items found to be not satisfactorily cleaned during the pre-operational hygiene inspection. These items must be re-cleaned before operations can commence.
- Items that are found to be not satisfactorily cleaned during other hygiene inspections are brought to the attention of the person responsible.
- If there is condensation in chillers, any affected product is removed and isolated for rework and the affected area is isolated. Condensation is removed as described in 6.2.1

9. VERIFICATION

- Cleaned surfaces are sampled and tested for microbiological conditions three times a week. Samples are collected during the pre-operational hygiene inspection. A range of surfaces in the slaughter floor, boning room, chillers, offal room and personal gear are sampled in rotation according to the procedures for microbiological testing of work surfaces.
- Results are recorded on the microbiological testing of surfaces report form. Results are examined for trends and to set baselines. Standards for microbiological conditions of surfaces are adjusted from time to time in response to changes in the baseline.
- If a sample does not comply with the microbiological standard, the person responsible for cleaning is notified and the surface re-sampled on the next sampling occasion.
- The QA manager conducts a weekly review of pre-operational hygiene monitor checklist, the daily hygiene monitoring checklist, and the corresponding corrective actions. The review is to ensure that observations made during hygiene inspections are properly recorded and that corrective actions are recorded and follow up monitoring indicates that corrective action is effective.
- Cleaning and sanitation procedures and documentation are subject to internal audit.
- Management reviews are conducted to consider results of internal audits, trends in microbiological test results and effectiveness of corrective actions. Management reviews will produce action plans for continuous quality improvement, particularly in cases where there are repeat infringements of hygiene standards or microbiological testing shows in trend towards poor hygiene.

10. References

Australian Standard for Consumption of Meat for the Human Consumption.

Australian Standard 2997-1987 cleaning and sanitation of plant and equipment in the meat processing industry.

Procedures for storage and handling of approved chemicals.

Management review procedures.

Internal quality audit procedure.

Procedures for microbiological sampling and testing work surfaces.

Pre-operational hygiene inspection procedure.

Daily hygiene inspection procedure.

Cleaning chemical product information sheets.

11. Documents

Pre-operational hygiene inspection checklist.

Daily operational hygiene inspection checklist.

Microbiological testing of work surfaces report form.

SLAUGHTER AND DRESSING OF BEEF

1. PURPOSE

This procedure establishes uniform hygienic processing methods for slaughter and dressing beef for human consumption.

2. BACKGROUND

The muscle tissue of healthy animals is clean and generally free from microbial contamination. The operations involved in slaughtering and dressing carcases involve possible contamination of exposed meat surfaces by dust, faeces, ingesta and other contaminants from the hide and gastro-intestinal tract.

Carcases can also be contaminated directly or indirectly by workers or by the work environment.

Some disease conditions of animals may not be apparent until after slaughter and carcases must be inspected by qualified people to detect diseases and abnormal conditions. Precautions must be taken to prevent cross-contamination between carcases until the final inspection process is complete.

Hygienic dressing can be achieved if stock are reasonably clean and dry, at the time of slaughter. In addition precautions must be taken to prevent carcases being contaminated by any material on the outside of hides during hide removal, and precautions must be taken to prevent contamination of carcases from either end of the alimentary tract or from cuts or breakages in the alimentary tract.

3. SCOPE

This procedure applies to slaughter and dressing of beef from preparation of stock for slaughter to dispatch from the slaughter floor to the chillers. The procedures address hygienic dressing and animal welfare issues.

4. DEFINITIONS

Hygienic dressing:	Procedures involved in removing the head, hide or skin, viscera, genital organs, feet and mammary glands to produce a carcase with no visible contamination.
Sanitise:	A treatment that reduces the number of microorganisms on a clean surface to an acceptable level. On the slaughter floor, this usually means contact with 82°C water for 10 seconds.

5. RESPONSIBILITIES

General Manager	• Ensures that equipment and facilities are available to carry out hygienic dressing

Plant Manager	• Ensures that slaughter lines are properly staffed. • Schedules and reschedules the kill according to availability clean stock. • Maintains proper training of all staff involved in slaughter and dressing. • Ensures that resources are available to maintain slaughter floors, stockyards and equipment in a suitable condition for hygienic dressing.
Livestock Manager	• Ensures a supply of clean dry livestock.
Supervisors	• Monitor hygienic dressing procedures and animal welfare procedures. • Initiate corrective action when procedures are not followed. • Provide on-the-job training and co-ordinate improvements i hygienic practices suggested by operators.
QA Manager	• Reviews monitoring records and corrective action documentation. • Develops plans to prevent re-occurrence of breaches of procedures.
QA staff	• Monitor hygienic slaughtering and dressing procedures and animal welfare procedures. • Initiate corrective action in consultation with supervisors.
Slaughter floor and stockyard employees	• Perform duties according to good manufacturing practices and work instructions. • Inform the Supervisor of suggestions for improvements in hygienic slaughter procedures.

6. PROCEDURES AND ACTIONS

6.1 Livestock Preparation

- Livestock are received according to the Work Instructions which include details of booking in procedures, accounting for stock and emergency telephone numbers.
- Stock are received and unloaded quietly. Diseased or crippled stock must be separated from mobs for emergency or special slaughter. Diseased, crippled or moribund stock must be destroyed humanely as soon as possible or separated from mobs for emergency or special slaughter. Bodies of destroyed livestock or dead stock must be disposed of by rendering, burying or incineration as soon as possible.
- Dirty stock that cannot be suitably cleaned by normal preslaughter washing procedures must be set aside in pens or paddocks and the livestock manager informed. Decisions on

the disposition and treatment of dirty stock must be made by the livestock manager in consultation with the plant manager.

- Livestock are placed in clean, roofed holding pens and provided with water prior to slaughter.
- Cattle are washed through a semi-automatic wash before slaughter to remove loose dust and dirt from the hide. Free water on the carcase is drained off before slaughter.
- Stock must be moved through the stockyards, wash pen and lead up race as quietly as possible, without excessive use of electric goads.
- As far as possible, familiar mobs of cattle should not be split in separate pens or divided by slaughter order.
- Pens must be washed out between mobs and repairs required to water troughs, flooring, roofing or fences reported to the livestock manager.

6.2 Cattle Washing

- All cattle are washed through a semi-automatic wash before slaughter to remove loose dust and hair from the hide. The wash is done in sufficient time before slaughter to allow free water to drain from hides.
- Moderately dirty cattle are washed by hand-held hose to remove dirt along cutting lines.
- Cattle that cannot be washed to a satisfactory level of cleanliness must be set aside in clean pens or paddocks until they are clean enough for slaughter.

6.3 Slaughter and Dressing - General Procedures

6.3.1 Knife and equipment sanitising

- All employees must comply with the following rules for using knives and implements.
- All hide opening cuts including opening the neck for sticking, opening first and second leg, scalping around the bung, and opening the mid line must be carried out with a spear cut, that is cutting from the inside of the hide to the outside with the blade of the knife leading the hand and being pushed through the hide.
- After cutting through the hide with a knife or other tool, the knife or tool must be rinsed in 82°C for at least 10 seconds. (The two knife system should be used to allow 10 second contact time in hot water). If the knife or tool blade is grossly contaminated with blood it should be rinsed in warm water before it is put into 82°C water.
- If a knife or tool accidentally cuts through hides, or any other contaminated material such as an abscess or any part of the alimentary tract, or is contaminated by urine or milk , it must be sanitised by rinsing in 82°C for 10 seconds. If the knife or tool blade is visibly contaminated it should be rinsed in warm water before it is put into hot water.
- After any contact between a knife, tool or other implement and a carcase, before the carcase passes final inspection, the knife or implement must be rinsed in 82°C before it comes into contact with any edible part of another carcase. If knives or implements are

grossly contaminated with blood they must be rinsed in warm water before being put into 82°C water.

- Knives must be sanitised by rinsing in 82°C after steeling and after removing from the knife pouch.

6.3.2 Hand washing

- After touching the hide by hand, or if hands come into contact with faecal matter, ingesta, urine, milk, abscesses or other contaminated material, hands must be washed with liquid soap and water.

6.3.3 Trimming

- If visible contaminated material such as hair, faeces, ingesta, milk, urine, gets into a carcase, the contaminated material must be trimmed off at the first available opportunity. This is usually at the work station where the contamination occurred.
- Knives and implements used to trim off contamination must be sanitised before and after each piece of contamination is trimmed off. Hands must be washed after handling any piece of contaminated tissue.
- Material trimmed from carcases must be placed in an inedible product container, chute or trough.

6.3.4 Inedible material

Any material placed in an edible product container, trough or chute must be removed from the slaughter floor as soon as possible.

6.3.5 Slaughter floor cleaning

Cleaning is done on the slaughter floor during operations according to the cleaning and sanitation procedures. Any hosing must be done with care to avoid splashing carcases or creating aerosols.

6.4 Slaughter and Dressing - Specific Procedures

6.4.1 Stunning, shackling and hoisting

- Stock should be driven into the knocking box as quietly as possible. Stock should be restrained in the knocking box one at a time.
- Stock should be stunned as quickly as possible with a captive bolt stunner using a cartridge as specified in the work instruction.
- Stock that are not fully stunned with one shot must be immediately re-stunned.
- The knocking box should be hosed out with warm water whenever it is contaminated by faecal matter.
- The stunned animal is only released from the knocking box when the previous animal is hoisted clear of the dry landing area.

- The stunned animal is shackled and the hide around the anus and tail is washed by hosing. Care must be taken to avoid splashing faecal matter to other parts of the carcase.
- A cup should be inserted into weasand through the stunned animal's mouth to push ingesta down the weasand.
- The stunned animal is hoisted and the dry landing area hosed to wash away faecal and other contamination.
- Operators must wash their hands after they become contaminated.

6.4.2 *Sticking and rodding*

- Bodies must be separated so that no exposed part of a carcase can touch another carcase after sticking and until the carcase passes final inspection.
- The hide is opened using a spear cut along the midline of the neck from the chin to the point of the brisket. The knife must be washed and sanitised after making this cut.
- The trachea and weasand are exposed with a sanitised knife. The back of the knife blade is run up the trachea until it is level with the point of the brisket. The knife is thrust forward to cut the vena cava.
- After bleeding is complete, the weasand is clipped. The weasand is rodded with a sanitised rodder and the weasand clip pushed up to the paunch. The weasand cup can be pushed into the paunch. Wash and sanitise the rodder.

6.4.3 *Hock, horn and muzzle removal*

- Hock and horn cutters must be washed and sanitised between each cut.
- The muzzle is skinned with a sanitised knife.
- Hocks, horns and muzzle pieces are put in an inedible bin.
- Hands must be washed whenever they are contaminated.

6.4.4 *Hide removal*

- The hide is first opened by cutting through the hide along the center line between the legs from the crutch area in front of the anus or vulva to the navel. A spear cut should be used except for the initial cut into the hide.
- A second sanitised knife, or the first knife after it is cleaned and washed is then used to remove testicles, pizzle or udders. Udders should be removed by separating them at the seam between the udder and abdominal wall. All the mammary glands must be removed without cutting them. If milk is spilled, the contaminated area must be trimmed immediately.
- A strip of hide is removed from the Achilles tendon to the dew claw. A spear cut with a sanitised knife is used to open the hide of the first leg from the Achilles tendon to the anus. In the same opening cut, the hide immediately around the anus is removed taking care not to cut the anal sphincter.

- With a sanitised knife, hide is flayed from the leg on both sides of the opening cut and down the flank to the navel. The hide must be laid back to avoid touching the exposed carcase.
- The hock of the free leg is cut off with a sanitised cutter.
- After the body is hung from the Achilles tendon of the first leg, the second leg is freed from the shackle and skinned in the same way as the first leg.
- The hide over the rump is flayed with a sanitised air knife. The hide is held with one hand while the air knife is held in the other hand to pocket between the rump and hide. If the knife hand is changed to flay the second side of the carcase, the hands must be washed.
- The tail switch is cut off and with a sanitised knife.
- The hide is opened along the midline from the navel to the brisket using a spear cut with a sanitised knife. A sanitised air knife is used to flay the hide from the flanks and brisket. Hands must be washed after holding the hide in this operation. Care must be taken to prevent the hide rolling in to touch the carcase.
- The hide is removed by downward hide puller using sanitised air knives to assist removal of the hide.

6.4.5 Evisceration

6.4.5.1 Bagging the bung

- After the hide is removed from around the anus the bung can be ringed and bagged.
- A bung bag is inverted over the operator's hand and arm. The bung is grasped through the bag and pulled up to create tension around the bung. The bung is ringed by cutting around it in a wide arc to avoid cutting into the rectum, bladder, urinary tract or anal sphincter.
- The bag is rolled down the arm and over the freed bung. The bag is held in place with a rubber ring applied by a ring expander or by a ziptie.
- A Safe Seal ™ 501 bung bagger should be used to bag the bung if available.
- The bagged bung should be pushed down into the anal channel.
- Knives must be washed and sanitised whenever they are contaminated and between carcases.
- Hands must be washed when they are contaminated and between every carcase.

6.4.5.2 Removing viscera

- The brisket is split with a sanitised brisket saw. The saw must not be inserted deeply to avoid cutting any viscera. If the paunch is broken during brisket splitting the carcase should be tagged to alert trimmers.
- The carcase is opened by cutting through the abdomen from the aitch bone to the brisket. This cut is made with a sanitised knife with the handle inside the abdomen and the tip of the knife pointing out to avoid cutting the viscera.

- The paunch is pulled over the brisket. The rectum is freed from the anal channel and past the kidneys. The diaphragm is broken by hand and the weasand is withdrawn and placed over the paunch. The intestines and pancreas gland are freed from the liver and the intestines, paunch and weasand are dropped into the viscera table.
- If there is any spillage from the intestines, the operator must wash his hands and apron and wash and sanitise his knife before proceeding. Carcases must be trimmed or tagged for attention by trimmers.
- The liver is removed with gall bladder attached and placed on the viscera table.
- The lungs, trachea and heart are freed by cutting downwards between the backbone and trachea and placed on the viscera table separate from the abdominal viscera.
- If a carcase is contaminated by ingesta, bile, urine or faeces, it should be tagged to alert trimmers.
- After each carcase is eviscerated, the operators must wash their hands and arms and wash and sterilise their knives. They also wash their aprons and boots by hosing with warm water and step through a sanitising boot-wash.

6.4.6 Carcase splitting

- The carcase splitting saw is sanitised between each carcase by spraying the blade with 82°C water.
- If the blade comes into contact with any contaminated material during splitting, it must be stopped and sanitised.

6.4.7 Trimming after inspection

- After splitting, carcases are subjected to final inspection.
- At inspection, carcases that are not fit for human consumption including those tagged for trimming attention are diverted to a retain rail for trimming and removal of condemned parts. When trimming retained carcases, carcases must be scanned in a systematic manner to detect contamination and pathological conditions. Contamination and pathological defects should be trimmed off with a single knife cut and knives must be sanitised between each cut. Hands must be washed after they touch contaminated material. All contaminated material trimmed off carcases must be placed in inedible bins. Retained carcases must be reinspected before they are washed and released from the slaughter floor.
- Carcases that are passed fit for human consumption are trimmed to remove remaining hygiene defects, blood clots in the stick wound, spermatic cords, spinal cord and other carcase blemishes. Carcases must be scanned in a systematic manner to locate defects.
- All trimming must be done according to paragraph 6.2.3.

6.4.8 Head removal

- The head is removed after hide pulling by cutting through the back of the neck at the base of the skull, separating the atlas and occipital bones and cutting through the remaining neck muscles with a sanitised knife.

- The head must be hung on a sanitised hook that correlates with the carcase.
- Hands are washed and knives sanitised after hanging up the head.
- The head is washed in the head wash cabinet with a clean hose nozzle by flushing the remaining oesophagus and trachea, flushing the nostrils and the oral and buccal cavity.
- The tongue is removed from the head and hung up separately from the head, and the tonsils removed and placed in a inedible product container.
- The tongue is washed and the head flushed internally and externally. Washing must be done carefully to minimise splashes and aerosols.
- The head and tongue are inspected. After inspection the tongue can be further trimmed and the cheeks and head meat removed from the head for edible use.

6.4.9 Offal handling

- After evisceration, offals are placed on a sanitised viscera table in correlation with the carcase for viscera inspection.
- Offal passed fit for human consumption can be removed from the viscera table for edible use. Edible offals must be individually washed.
- Condemned offals are discharged from the viscera table to the condemned chute.

6.4.10 Final wash

- Carcase sides receive a final wash before they leave the slaughter floor. The wash is intended to remove bone dust from the spinal column and blood from the stick wound and neck area. The wash may be directed at these areas only.

7. MONITORING

- All operators are responsible for monitoring their own work so that corrective action can be taken if accidental contamination occurs.
- Department supervisors and QA officers are responsible for monitoring all slaughter floor procedures. Each operation is monitored for at least three carcases at least once during each work period. Results of monitoring are recorded on the slaughter floor procedures monitoring form.

8. CORRECTIVE ACTION

- Corrective action is taken according to the guidelines for corrective action.
- If accidental contamination occurs, the contamination must be trimmed off immediately or the carcase tagged for later examination and trimming.
- Any breaches of procedures noted by the supervisor or QA Officer must be corrected by informing the operator of the correct procedure.
- After corrective action is taken, monitoring should be increased to ensure that the corrective action is effective.

9. VERIFICATION

- The QA Manager conducts a weekly review of the beef slaughter floor procedures monitoring form and corresponding corrective actions to ensure that breaches of procedures and corrective actions are recorded and follow up monitoring indicates that corrective action is effective.
- Carcase inspections are conducted according to meat hygiene assessment procedures to determine trends in the hygienic quality of carcase meat.
- All slaughter floor procedures and documentation are subject to internal audit.
- Chilled carcases are sampled and tested for microbiological condition according to carcase microbiological test procedures.
- Management reviews are conducted to consider results of internal audits, trends in meat hygiene assessment results, effectiveness of corrective actions and results of microbiological testing. Management review will produce action plans for continuous quality improvement, particularly in cases of repeat infringements of hygiene standards.

10. REFERENCES

Australian Standard for Consumption of Meat for Human Consumption

Procedures for Conducting Meat Hygiene Assessment

Procedures for Microbiological Sampling and Testing of Carcases

Guidelines for Corrective Action

Work Instructions

Internal Auditing Procedures

Management Review Procedures

Personal Hygiene Good Manufacturing Practices

Cleaning and Sanitation Good Manufacturing Practices.

11. DOCUMENTS

Slaughter Floor Procedures Monitoring forms

Meat Hygiene Assessment forms

Internal Audit forms

SLAUGHTER AND DRESSING OF SHEEP AND LAMBS

1. PURPOSE

This procedure establishes uniform hygienic processing methods for slaughter and dressing sheep and lambs for human consumption.

2. BACKGROUND

The muscle tissue of healthy animals is clean and generally free from microbial contamination. The operations involved in slaughtering and dressing carcases involve possible contamination of exposed meat surfaces by dust, faeces, ingesta and other contaminants from the fleece and gastro-intestinal tract.

Carcases can also be contaminated directly or indirectly by workers or by the work environment.

Some disease conditions of animals may not be apparent until after slaughter and carcases must be inspected by qualified people to detect diseases and abnormal conditions. Precautions must be taken to prevent cross-contamination between carcases until the final inspection process is complete.

Hygienic dressing can be achieved if stock are reasonably clean and dry, at the time of slaughter, and wool length is short. In addition, precautions must be taken to prevent carcases being contaminated by any material on the outside of skins during pelt removal, and precautions must be taken to prevent contamination of carcases from either end of the alimentary tract or from cuts or breakages in the alimentary tract.

3. SCOPE

This procedure applies to slaughter and dressing of sheep and lambs from preparation of stock for slaughter to dispatch from the slaughter floor to the chillers. The procedures address hygienic dressing and animal welfare issues.

4. DEFINITIONS

Hygienic dressing:	Procedures involved in removing the head, hide or skin, viscera, genital organs, feet and mammary gland to produce a carcase with no visible contamination.
Sanitise:	A treatment that reduces the number of microorganisms on a clean surface to an acceptable level. On the slaughter floor, this usually mean contact with 82°C water for 10 seconds

5. RESPONSIBILITIES

General Manager	• Ensures that equipment and facilities are available to carry out hygienic dressing

Plant Manager	• Ensures that slaughter lines are properly staffed. • Schedules and reschedules the kill according to availability of clean stock. • Maintains proper training of all staff involved in slaughter and dressing. • Ensures that resources are available to maintain slaughter floors, stockyards and equipment in a suitable condition for hygienic dressing.
Livestock Manager	• Ensures a supply of clean dry livestock. • Arranges for shearing of long wool sheep before slaughter.
Supervisors	• Monitor hygienic dressing procedures and animal welfare procedures. • Initiate corrective action when procedures are not followed. • Provide on-the-job training and co-ordinate improvements in hygienic practices suggested by operators.
QA Manager	• Reviews monitoring records and corrective action documentation. • Develops plans to prevent re-occurrence of breaches of procedures.
QA staff	• Monitor hygienic slaughtering and dressing procedures and animal welfare procedures. • Initiate corrective action in consultation with supervisors.
Slaughter floor and stockyard employees	• Perform duties according to good manufacturing procedures and work instructions. • Inform the Supervisor of suggestions for improvements in hygienic slaughter procedures.

6. PROCEDURES AND ACTIONS

6.1 Livestock Preparation

- Livestock are received according to the work instructions which include details of booking in procedures, accounting for stock and emergency telephone numbers.
- Stock are received and unloaded quietly and with care. Flappers and trained dogs may be used to assist in unloading stock. All dogs must be muzzled.
- Stock must not be lifted by the head, legs or wool during unloading.

- Diseased, crippled or moribund stock must be destroyed humanely as soon as possible, or separated from mobs for an emergency or special slaughter. Bodies of destroyed livestock or dead stock must be disposed of by rendering or burial as soon as possible.
- Stock that are excessively dirty and wet must be placed in raised, well ventilated and covered pens to rest and dry out. Wool with dags attached must be trimmed off. Sheep and lambs cannot be slaughtered if the legs, bellies and brisket are coated with mud, faecal dags, fly strike or if the fleece is grossly soiled and wet.
- Long wool sheep should be shorn before slaughter.
- Stock are held in clean, roofed and well ventilated holding pens for ante mortem inspection and prior to slaughter. Stock are provided with drinking water.
- Stock must be moved through the stockyards and lead up race as quietly as possible.
- Pens must be cleaned between mobs and repairs required to water troughs, flooring, roofing and fences reported to the livestock manager.

6.2 Slaughter and Dressing General Procedures

6.2.1 Knife and equipment sanitising

- All employees must comply with the following rules for using knives and implements.
- All pelt opening cuts (apart from sticking and small initial opening cuts) must be carried out with a spear cut, that is cutting from the inside to the outside of the skin with the blade of the knife leading the hand and being pushed through the skin..
- After cutting through the pelt with a knife or other tool, the knife or tool must be rinsed in 82°C water for at least 10 seconds. (The two knife system should be used to allow 10 second contact time in hot water). If the knife or tool blade is grossly contaminated with blood or wool it should be rinsed in warm water before it is put in 82°C water.
- If a knife or tool accidentally cuts through the pelt, or any other contaminated material such as an abscess or any part of the alimentary tract, or is contaminated by urine or milk, it must be sanitised by rinsing in 82°C for 10 seconds. If the knife or tool blade is visibly contaminated it should be rinsed in warm water before it is put into hot water.
- After any contact between a knife, tool or other implement and a carcase, before the carcase passes final inspection, the knife or implement must be rinsed in 82°C before it comes into contact with any edible part of another carcase. If knives or implements are grossly contaminated with blood they must be rinsed in warm water before being put into 82°C water.
- Knives must be sanitised by rinsing in 82°C water after steeling and after they are removed from the knife pouch.

6.2.2 Hand washing

After touching the fleece or pelt by hand, or if hands come into contact with faecal matter, ingesta, urine, abscesses or other contaminated material, hands must be washed with liquid soap and water.

6.2.3 Trimming

- If visible contaminated material such as hair, faeces, ingesta, milk, urine, gets into a carcase, the contaminated material must be trimmed off at the first available opportunity. This is usually at the work station where the contamination occurred.
- Knives and implements used to trim off contamination must be sanitised before and after each piece of contamination is trimmed off. Hands must be washed after handling any piece of contaminated tissue.
- Material trimmed from carcases must be placed in an inedible product container, chute or trough.

6.2.4 Inedible material

Any material placed in an inedible product container, trough or chute must be removed from the slaughter floor as soon as possible.

6.2.5 Slaughter floor cleaning

Cleaning is done on the slaughter floor during operations according to the cleaning and sanitation procedures. Any hosing must be done with care to avoid splashing carcases and creating aerosols.

6.3 Slaughter and Dressing - Specific Procedures

6.3.1 Restraining, Stunning, Sticking

- Animals are herded into the restraining conveyor as quietly as possible to avoid bruising and mistreatment.
- The restraining conveyor should be operated at a speed in equilibrium with the sticking rate.
- Animals are electrically stunned using the appropriate voltage for the type of stock. Voltages are prescribed in a work instruction. The stunning electrodes are placed on the base of the skull (not the neck). Care must be taken to avoid piercing the animal's eyes, cheeks, nostrils or ears with the stunning electrodes. The stunned animal must not make contact with the next animal in the restrainer during the stunning process.
- Stunned animals are discharged onto the shackling table one at a time. The right hind leg of the stunned animal is shackled and the shackle is lifted onto the bleeding rail.
- The sticking operator pulls back the stunned animal's head and cuts the neck and throat to severe the jugular veins, carotid arteries, trachea and weasand below the epiglottis.

6.3.2 Pelt Removal (Inverted Dressing)

- In all pelt removal procedures, it is necessary to grip the pelt with one hand and use a knife or air knife in the other hand. The knife hand may not be changed unless the hands are washed The hand used to grasp the pelt should not touch the carcase.
  In this procedure, the first step in pelt removal is to remove a strip of skin from the brisket while the carcase is hanging from the hind legs. The purpose of removing the

strip is to help to roll the pelt away from the carcase after the forequarter work up is complete. The disadvantage of removing the strip of skin is that the brisket is exposed to possible contamination.
The brisket can be cleared by knife in the same operation as clearing the legs without first removing a strip of pelt but the brisket must be cleared posterior to the xiphoid cartilage to prevent roll back of the fleece onto the carcase. An alternative procedure is to leave the brisket intact until after the neck and forelegs are clear and then separate the pelt from the brisket by working an air knife in between the brisket and pelt.

- A strip of pelt is removed from the brisket by making a small cut with a sanitised knife into the pelt about 10 cm posterior to the navel end of the brisket. From this initial cut, the pelt is cut with a spear cut along the right side of the brisket about 5 cm off-centre to the point of the brisket. Another spear cut is made on the left side of the brisket and the piece of pelt between the two spear cuts is pulled down to expose the brisket. The knife must be sanitised between each cut. The exposed brisket is then papered to protect it from further contamination.

- The carcase forelegs are suspended on a spreader and the pelt is opened from the brisket point to the stick wound with spear cut made with a sanitised knife. The hanging piece of pelt from the brisket is split on the centre line so that the two pieces will fall either side of the neck. The weight of the pieces of pelt will make the pelt roll away from the skinned neck.
The knife is sanitised and a spear cut is made from the point of the brisket up the front of the left leg past the knuckle. The knife is sanitised and another spear cut is made up from the brisket point past the knuckle of the right leg. This completes the Y-cut.

- A sanitised knife is used to flay the pelt from the inside of the right foreleg from the arm pit to the hock. The pelt is pulled around the inside of the leg to clear the leg and right side of the brisket.

- A sanitised air knife is used to flay the pelt from the outer side of the right leg up to the hock and down over the shoulder. The final attachment of the pelt to the hock is cut and the pelt from around the right leg and right brisket should be laid back so the wool does not roll in to touch the carcase. The brisket and outer side of leg should be papered if the wool rolls in. The piece of pelt cut from the brisket should be hanging down either side of the neck to help prevent wool roll in.

- The procedure is repeated to clear the left foreleg and brisket.

- Both sides of the neck and the back of the neck are cleared with a sanitised knife. The head is skinned over the cheeks and over the top of the muzzle. Head skinning is completed by inserting the freed skin from the muzzle into the nose roller.

- The pelt is pulled back over the shoulders.

- The skin around the anus is cut to ensure that the pelt can be freed by the pelt puller without tearing out the rectum. A cut is made with a sanitised knife between the base of the tail and the anus, the cut is continued between the anus and right leg and between the anus and left leg to make a triangular cut around the anus. The cut must go through the skin only. Muscle or the anal sphincter must not be cut.

- The forelegs are transferred to the W-hook. If this transfer is done manually, operators should wash their hands between each carcase.

- The hind hocks are cut with sanitised hock cutters and the carcase drops to an inverted position. At this stage, the fleece on the skinned pelt should be well clear of the exposed carcase surface and any paper should be removed.
- The pelt is separated from the flank by punching down the flank with the forearm. One arm is used for punching and the other hand is used for grasping the pelt at the brisket. Hands and arms must be washed between each carcase. After punching, the operator must make sure that the wool side of the pelt is rolled away from the carcase surface.
- The midline of the pelt over the belly is opened by spear cut with a sanitised knife and the pizzle removed. The pelt on the hind legs is opened by spear cut with a sanitised knife. With a sanitised knife, the skin over the testes or udder is cleared and the udders removed by separating them from the carcase at the seam between the udder and abdominal wall.
- The pelt is pulled down from the shoulders to the rump. This operation may be done with a mechanical shoulder puller.
- The hanging pelt is put into the jaws of the pelt puller and the pelt is stripped off over the hind legs.
- The carcase hind legs are lifted into a gambrel. The front hocks are cut off with sanitised cutters and the carcase is reinverted to hang from the hind legs.
- Any faecal matter expelled during pelt pulling should be trimmed off using a sanitised knife on each cut. Any skin pieces left after pelt pulling are trimmed off.

6.3.3 Evisceration

6.3.3.1 Weasand sealing and rodding

- The weasand is sealed as soon as possible after bleeding is complete.
- The skin around the neck is opened with a spear cut. The skin is flayed back from the anterior end of the neck and the neck cut opened sufficiently to expose the end of the weasand. The weasand is separated from the trachea and clipped with a weasand clip. Hands must be washed and equipment sanitised between each carcase.
- After the pelt is removed from the forequarter and before the carcase is dropped to the inverted position, the neck is trimmed of any ingesta using a sanitised knife between each cut and the weasand is rodded with a sanitised rodder to separate it from the trachea and to push the clip up to the paunch.

6.3.3.2 Freeing the bung

- After the pelt is removed, the tail tip is cut off and put in an inedible bin.
- The bung is pulled up slightly with a sanitised hook to put tension on the tissues around the rectum.
- The bung is freed from the pelvic attachment with a circular cut around the bung. The cut must free the anus and rectum of male sheep and the anus, rectum, vulva, urethra and uterus in females. Care must be taken not to cut through the rectum, urethra, bladder or sphincter.

- Once free, the rectum should not be lifted out of the anal cavity as faecal pellets could be deposited on the carcase. The freed bung should be pushed down into the anal cavity.
- The hook and knife must be sanitised between each carcase and hands washed.

6.3.3.3 Stripping the rectum

- An incision is made in the abdominal cavity immediately forward of the pubic symphysis.
- The handle of the knife is inserted into the abdominal cavity and with the tip of the knife outside the cavity, the heel of the knife blade is used to split open the abdomen down to the navel end of the brisket.
- The freed rectum, bladder and other attachments are pulled down through the anal cavity. The rectum end of the intestine is stripped of faecal matter by squeezing the intestine between the operator's fingers and running the fingers towards the end of the rectum. A knot is tied in the intestine at the start end of the strip and the rectum is cut off close to the knot. The rectum and bladder are put in the inedible bin.
  After stripping the rectum, hands must be washed and the knife sanitised or a second sanitised knife used for the next carcase.
- If hands are contaminated during stripping, they must be washed immediately. If there is spillage from the rectum or bladder onto the carcase, the carcase must be trimmed immediately or tagged for attention by trimmers.

6.3.3.4 Removal of viscera

- The surface of the viscera table is sanitised with 82°C water on every revolution.
- The attachments of the stomach and intestines to the carcase are broken by hand and the stomach, intestines and rodded oesophagus are lifted out of the carcase and placed on the large pan of the sanitised viscera table.
- If there is any spillage of intestinal contents onto the operator's hands or the carcase, hands must be washed immediately and the carcase trimmed or tagged for attention by trimmers.
- The brisket is cut with sanitised brisket scissors along midline of the brisket.
- The diaphragm is cut and the lungs, heart, liver and trachea are removed from the thoracic cavity by pulling them down through the brisket. The thoracic viscera are placed in the small viscera pan of the sanitised viscera table.
- Operators must wash their hands and sanitise knives between eviscerating each carcase.

6.3.4 Trimming After inspection

- After evisceration, carcases are subject to final inspection.
- At inspection, carcases that are not fit for human consumption including those tagged for trimming attention, are diverted to a retain rail for trimming and removal of condemned parts. When trimming retained carcases, carcases must be scanned in a systematic manner to detect contamination and pathological conditions. Contamination and pathological defects should be trimmed off with a single knife cut and knives must be sanitised between each cut. Hands must be washed after they touch contaminated

material. All contaminated material trimmed off carcases must be placed in an inedible product container.
Retained carcases must be reinspected before they are washed and released from the slaughter floor.

- Carcases that are passed fit for human consumption are trimmed to remove remaining hygiene defects and other carcase blemishes. Carcases must be scanned in a systematic manner to locate defects.
  For forequarter trimming the carcase forequarter can be lifted onto a bar to expose the neck, throat and forelegs for trimming.
- All trimming must be done according to paragraph 6.2.3.

6.3.5 Head and tongue removal

- The head is removed after carcase inspection.
- The neck is broken at the occipital/atlantal joint with a hock cutter.
- The tongue is excised and placed in chute for transfer to the offal room for further processing.
- The head is severed from the carcase and transferred to the head room by chute.

6.3.6 Offal Handling

- After evisceration, offals are placed on the sanitised viscera table in correlation with the carcase for viscera inspection.
- Offal passed fit for human consumption can be removed from the viscera table for edible use. Edible offals must be individually washed.
- Condemned offals are discharged from the viscera table to the condemned chute.

6.3.7 Final Wash

- After trimming, carcases are washed through an automatic wash cabinet.

7. MONITORING

- All operators are responsible for monitoring their own work so that corrective action can be taken if accidental contamination occurs.
- Department Supervisors and QA Officers are responsible for monitoring all slaughter floor procedures. Each operation is monitored for at least 10 carcases at least once during each work period. Results of monitoring are recorded on the slaughter floor procedures monitoring form.

8. CORRECTIVE ACTION

- Corrective action is taken according to the guidelines for corrective action.
- If accidental contamination occurs, the contamination must be trimmed off immediately or the carcase tagged for later examination and trimming.

- Any breaches of procedures noted by the supervisor or QA Officer must be corrected by informing the operator of the correct procedure.
- After corrective action is taken, monitoring should be increased to ensure that the corrective action is effective.

9. VERIFICATION

- The QA Manager conducts a weekly review of mutton slaughter floor procedures monitoring form and corresponding corrective actions to ensure that breaches of procedures and corrective actions are recorded and follow up monitoring indicates that corrective action is effective.
- Carcase inspections are conducted according to meat hygiene assessments procedures to determine trends in the hygienic quality of carcase meat.
- Chilled carcases are sampled and tested for microbiological condition according to carcase microbiological test procedures.
- All slaughter floor procedures and documentation are subject to internal audit.
- Management reviews are conducted to consider results of internal audits, trends in meat hygiene assessment results, effectiveness of corrective actions and microbiological testing. Management reviews will produce action plans for continuous quality improvement, particularly in cases of repeat infringements of hygiene standards.

10. REFERENCES

Australian Standard for Consumption of Meat for Human Consumption

Procedures for Conducting Meat Hygiene Assessment

Procedures for Microbiological Sampling and Testing of Carcases

Guidelines for Corrective Action

Work Instructions

Internal Auditing Procedures

Management Review Procedures

Personal Hygiene Good Manufacturing Practices

Cleaning and Sanitation Good Manufacturing Practices.

11. DOCUMENTS

Mutton Slaughter Floor Procedures Monitoring forms

Meat Hygiene Assessment forms

Internal Audit forms

SLAUGHTER AND DRESSING OF PIGS

1. PURPOSE

This procedure establishes uniform hygienic processing methods for slaughter and dressing of pigs for human consumption.

2. BACKGROUND

The muscle tissue of healthy animals is clean and generally free from microbial contamination. The operations involved in slaughtering and dressing carcases involve possible contamination of exposed meat surfaces by dust, faeces, ingesta and other contaminants from the hide and gastro-intestinal tract.

Carcases can also be contaminated directly or indirectly by workers or by the work environment.

Some parasitic infestations and disease conditions of pigs may not be apparent until after slaughter, and carcases and viscera must be inspected by qualified people to detect diseases and abnormal conditions. Precautions must be taken to prevent cross-contamination between carcases until the final inspection process is complete.

Hygienic dressing can be achieved if stock are reasonably clean at the time of slaughter, and hygienic procedures followed. Precautions must be taken to prevent contamination of carcases by the contents of the alimentary tract, particularly during the excision of the rectum and associated organs.

3. SCOPE

This procedure applies to slaughter and dressing of all pigs (except that large sow or chopper pigs may be processed by skinning in accordance with beef slaughter and dressing procedures) from preparation of stock for slaughter to dispatch from the slaughter floor to the chillers. The procedures address hygienic dressing and animal welfare issues.

4. DEFINITIONS

Hygienic dressing:	Procedures involved in removing the viscera, genital organs, mammary gland, bristles, toe nails (and/or, if specified, head and trotters) to produce a carcase with no visible contamination.
Sanitise:	A treatment that reduces the number of micro-organisms on a clean surface to an acceptable level. On the slaughter floor, this usually means contact with 82°C water for 10 seconds.

5. RESPONSIBILITIES

General Manager	• Ensures that equipment and facilities are available to carry out hygienic dressing

Plant Manager	• Ensures that slaughter lines are properly staffed.
	• Schedules and reschedules the kill according to availabil clean stock.
	• Ensures adequate training of all staff involved in slaught and dressing.
	• Ensures that resources are available to maintain slaughte floor, stockyards and equipment in a suitable condition f hygienic dressing.
Livestock Manager	• Ensures compliance with humane livestock handling procedures.
Supervisors	• Monitor hygienic dressing procedures and animal welfar procedures.
	• Initiate corrective action when procedures are not follov
	• Provide on-the-job training and co-ordinate improvemen hygienic practices suggested by operators.
QA Manager	• Reviews monitoring records and corrective action documentation.
	• Develops plans to prevent re-occurrence of breaches of procedures.
Slaughter floor and stockyard employees	• Perform duties according to good manufacturing proced and work instructions.
	• Inform the Supervisor of suggestions for improvements i hygienic slaughter procedures.

6. PROCEDURES AND ACTIONS

6.1 Livestock Preparation

- Livestock are received according to the work instructions which include details of booking in procedures, tattoo identification of lots, accounting for stock and emergency telephone numbers.
- Stock are received and unloaded quietly and with care.
- Diseased or moribund pigs must be destroyed humanely as soon as possible. Carcases of destroyed stock or stock found to be dead on arrival must be disposed of by rendering or burial as soon as possible.
- Crippled or injured pigs should be presented for humane emergency slaughter immediately.
- Any pig displaying symptoms of an exotic or notifiable disease should be immediately isolated in an approved Suspect Pen and relevant veterinary authorities notified.

- Pigs are held in clean, roofed and well ventilated holding pens prior to slaughter. All pens are supplied with drinking water.
- Pigs must be moved through the yards and lead up race as quietly as possible.
- Pigs should be washed prior to slaughter to remove faeces and dirt from the skin. Washing should be undertaken with care, so as to not stress the animals.
- Pens must be cleaned between drafts and repairs required to water troughs, flooring, roofing and fences reported to the Livestock Manager.

6.2 Slaughter and Dressing - General Procedures

6.2.1 Knife and equipment sanitising

- All employees must comply with the following rules for using knives and implements.
- After making cuts through the skin (sticking, bung dropping, belly/brisket opening) with a knife or other tool, the knife or tool must be rinsed in 82°C water for at least 10 seconds. The two knife system is the most practical way of ensuring 10 second contact time. If the knife or tool blade is grossly contaminated, it should be rinsed in warm water before it is put in 82°C water.
- If a knife or tool accidentally cuts any contaminated material such as an abscess or any part of the alimentary tract, or is contaminated by urine or milk, it must be sanitised by rinsing in 82°C for 10 seconds.
- After any contact between a knife, tool or other implement and a carcase, before the carcase passes final inspection, the knife or implement must be rinsed in 82°C water before it comes into contact with any edible part of another carcase.

6.2.2 Hand washing

- If hands come into contact with faecal matter, ingesta, urine, abscesses or other contaminated material, hands must be washed with liquid soap and water. In all cases where the hand comes into contact with the lower intestinal tract (bung dropping, evisceration), the hand must be washed prior to handling any other part of that carcase or the next carcase.

6.2.3 Trimming

- If visible contaminants such as faeces, ingesta, milk and urine are noticed on a carcase, the contaminated material must be trimmed off at the first available opportunity. This is usually at the work station where the contamination occurred.
- Contaminants such as singed bristle and scurf may be scraped from a surface of unbroken skin, but must be trimmed from exposed tissue.
- Knives and implements used to trim contamination must be sanitised before and after each piece of contamination is trimmed off. Hands must be washed after handling any piece of contaminated tissue.

- Material trimmed from carcases must be placed in an inedible product container, chute or trough.

6.2.4 Inedible material

Any material placed in an inedible product container, trough or chute must be removed from the slaughter floor as soon as possible. Care must be exercised not to contaminate edible product or product contact surfaces during removal.

6.2.5 Slaughter floor cleaning

Cleaning is done on the slaughter floor during operations according to the cleaning and sanitation procedures. Any hosing must be done with care to avoid splashing carcases or creating aerosols.

6.3 Slaughter and Dressing - Specific Procedures

6.3.1 Restraining, stunning, sticking

- Pigs are herded into the restraining conveyor as quietly as possible to avoid bruising and mistreatment.
- The restraining conveyor should be operated at a speed in equilibrium with the sticking rate.
- Animals are electrically stunned using the appropriate voltage for the type of stock. Voltages are prescribed in a work instruction. The stunning electrodes are placed on the base of the skull. Care must be taken to avoid damaging the tissue of the neck.
- Stunned animals are discharged onto the shackling table one at a time. The right hind leg of the stunned animal is shackled, the shackle is attached to the bleeding rail and the pig suspended ready for sticking.
- A small incision (not more than 5 cm long) is made in the throat area immediately anterior to the brisket. Using a stabbing rather than a cutting motion, the aorta is severed at its junction. Blood drains to an outside blood tank for further processing or disposal. The sticking knife must be rinsed with warm water and sanitised by immersion in 82°C water between every carcase
- Carcases move along the bleeding rail to the scald tank, maintaining a minimum separation between carcases of 900 mm.

6.3.2 Scald tank procedures

- Carcases are lowered into the scald tank and allowed to soak until the bristle becomes soft and easily removable.
- The temperature of water in scald tub must be maintained at 60-63°C to facilitate ease of de-hairing. Water temperature must be checked at least every 15 minutes. A thermometer is suspended in scald tank. If water is too cold de-hairing will be difficult and results poor, if water is too hot the carcase skin will become "soapy" and in extreme cases the carcase may be par-boiled.

- When the bristle has softened sufficiently, the carcase is mechanically lifted into the beaters which remove most of the bristle. The carcase is then mechanically lifted onto the shave table.
- Using a knife, manually shave remaining bristle and scurf from the carcase. Toe nails are removed using an appropriate hook. Nails are discarded to inedible materials bin.
- On each hind leg, make two vertical incisions through the skin on either side of the tendon running down the rear of the metatarsal bone. A gambrel is inserted between the tendon and the metatarsal bone.
- Attach a slide to the gambrel and hoist the carcase to the dressing rail using an electric winch.

6.3.3 Singeing and pre-evisceration wash

- Use a gas powered blow torch to singe remaining stubble and scurf from the carcase. Use a knife to scrape any remaining extraneous material from the carcase, taking care not to contaminate exposed tissue.
- Push the carcase to the wash station and shower with cold water to remove loose and burned hair from the carcase prior to evisceration.
- The inner ears and surrounding tissue are excised and discarded.

6.3.4 Evisceration

6.3.4.1 Freeing the bung

- In males, the testicles are excised from the scrotum and discarded. The scrotum may be left *in situ*, if specified.
- In males the anus and rectum, and in females the anus, rectum, vulva, urethra and uterus are freed from pelvic attachments by a circular incision, the operator hooking the anal sphincter. This incision is critical because no incision must be made into or through any organ. Incision into the rectum or urethra will cause contamination of the rectal channel with faeces and urine, respectively. When freed, the organs are allowed to fall into the pelvic channel, not excised. It is critical that the sphincter is not incised or damaged, causing faecal contamination to the pelvic cavity. It is also important to avoid damaging primal meat cuts with knife scores.
- Knife MUST be sterilised and hands washed BEFORE next operation.

6.3.4.2 Opening of the abdominal and thoracic cavities

- In males the pizzle is removed, ensuring that the prepuce is completely excised, and discarded to an inedible chute.
- A knife is inserted in the sticking wound and forced upward, splitting the brisket. Care must be taken not to damage viscera or cause spillage.
- An incision is made in the abdominal cavity immediately forward of the pubic symphysis.

- The handle of the knife is inserted into the abdominal cavity and with the tip of the knife outside the cavity, the heel of the knife blade is used to split open the abdomen down to the open brisket.

6.3.4.3 Removal of viscera

- The surface of the viscera table is sanitised with 82°C water on every revolution.
- The anus, rectum, colon, bladder and other attachments are pulled down and clear of the carcase. The intestines and stomachs are freed from their attachments, exposing the diaphragm. The diaphragm is incised on either side, allowing the abdominal and thoracic viscera to be removed in one operation. The weight of the combined viscera is used to free the trachea and oesophagus from their attachments and the epiglottis and tongue are excised. The entire alimentary tract and the attached thoracic organs are placed in the viscera table.
- Kidneys are enucleated and life *in situ*.
- Operators must wash their hands and sanitise knives between each carcase, and wash aprons as necessary.

6.3.5 Trimming after inspection

- After evisceration, carcases are subject to final inspection by a suitably qualified and accredited person.
- At inspection, carcases that are not fit for human consumption including those tagged for trimming attention, are diverted to a retain rail for trimming and removal of condemned parts. Contamination and pathological defects should be trimmed off with a single knife cut and knives must be sanitised between each cut. Hands must be washed after they touch contaminated material. All contaminated material trimmed off carcases must be placed in an inedible product container. Retained carcases must be reinspected before they are washed and released from the slaughter floor.
- Carcases that are passed fit for human consumption are trimmed to remove remaining hygiene defects and other carcase blemishes. Carcases must be scanned in a systematic manner to locate defects.

6.3.6 Offal handling

- After evisceration, offals are placed on the sanitised viscera table in correlation with the carcase for viscera inspection.
- Offal passed fit for human consumption can be removed from the viscera table for edible use. Edible offals must be individually washed.
- Condemned offals are discharged from the viscera table to the condemned chute.

6.3.7 Splitting and final wash

- In the case of baconers and larger pigs or to customer specification, carcases may be split into sides. Using a long-bladed knife, mark down both sides of the lateral processes of the spinal vertebrae. Split into sides using an appropriate band/circular saw.

- After trimming, carcases are washed through an automatic wash cabinet and transferred to active chilling without delay.

7. MONITORING

- All operators are responsible for monitoring their own work so that corrective action can be taken if accidental contamination occurs.
- Department Supervisors and QA officers are responsible for monitoring all slaughter floor procedures. Each operation is monitored for at least 10 carcases at least once during each work period. Results of monitoring are recorded on the slaughter floor procedures monitoring form.

8. CORRECTIVE ACTION

- Corrective action is taken according to the guidelines for corrective action.
- If accidental contamination occurs, the contamination must be trimmed off immediately or the carcase tagged for later examination and trimming.
- Any breaches of procedures noted by the supervisor or QA Officer must be corrected by informing the operator of the correct procedure.
- After corrective action is taken, monitoring should be increased to ensure that the corrective action is effective.

9. VERIFICATION

- The QA Manager conducts a weekly review of documented slaughter floor monitoring results to ensure that breaches of procedures and corrective actions are recorded and follow up monitoring indicates that corrective action is effective.
- Carcase inspections are conducted according to meat hygiene assessment procedures to determine trends in the hygienic quality of carcase meat.
- Chilled carcases are sampled and tested for microbiological condition according to carcase microbiological test procedures.
- All slaughter floor procedures and documentation are subject to internal audit.
- Management reviews are conducted to consider results of internal audits, trends in meat hygiene assessment results, effectiveness of corrective actions and microbiological testing. Management reviews will produce action plans for continuous quality improvement, particularly in cases of repeat infringements of hygiene standards.

10. REFERENCES

Australian Standard for Consumption of Meat for Human Consumption

Procedures for Conducting Meat Hygiene Assessment

Procedures for Microbiological Sampling and Testing of Carcases

Guidelines for Corrective Action

Work Instructions

Internal Auditing Procedures

Management Review Procedures

Personal Hygiene Good Manufacturing Practices

Cleaning and Sanitation Good Manufacturing Practices.

11. DOCUMENTS

Slaughter Floor Procedures Monitoring forms

Meat Hygiene Assessment forms

Internal Audit forms.

PEST AND VERMIN CONTROL PROGRAM

1. PURPOSE

The purpose of this procedure is to establish a uniform method for pest and vermin control.

2. BACKGROUND

The presence of vermin or insect pests in or around a food preparation factory is a hazard to human as well as animal health, and therefore must be controlled.

The main methods employed for the control of vermin and pests are physical barriers, destruction and/or trapping(for larger vertebrates) and chemical treatments. A vigorous cleaning and sanitation program is imperative for the removal of harbourages /breeding sites and alternative food sources. The most effective programs usually employ a combination of control methods.

All chemicals used in the execution of this program must be approved in accordance with Part 23 Prescribed Goods (General) Orders for use in export meat processing plants. Safeguards must be in place to prevent accidental contamination of food, food preparation areas, equipment and operatives with poisonous chemicals.

Records must be kept on checks made on vermin and pest activity and of the action taken.

3. SCOPE

This procedure is applicable to all activities for pest and vermin control (both company and contractor), and all activities involved in use and storage of chemicals used for pest and vermin control.

4. DEFINITIONS

Vermin:	• All rodents. • Larger vertebrates. • Species for which slaughter establishments are not registered to slaughter.
Pests:	Insects, both flying and crawling.
Physical barrier:	Insect screening, self closing doors, air curtains, etc.
Harbourages:	Anything used as temporary shelter by vermin or pests.
Breeding sites:	Any environment that provides specific requirements of pests and vermin for breeding such as food supply, proximity to water, temperature, etc.
Chemical treatments:	Application of poisons, or insecticides by misting, fogging, perimeter baiting, etc.

Pesticide Type A:	Insecticide approved for use in food production areas and amenities un specific conditions.
Pesticide Type B:	Insecticide approved for external use only.
Pesticide Type C:	A rodenticide for use strictly in accordance with labelled directions.
Pesticide Type D:	A miscellaneous pesticide for use strictly in accordance with labelled directions.

5. RESPONSIBILITIES

Works Manager

- Ensures that resources are available to carry out the scope this procedure and participates in reviews of the procedur
- Takes part in management reviews.
- Makes entries on Map of Sightings (Form VC01) as requi by all personnel.

Quality Assurance Manager

- Ensures the Pest Control Contractor is fully conversant wi legislative requirements, current industry best practices an company requirements.
- Reviews pest and vermin reports and corrective actions.
- Takes part in management reviews.
- Arranges for repairs, maintenance and installations relevan to pest and vermin control.
- Ensures effective integration of other on-plant programs e sanitation and hygiene, disposal of waste material, etc, witl pest and vermin control.
- Reviews and updates pest and vermin control procedures.
- Makes available to the pest control contractor the Map of Sightings as recorded for each calendar month.
- Make entries on Map of Sightings (Form VC01) as require by all personnel.

Pest Control Contractor:

- Provides regular monthly services and responds promptly t requests for extra servicing, made by management in the event of increased activity between services, or ineffective treatments.
- Any pesticides may be used only in accordance with the requirements of Part 23 of the PGGOs and as required by t chemical manufacturer.
- Completes all report forms (VC01, VC06) in full, specifyin
  - Species targeted.
  - Location of each treatment.
  - Type of treatment ie. chemical, physical, placement of

traps and bait stations, etc.

- Specifies the name of the chemicals used and the concentration at which the chemicals were active.
- Records the level of activity.
- Replaces all bait blocks showing signs of gnawing.
- Replaces bait and cleans fly bait stations.

The most important aspect of the Pest Control Contractor's responsibilities is providing recommendations on ways to improve the pest and vermin control program. These recommendations can be based on the Contractor's knowledge of the target species, the Map of Sightings (Form VC 01) and the Contractor's observations on the day of servicing.

Quality Assurance Officer

- Conducts weekly monitoring of all aspects of the pest and vermin control program.
- Records results on Weekly Vermin Report (VC02) and the Weekly Insect Report (VC04).
- Dispenses pesticide type B to exterior surfaces of buildings and other equipment when seasonal increases in numbers of flying insect warrants increased frequency of treatment.
- Distributes monthly the Map of Sighting (VC01) to the predetermined locations for use by all plant operatives.
- Implements the internal pest and vermin elimination program, as required by the presence of pests and vermin in an edible production area,

All Plant Personnel

- Record all pest and vermin sightings and activities encountered on Map of Sightings (Form VC01).

6. PROCEDURES AND ACTIONS

6.1 Vermin control

Effective vermin control relies on the combination of:

- Physical barriers to deny access by vermin to edible production and storage areas, dry goods storage areas and operatives' amenities.
- A broad scope cleaning and sanitation program to include external areas of the plant, and vigorous housekeeping.
- Chemical treatments by way of perimeter baiting and, when necessary, an interior baiting regime.

6.1.1 Physical barriers

All entrances to edible production and storage areas, dry goods storage areas and operatives' amenities must be fitted with self-closing doors mounted in such a way that light cannot be seen between the rubber door seal and the floor and door jam.

A correctly fitted panel shall be installed in the livestock race. This is put in place after daily production and is designed to deny vermin access to the slaughter floor through the knocking box.

All drain ports shall be covered with a fitted steel plate. These plates are fitted after night cleaning is completed and can remain in place in all but the wettest processing areas.

Chutes from edible production areas to inedible/condemned material areas shall be fitted with a correctly fitting flap at the discharge end.

6.1.2 Cleaning and sanitation, housekeeping

A broad scope cleaning and sanitation program is necessary to remove food sources which attract vermin.

Sanitation of edible production and storage areas, dry goods storage areas and operatives' amenities must be of the highest standards so as not to attract vermin and to deny vermin an alternative food source when internal baiting is used.

All pooling of water shall be removed from the floor of production areas and amenities after the cleaning operation. This is imperative when using internal baiting to ensure that vermin leave the building after taking bait.

The byproducts plant shall be swept daily and all spills cleaned up immediately. As far as possible, all food sources are to be eliminated.

The livestock yards and pens shall be kept as clean as possible by regular high pressure hosing. Particular attention is needed when cleaning yards that have held grain-fed animals to ensure all grain is removed.

High-traffic personnel thoroughfares shall be cleaned regularly throughout the day and at the end of the production shift.

The operatives' lunch room shall be cleaned after each main work break and again at the end of the production shift. A foaming detergent shall be applied when required to achieve a thorough clean, and at weekly intervals.

Lockers shall be emptied of their contents the first and third Friday of each month to allow for hot water cleaning.

All carton pallets are removed from the bulk carton store weekly to allow for sweeping and hosing.

Vigorous housekeeping removes likely harbourages from around buildings in particular, but also from the establishment grounds in general.

Initiatives of vigorous housekeeping include:

- clearing grass from edges of concrete aprons by establishing 2 metres of bare earth;
- ensuring that vegetation is kept under control across the premises particularly around the effluent ponds;
- storage of equipment and materials used for plant maintenance and construction in designated storage facilities in such a way so as not to create harbourages ie. on racks off the floor.

Management should approach neighbouring properties if harbourages exist that could impact on the operation of this program.

6.1.3 Chemical treatments

Rodents are controlled with rodenticidal baits used in a perimeter baiting regime. Rodent bait stations are individually numbered and their location recorded on a site map.

The perimeter baiting regime is established with advice from the Pest Control Contactor and takes into account prevailing conditions at the establishment eg. proximity of the byproducts plant to edible production buildings, location of effluent ponds, and other features of topography.

Baits are to be placed in a bait station which is designed to allow access to rodents but not livestock and birds, in accordance with the manufacturer's instruction. Bait stations must be positioned so that the contents cannot be washed into any water course.

Plant operatives, other than the QA Officer responsible, should be denied access to bait stations by using simple locking devices.

The rodenticidal baits are the All Weather Wax-Block type. The baits shall be wired into the bait station to prevent removal.

6.1.4 Interior vermin baiting regime

During the cooler months, there may be some vermin sightings inside edible production and storage areas, dry goods storage areas and operatives amenities.

These are very serious incidences and require urgent management review of the vermin control program. If sightings continue, an interior baiting regime can be instigated.

The chemical manufacturer's instructions for use of the bait in food preparation areas must be strictly adhered to. These instructions may include, no more than 2 bait blocks in each station, stations to be positioned not more than 2.5 metres apart, removal of bait stations from the food preparation area within 2 weeks of the last recorded vermin sighting.

All pesticide type C must be removed from edible production areas before the commencement of a production shift.

The QA Officer responsible for the operation of this program shall number each bait station and position 10 bait stations into each production area in which vermin activity has been recorded.

The officer shall distribute the bait stations after completion of the night cleaning, and collect the bait stations before pre-operational hygiene assessment the next morning.

The officer must unlock the bait stations and check that no bait blocks are missing before taking the bait stations to the poison store.

6.2 Control of larger vertebrate

- A non-injury causing trap is kept on plant for the capture of feral or native animals that may be a hygiene threat.
- Should animals or signs of animals be reported, the trap will be baited accordingly and set in an appropriate position.
- Feral animals will be humanely destroyed while native animals will be handed over to wildlife authorities for re-location.
- Nesting sites for birds shall be eliminated, as far as possible by screening. All nests shall be removed in a timely fashion to prevent egg laying.
- Details of trap setting and animal capture is documented on the Weekly Vermin Report, (VC02).

6.3 Insect control

Flying insects can be excluded from edible production and storage areas, dry goods storage areas and operatives amenities by effective external barriers.

Crawling insects are more difficult to exclude from these critical areas by using physical barriers. Management must implement an effective program to reduce the biomass of insects (flying and crawling) at the plant and to prevent insect being attracted to the plant during seasonal fluctuations.

6.3.1 Physical barriers

All entrances to edible production and storage areas, dry goods storage areas and operatives' amenities shall be fitted with self-closing doors, mounted in such a way that light cannot be seen between the door-mounted rubber seal and the floor and door jam.

A corridor at least 2 metres long extending outwards from the entrance is constructed to shade the self-closing door. Shaded or dark areas act as a natural deterrent to flying insects.

Black plastic strips are fitted to the end of the corridor. These strips must be subject to pre-operational assessment and cleaned at regular interval throughout the day to avoid contamination of operatives outer clothing and work equipment.

An air curtain is installed at the external doorways. The air curtain is mounted vertically the full height of the doorway. Air curtains are wired to run continuously and to move air across the doorway at 6 m/sec.

If insecticuters are installed in these darkened corridors, they must be shrouded to the outside so as not to attract flying insects into the corridor.

Positive pressure ventilation provides an outward moving barrier to flying insects (and dust) when doors are opened. Ventilated input air must be filtered.

All entrances to inedible/condemned material processing areas shall be insect screened. If these areas have large chutes or slides entering directly from edible product areas, the type of personnel entrances used for edible areas should be installed.

6.3.2 Insect biomass reduction

This initiative is achieved by integration of physical barriers to food supplies, chemical treatments, and vigorous housekeeping.

Insect screens shall be erected around the contra-shear and save-all pits, external blow-pots and paunch material shaker screens. Hide receival and trim areas should be insect proofed and all sumps and spoon drains should be covered with chequer plate.

Pesticide type B is sprayed onto the external wall surfaces and the insect screened areas twice daily during the warmer months. The first application is done before sunrise and is directed to areas of high insect density, usually in protected areas around the rendering plant and hide handling area, etc. The second application is done around the middle of the day and is directed toward the most sunlit areas of the plant's exterior walls and insect screened areas.

Extreme care is required to ensure that no spray enters edible production and storage areas, dry goods storage areas and operatives' amenities and that spray is not directed towards thoroughfares used by edible production operatives or entrances to edible production areas.

On a weekly basis, the roofed area of the livestock yards/pens are sprayed with pesticide type B. This operation requires livestock to be removed from the lairage and water to be dropped from the troughs before dispensing the insecticide and is best conducted over weekends.

On a weekly basis, Pesticide type B is sprayed on the walls and floors of the rendering plant and inedible/condemned material areas. Extreme care is taken to ensure that no spray enters edible production areas, or is included in product to be rendered or finished rendered product in storage.

On a monthly basis, insecticide type B is used to spray the wall and floors, and lockers in the operatives amenities. This is to be done by the Pest Control Contractor during the monthly service.

Management shall arrange for all items to be removed from the lockers as part of the monthly housekeeping regime. The amenities and lockers shall be thoroughly rinsed with potable water before operatives re-enter the amenities.

A perimeter fly baiting regime can be established using fly-bait stations and granular fly bait type B. The location of the fly-bait stations are recorded on a site map.

These bait stations are used to intercept flies moving to the plant from other areas. This is best achieved by positioning the bait stations at least fifty metres from the plant, 2 to 3 metres from the ground and on the side of the plant facing the direction of the prevailing summer winds.

Fly bait stations must be constructed to prevent ingress of water and to prevent access by birds.

Issues of housekeeping include:

- maintaining effective bunding around concrete aprons to ensure spills are contained and cleaned up without delay,
- ensuring vegetation is kept under control in all parts of the premises and particularly around the effluent ponds.

6.3.3 Internal flying insect elimination regime

All ante-rooms to edible production areas should have an insecticuter installed.

These devices should also be installed in dry goods storage areas, and carton make-up rooms, etc. that have entrances to the building exterior.

Each insecticuter is numbered and its location is recorded on a site map.

The insect attracting globes are to be replaced at the intervals specified by the manufacturer as the effectiveness of the globe dissipates over time. The date a new globe is installed, and its effective life expectancy is recorded. This information is attached to the relevant insecticuter.

All insecticuters are cleaned out weekly.

If flying insects penetrate the external barriers and gain access to edible production and storage areas, dry goods storage areas and operatives amenities, the type of intervention will depend on the extent of the infestation and the structural features of the room.

Flying insects present a large risk to product safety, all actions to eliminate flying insects must be both rapid and affective.

If the infestation is limited to a few individual insects that can be kept under constant surveillance, the insects can be destroyed by swatting them in such a way that product, contact surfaces or packaging materials are not contaminated.

A few individual flies can be removed from rooms by switching off the lights so that the exit doorway provides the only light source. This may not be an effective means of removal for other types of flying insects.

If the infestation is extensive, then the insects must be sprayed with an insecticide type A.

Insecticide type A may only be dispensed after all product and packaging material is removed from the room or covered. The AQIS PMT shall be informed.

Insecticide type A must be sprayed in the direction of individual insects and not at any particular surface.

After spraying, contact time is allowed for the insects to be destroyed and the insecticide to settle or be exhausted from the room. This contact time is specified in writing by the chemical manufacturer. When the contact time has lapsed, the room shall be rinsed with potable water and product contact surfaces shall be hand scoured with detergent until clean and rinsed with hot water before product or packaging material may be reintroduced.

7. MONITORING

All employees are responsible for reporting sightings and activity throughout the plant and its surrounds on the Map of Sightings (Form VC01).

The QA Officer with specific responsibility for the monitoring of the Pest and Vermin Control Program shall monitor and make records at weekly intervals of the following elements of the program:

Vermin Control (Form VC02)

- Consult pre-operational hygiene forms for reports of vermin activity.
- Check condition of rubber door seals.
- Check rodent bait stations and record activity.
- Check the number and location of the bait stations against the most current site map.
- Clean bait station of any droppings and replace any gnawed bait blocks. Slightly eaten blocks may be trimmed. Secure an adhesive label to the station specifying the date of servicing.

Interior Rodent Control (Form VC03)

- Record the position of each bait station on a site map of the production area.
- Record the date, the bait station number and the level of activity for each bait station.

Insect Control Form VC04)

- Consult pre-operational hygiene forms for reports of insect activity and air curtain operation.
- Check condition of insect screens.
- Record date and location of pesticide type B spraying.
- Record date of amenities treatment and comment on extent of the rinse.
- Check condition of the fly bait stations.
- Check condition of housekeeping around inedible/condemned areas and the rendering plant.
- Record date, location and chemical used for all interior flying insect treatments.
- Record date, unit number and how many insects found in each insecticuter.

8. CORRECTIVE ACTION

The QA Officer shall complete a Maintenance Notice for any items requiring repair.

The External Area Supervisor shall be notified of any items relating to poor housekeeping and an estimated time required to rectify the situation will be negotiated.

Corrective actions arising from incidences of pests and vermin in edible production and storage areas, dry goods storage areas and operatives' amenities, or particularly high populations of pest and vermin activity at the plant during seasonal increases, will require

urgent management review of all aspects of the program. Management reviews and actions taken must be recorded.

9. VERIFICATION

Analysis of activity at each rodent bait station is conducted to determine the zones of the perimeter showing high activity. These zones will be treated with more bait stations taken from zones with no activity.

If activity is occurring in all zones of the perimeter, then extra bait stations will be positioned in the high activity zones.

Analysis of the number of insects destroyed by the insecticuter units in the ante-rooms, amenities and dry goods storage is conducted. These insects have got through the external barriers and their numbers must be monitored carefully for adverse trends which could indicate some breakdown in the external barriers.

A numerical summary of the Forms VC01, VC02 and VC04 is produced to detect trends in species activity at various locations around the plant. This summary is made available to the Pest Control Contactor to maximise the effect of the monthly professional service.

Traps are rotated through the edible production and storage areas, dry goods storage areas and operatives amenities on a monthly regime to verify activity reports.

Vermin and pest control procedures and documentation are subject to internal audit.

Management reviews are conducted to consider results of internal audits, trends identified from analysis of activity reports and effectiveness of corrective actions.

Management reviews will produce action plans for continuous quality improvement in procedures relating to, and desired outcomes of the pest and vermin control program.

10. DOCUMENTS

Rodent Bait Station Map

Interior Rodent Bait Station Map

Fly Bait Station Map

Insecticuter Location Map

Map of Sightings	VC01
Weekly Vermin Report	VC02
Interior Rodent Report	VC03
Weekly Insect Report	VC04
Contractor's Vermin Report	VC05
Contractor's Insect Report	VC06

TRAINING

1. PURPOSE

The purpose of this training program is to train all new and existing staff in the responsibilities and procedures that must be adhered to, and to keep existing staff up-to-date and to ensure that persons performing specific quality related tasks are given the training and support necessary to perform the job competently.

2. BACKGROUND

Many products and processes quickly become outmoded by changes in technology which can have a direct effect on the quality function. Appropriate training programs are essential in order to create or update individual knowledge and skills. Auditable records are essential both to demonstrate that the necessary skills exist and to manage training needs.

3. SCOPE

This procedure applies to induction training for all new or prospective employees, training for process operatives, training for operatives controlling CCP's, reinforcement training and training for supervisory/QA staff. This procedure also specifies the means of tracking the performance of individuals over time.

4. RESPONSIBILITIES

Works Manager	• Creates a training culture throughout the plant by ensuring that sufficient resources are available to carry out training initiatives.
	• Takes part in management reviews.
Quality Assurance Manager	• Reviews systems monitoring documentation and discusses with the Training/QA Officer the scope of targeted training programs required.
Training/QA Officer	• Develops targeted training programs in consultation with the QA Manager.
	• Controls training and operational conformance records kept on all production personnel and staff.
	• Conducts induction training.

5. PROCEDURES AND ACTIONS

5.1 Induction training

- Prior to commencing allocated duties, all new employees shall undergo an induction program. An induction manual which contains general knowledge about the company is introduced and explained. The manual includes:
  - Occupational Health and Safety practices.
  - Training.
  - Industrial Relations.
  - QA programs.
- An induction training session is given by the Training/QA Officer. During this session the company's Quality Policy, legislative requirements, personal hygiene and safety procedures are explained. The Training/QA Officer maintains records of persons who have attended an induction training session.

5.2 Training for process operatives

- The Foreman and Training/QA Officer are responsible for planning and coordinating on-the-job training. With the assistance of the QA Manager they are also responsible for the ongoing training needs of employees under their control. Each person has access to a copy of the Standard Operating Procedures and Work Instructions which contain information on the quality related aspects of their tasks.
- The Foreman, Training/QA Officer, QA Manager and the training committee (refer Appendix 1) are responsible for ensuring that the quality of product and procedures is maintained during on-the-job training prior to individuals achieving complete proficiency. Special attention is paid to new and casual employees to ensure a high standard of hygienic practice is maintained during on-the-job training.
- Emphasis is placed on helping people to understand why they are expected to do certain quality related duties, particularly in the context of food handling.

5.3 Training for operatives controlling CCPs

- Persons performing specific, high potential risk tasks eg. slaughtermen, trimmers, carcase sorters and loadout operatives, are given training in the technical aspects required to perform those tasks. This training includes an introduction to quality systems, HACCP techniques, microbiological monitoring and verification procedures and techniques.
- Designated backup personnel are trained to assume the quality related duties of key personnel in their absence.

5.4 Reinforcement training

Procedure awareness training will be conducted to provide management with greater assurance that all elements of process and process control are understood by the process operatives. This training primarily requires the HACCP audit table, the SOP and work

instruction for the task to be read and explained to the relevant group of operatives in the presence of their sectional supervisor and the QA Manager. This type of training initiative is conducted twice a year, and when systems monitoring shows an adverse trend, or in the event of serious procedural non-conformity during internal audit or external regulatory review. The date of the procedure awareness training is recorded in the operative's record.

5.5 Training for supervisory/QA staff

- Supervisory/QA staff are provided with information modules relevant to their area, containing legislative requirements, carcase measurement and description techniques and any other information deemed to be required.
- These staff are benchmarked by regular examination of this information.

5.6 External training

- Recognised external training courses are used to maintain a core of supervisory and QA staff trained in quality related techniques and accredited by relevant authorities to perform specific quality related functions.
- Key personnel involved in training are given special instruction in training methods through recognised courses.
- All training initiatives shall include the following key elements:

(i) Identify need for training	• Determine if training needs exist. • Identify competencies for specific jobs/tasks. • Identify competencies held by individuals for specific jobs/tasks.
(ii) Design and develop training	• Define training requirements. • Prepare training plan. • Develop training course/s. • Develop assessment methods.
(iii) Organise training resources	• Arrange location and facilities. • Arrange equipment, tools and facilities.
(iv) Deliver and evaluate training	• Deliver training. • Provide opportunities for practice. • Follow-up and support learners. • Evaluate training.
(v) Assess learners	• Assess trainee competencies. • Review learning process. • Record assessment results.
(vi) Promote training	• Provide training information.

(vii) Manage training	• Follow-up action on information provided. • Maintain training records. • Provide reports on training.

6. MONITORING

All records of induction, reinforcement and Supervisory/QA staff training are maintained. These records are specific to each individual who has participated in the program. Monitoring of the effect of training initiatives on process control is achieved by recording the number and criticality of process defects detected at each work station, and by recording the number of process defects attributable to each operative.

7. CORRECTIVE ACTION

- The results of monthly Internal Reviews are used by the Training/QA Officer and QA Manager to target training needs to procedures and process operatives with poor operation compliance. In the first week of each month, a corrective action plan shall be devised for the five procedures with most non-compliance.
- Sanctions may be bought against repeatedly non-conforming operatives in accordance with the company's discipline policy.
- The corrective action plan is to be ratified by the Management Review Committee.
- Following implementation and review, the corrective action plans are to be signed off by the Plant Manager.

8. VERIFICATION

- Verification of training initiatives are manifest in the capacity of the process to be standardised and improved.
- The means of measuring process improvement include:
  - ➢ reduction in the number and criticality of defects recorded at each work station.
  - ➢ increase in the process conformity index over time.
  - ➢ decrease in the contamination defect rating over time.
  - ➢ less rework on the retain rail.
  - ➢ decrease in product rejection and claims.
  - ➢ improved results at internal audit and regulatory reviews.

9. REFERENCES

The Induction Manual

Supervisory/QA Staff information modules.

10. DOCUMENTS

Employee Training Record

Weekly Process Monitoring Forms

Corrective Action Plan

CORRECTIVE ACTION

1. PURPOSE

The purpose of this procedure is to establish a uniform method to be used by all staff when dealing with non-conforming product and procedures, and to provide instruction on taking and recording corrective action.

2. BACKGROUND

The emphasis for corrective action must be on correcting the system and not just on dealing with the product. Corrective action procedures should include a uniform procedure for investigating all incidents to detect and eliminate direct or potential causes of the problem.

3. SCOPE

This procedure is applicable to:

- all product found to be outside specified requirements;
- any aspect of operational procedures which have the potential to directly affect product wholesomeness or integrity.

4. RESPONSIBILITIES

Works Manager	• Authorises and promotes training programs. • Supports maintenance program. • Provides adequate resources.
QA Manager	• Reviews monitoring documentation to determine efficacy of corrective action.
Processing Foremen	• Takes immediate corrective action when notified of or discovering a non-conformance or potential problem.
Operatives	• Take immediate corrective action when a problem arises **and/or** notify Foreman.

5. DEFINITIONS

Non-conforming product:	Product that does not conform to specifications.
Non-conformance procedure:	Procedure for assessment and disposition of non-conforming product.

6. PROCEDURES AND ACTIONS

- Any person who identifies product or procedures which do not comply with documented procedures must report this fact to their immediate supervisor.
- After confirming the advice that there is non-conforming product or procedures the supervisor involved should adhere to the following principles for corrective action in all cases:

  (i) Assess the extent of affected product including companion product which may also be affected, check both upstream and downstream and initiate segregation and/or rework as appropriate to the problem.

  (ii) Take steps to prevent further deterioration of product already affected.

  (iii) Take steps to prevent any more product from becoming affected.

  (iv) Identify the reasons for the problem at source.

  (v) Assess the continued appropriateness of procedures and facilities to achieve their stated purpose and implement changes where necessary to protect product.

6.1 General principles for dealing with non-conforming product

- Where monitoring of procedures detects a deviation according to a monitoring plan based on assessment against documented procedures and work instructions, an immediate follow-up assessment must be made to determine if the deviation has resulted in product being affected. This is done by examination of a product sample in accordance with normal inspection and test sampling procedures for that product. Evidence of affected product must be handled in accordance with paragraph 6 above.
- Where a deviation in procedures has been observed, or the results of product inspections indicate that a procedural deviation may be occurring, the following assessment should be carried out to determine the continued appropriateness of procedures to achieve their stated purpose.
- In conducting this assessment the supervisor must determine if the problem is a part of the production system, ie. a "System Problem", before attributing blame to the operator. This assessment must include the following criteria:

Does the system provide the operator with the means for:

• Knowing what he/she is supposed to do?	Good training, clear job descriptions, procedures, work instructions and specifications.
• Knowing what he/she is actually doing?	Either by a means of self-monitoring or constructive and timely feedback mechanisms.
• Achieving the required task?	The correct tools, facilities, methods and materials to do the job properly.

If any of these criteria are not fully met the error is a "System Problem" and corrective action must be aimed at building prevention into the system before attributing blame to the individual operator. **Most** problems will be "System Problems".

- If these conditions are met then assess whether the problem is an "Operator Problem", ie. a human error, and take action according to these three categories:

Inadvertent errors	Provide aids for human attentiveness.
	Make the task foolproof.
Technique errors	Answer the question "What should the operator be doing differently than he/she is doing now?
	Identify the "knack" that allows some workers to do superio work.
	Is the person a "square peg in a round hole"?
	Institute training or redeployment.
Wilful errors	Try to find the reason why the person is not complying.
	Remove ambiguity in the company's standards and priorities.
	Explain the "reason why" something is important eg. effects on other workers, food safety, regulations, etc.
	De-personalise orders by working on group attitudes.
	Create incentives.
	Establish accountability.
	Provide balanced assistance.
	Foolproof the operation.
	Institute disciplinary measures.
	Reassign the work.

- Where problems are detected during normal operational monitoring and control activities, specific aspects of corrective action should be in line with documented guidelines set out in the HACCP Tables for individual tasks.
- A follow-up inspection must always be conducted to confirm the effectiveness of action taken. A record of corrective action taken and its effectiveness must always be made on the relevant monitoring sheet.

7. VERIFICATION

The QA Manager conducts a weekly review of procedure monitoring documentation to ensure that breaches of procedures and corrective actions are recorded and follow up monitoring indicates that corrective action is effective.

All corrective action is documented and subjected to internal audit.

Management reviews are conducted to consider effectiveness of corrective actions. Management review will produce action plans for continuous quality improvement, particularly in cases of repeat non-conformance.

8. REFERENCES

Australian Standard for Consumption of Meat for Human Consumption.

Internal Auditing Procedures.

Management Review Procedures.

HACCP Tables.

9. DOCUMENTS

Monitoring Records.

Internal Audit Reports.

PRODUCT TRACEABILITY AND RECALL

1. PURPOSE

The purpose of this procedure is to establish a uniform method to trace all products to their source and to maintain product identification during receival, holding, processing, storage and dispatch. Traceability is essential in the event that the company receives a request for an emergency recall of product that is or has been in the control of the company.

2. BACKGROUND

Product recalls for meat are rare events but when they occur it is usually vital that product be traced as quickly as possible. Examples of situations which could warrant an immediate recall could include evidence of violative levels of chemical residues in meat or the detection of a suspected exotic animal disease such as Foot and Mouth Disease Requests for recalls may come from various Regulatory Authorities.

3. SCOPE

This procedure applies to the traceability of all product, and actions to be taken whenever this company is legitimately required to recall product.

4. RESPONSIBILITIES

Plant Manager	• Determines legitimacy of any request for recall. • Initiates recall procedure.
QA Manager	• Manages and oversees this procedure. • Liaises with relevant Regulatory Authorities.

5. PROCEDURES AND ACTIONS

- A system must be established to enable the ready identification of product during all stages of receival, holding, processing, storage and dispatch. The system may entail any or all of the following:
  - use of tail tags, tattoos and other means of identifying livestock,
  - reconciliation of large drafts/mobs with the Kill Sheet,
  - reconciliation of livestock identification with sequential carcase numbers,
  - inclusion of all livestock identification data on computerised scales print-outs,
  - recording packing times (in two hour blocks) of all packaged offals,
  - use of stamped impressions and/or tags to denote health status,
  - use of Retain Tags to identify non-conforming product.

- All requests for recall of product must be directed immediately to the Plant Manager.
- The following information must be obtained from the person requesting recall:
  - the authority of the person to initiate recall,
  - the nature of the problem,
  - product type,
  - slaughter dates,
  - quantities involved,
  - transfer documentation reference numbers, where applicable.
- The Plant Manager determines the legitimacy of the request and, if satisfied, initiates the recall procedure.
- The QA Manager or his delegate is responsible for immediately following the product through the inventory control system to determine the location of any product still on plant and the possible destination(s) of product of that type that has left the company's control.
- The QA Manager provides the Authority requesting the recall with details of suspect product still on plant and details of dispatched product.
- Where a need for a product recall is initiated internally, similar procedures apply to trace and recall product on or off plant. The QA Manager is responsible for contacting the intended recipient of suspect product that has left the plant and for making arrangements to locate, isolate and retain suspect product. The QA Manager is also responsible for notifying the relevant Authorities as appropriate.
- Product still in the control of the company is segregated and an Incident Report is completed in accordance with Control of Non-conforming Product Procedure, until further instructions are received from the Authority initiating the recall.

6. VERIFICATION

All actions taken are documented and subjected to internal audit.

Management reviews are conducted to consider effectiveness of procedures.

7. REFERENCES

Corrective action is taken according to the guidelines for corrective action.

Management Review Procedure.

Control of Non-conforming Product Procedure.

8. DOCUMENTS

Incident Report.

CONTROL OF NON-CONFORMING PRODUCT

1. PURPOSE

The purposes of this procedure are:

- to formalise procedures that should be followed to identify, segregate and control non-conforming product in the event of serious non-conformance being detected.
- to provide formal written notice of the breach of regulatory requirements to the appropriate Authority.
- to provide an auditable record over time of all incidents which have resulted in a serious non-conformance and the follow-up action taken.

2. BACKGROUND

Non-conforming product is identified and segregated from production flows to prevent unauthorised use, shipment or inclusion with conforming items. Serious breaches of regulatory requirements may require contact to be made with the appropriate regulatory authority to report the incident and to seek instruction on the disposition of the product and further action to be taken. Contact is normally not necessary if product integrity has not been affected and the problem can immediately be resolved. On no account can product which does not meet regulatory requirements be released until a direction has been received from the appropriate authority.

3. SCOPE

This procedure applies in the following circumstances:

- Regulatory requirements are not met, or product wholesomeness has been affected or is at risk.
- Initial corrective action has not been effective.
- Product has been retained for further treatment.
- There has been any reason to isolate and retain control over product.
- It is deemed necessary by the QA Manager.

4. RESPONSIBILITIES

QA Manager

- Manages and oversees this procedure.
- Authorises release of retained product.
- Where necessary, contacts regulatory authorities.

5. DEFINITIONS

Non-conforming product:	Product that does not conform to specifications.
Incident Report:	Written report of an incidence of non-conformance with the program.

6. PROCEDURES AND ACTIONS

- After confirming advice that there is non-conforming product, the QA Manager or delegate directs the identification and segregation of affected product as appropriate (including companion product where a sample of a particular draft or mob is shown to be affected) using the company Retain system.
- In order to maintain segregation and control over the product a uniquely numbered Retain Tag is applied to the product by QA Personnel. Details of the product, including Retain Tag numbers and its location are recorded in the Retained Product Register held by the QA Manager.
- No person may remove a Retain Tag or cause product to be moved which is held under control of a Retain Tag unless under the direction of the QA Manager. The final disposition and disposal of the retained product is entered on the Retained Product Register by the QA Manager at the time of release.
- The QA Manager completes an Incident Report which must include the following:
  - time and date,
  - description of affected product,
  - how product was affected or could potentially be affected,
  - reason why the problem occurred,
  - action taken to isolate product and prevent any further product from being affected,
  - suggested follow-up action to prevent a recurrence of the problem.
- Where appropriate, the QA Manager records on the Incident Report any contact made with the relevant regulatory authority and the instructions received from the regulatory authority. The final resolution of the problem and action taken to prevent recurrence shall be recorded on all Incident Reports.
- Provision is made on the Incident Report for remarks by the Plant Manager, QA Manager and by the relevant regulatory authority as appropriate.
- All Incident Reports are discussed at the quarterly Management Review meetings in accordance with Management Review Procedure.

7. REFERENCES

Management Review Procedure.

Corrective Action Procedure.

8. DOCUMENTS

Retain Tag.

Retained Product Register.

Incident Report.

INTERNAL AUDIT

1. PURPOSE

The purpose of this procedure is to establish a method for planning and conducting a program of Internal Audits to determine if documented HACCP based process control procedures are implemented effectively, are suitable to achieve stated objectives (particularly Critical Limits) and are adequately documented.

2. BACKGROUND

There must be a system in place which provides management with timely feedback on the effectiveness and operation of the HACCP based process control program. The audits are designed to confirm that the program is operating effectively in compliance with documented procedures, and to point to the areas where improvements should be implemented.

3. SCOPE

This procedure is applicable to the auditing all elements of the documented HACCP based process control program.

4. DEFINITIONS

Audit:	A systematic and independent examination of the effectiveness of the program.

5. RESPONSIBILITIES

Works Manager	• Allocates adequate resources. • Chairs review meetings.
QA Manager	• Maintains overall control of the audit process. • Plans and schedules audits. • Prepares and amends Audit Checklists. • Oversees corrective action. • Trains auditors.

6. PROCEDURES AND ACTIONS

- Audits must always be conducted in accordance with this procedure, which includes the following elements:

  - preparation of an Audit Plan,
  - preparation of Audit Schedules,

- preparation of Audit Checklists,
- conduct of the audit,
- report of audit findings,
- maintenance of adequate records,
- review of internal audit procedures.

- Audits are conducted at two levels:
  - Program Audit:

    is used to examine how the program is structured,

    determines whether or not the program is complete and adequate to meet specified needs,

    verifies that key personnel are aware of their responsibilities in the program.

A program audit **does not** verify compliance with procedures.

  - Compliance Audit:

    to verify compliance with procedures documented in the program.

- Internal audits pay attention to compliance with documented control procedures for operational functions such as process control; inspection and test monitoring; and handling, storage and delivery. Internal audits also cover management procedures such as non-conformance control, corrective action, document control and management review.
- The QA Manager is responsible for the planning and scheduling internal audits.
- Auditors must be assessed for their capacity to conduct audits of the activities and areas concerned. Knowledge of procedures, including GMP, and the conduct of audits will be determined by the QA Manager before appointing individuals to an auditing activity. Assistance in conducting audits may be requested by auditors for practical or technical reasons. An auditor should not be a person normally connected with the particular department being audited.
- The Audit Plan is prepared by the QA Manager, and includes:
  - the specific procedures, equipment, areas and elements of the program to be audited,
  - the basis for audit, if other than routine, including organisational or regulatory changes, reported deficiencies or supplier/material performance,
  - the procedure for reporting the findings, conclusions and recommendations,
  - the type of audit, ie. Program or Compliance.

- Audits are conducted according to a predetermined Audit Schedule. In general, internal audits are conducted on a quarterly basis. Alterations to the audit schedule can be made to cater for:
  - new products, processes or equipment,
  - administrative and regulatory changes,
  - special customer considerations,
  - non-conformances and deficiencies,
  - seasonal fluctuations in production.
- Audit checklists of references/questions covering all components of the program are prepared and maintained by the QA Manager. These checklists form the basis of all audits. Appropriate elements of the audit checklists are selected for each audit. Additions to the checklists may be made by an auditor during the course of an audit. Audit checklists are developed to cover specific technical aspects of documented procedures and can be used to provide the basis for training of prospective auditors.
- Audit checklists are updated by the QA Manager whenever amendments are made to the documented HACCP based process control program.
- An audit is conducted using the checklists as a guide. The work areas and elements scheduled to be audited are visited and objective evidence of compliance or non-compliance is obtained to determine whether the program is working effectively.
- Specific details of non-conformities are noted on the checklists during the audit. The auditor identifies any departures from approved procedures on a Corrective Action Request (CAR). Corrective action, where appropriate, will be in accordance with established procedures.
- Audit findings are reported to the QA Manager and the Works Manager through a written audit report made out by the auditor. The report is tabled at the quarterly Management Review meeting.
- Follow-up action is decided by the QA Manager and, where appropriate, the Management Review meeting. The effectiveness of corrective action will be "closed out" by a follow-up audit.
- Follow-up action can include:
  - identification of the reason(s) for the non-conformance,
  - assessment of the continued appropriateness of the procedure to achieve its stated purpose,
  - amendment to documented procedures,
  - introduction of training and/or other appropriate action deemed necessary to correct human error.

- Records of all audit reports and recommendations, together with corrective and follow-up preventive actions are retained for both internal and third party/regulatory audit purposes.
- Analyses of deficiencies pertaining to suppliers are used as a guide to maintaining "Approved Supplier" listings.

Part of the process of internal audit is to ascertain the effectiveness of this internal audit procedure. Amendments to this procedure are aimed at improving both its application as a program guide and as an audit training document.

7. REFERENCES

Management Review Procedure.

Corrective Action Procedure.

8. DOCUMENTS

Audit Plan

Audit Schedule

Audit Checklists

Corrective Action Request (CAR)

Audit Report

Follow-up Audit Report

Management Review Minutes.

MANAGEMENT REVIEW

1. PURPOSE

This procedure establishes a uniform method for systematic review and evaluation of the HACCP based process control program to ensure its continued adequacy, effectiveness and improvement.

2. BACKGROUND

A quarterly review meeting procedure has been established to provide, in conjunction with the internal audit procedure, an overall control mechanism for the HACCP based process control program. These meetings are to focus on the effectiveness of the program, its scope, long term direction, management and improvement.

3. SCOPE

This procedure is applicable to all aspects of the documented HACCP based process control program

4. RESPONSIBILITIES

Works Manager	• Convenes and chairs review meetings.
	• Authorises necessary changes to procedures.
Quality Assurance Manager	• Takes and distributes minutes of review meetings.
	• Reviews results of operational monitoring and identifies adverse trends.

5. DEFINITIONS

Audit:	A systematic and independent examination of the effectiveness of the program.
Incident Report:	Written report of an incidence of non-conformance to the program.

6. PROCEDURES AND ACTIONS

- The Management Review Committee meets quarterly to discuss and evaluate the impact of change as it concerns the company and its program.
- The Management Review Committee consists of:
  - the Works Manager,
  - the QA Manager,
  - the Production Manager,

- the Processing Foreman,
- invited personnel as decided by the meeting.

- Minutes of the meeting are taken by the QA Manager and include a record of actions decided and allocation of responsibility to implement the action and to follow up on its effectiveness.
- The QA Manager is responsible for distribution of the minutes to committee members. A copy of the minutes is kept on file.
- The Works Manager presents regulatory authority audit and inspection reports.
- The QA Manager presents:
  - Internal Audit Reports,
  - Company Incident Reports completed since the previous meeting,
  - Relevant correspondence including regulatory/legislative changes or customer complaint feedback,
  - Proposed amendments and alterations to the documented HACCP based process control program including draft Hazard Analysis,
  - Follow-up reports on carryover items from previous meetings.
- The meeting reviews summaries of the results of operational monitoring programs, resulting trend analysis, and of corrective actions taken including any suggestions from line personnel.
- The maintenance program is also reviewed highlighting future development and corrective actions taken to resolve maintenance problems.
- The meeting decides areas which need longer term corrective action(s) and what form these action(s) will take including allocation of responsibility for implementation and follow-up on effectiveness.
- The meeting prioritises action to be taken.
- Where appropriate, the relevant regulatory authorities are informed of decisions pertaining to operational and maintenance changes that concern the documented HACCP based process control program in a regulatory context.
- Wherever possible, proposed changes to the documented HACCP based process control program should be discussed in the context of the Management Review meetings. However, there is an over-riding requirement that changes be processed in a manner which ensures prompt action is taken as authorised by the Works Manager to maintain the integrity of the program.

7. REFERENCES

Internal Audit Procedure.

8. DOCUMENTS

Management Review Meeting Minutes.

Internal/external Audit Reports.

Incident Reports completed since the previous meeting.

Relevant correspondence.

Proposed Amendments to the program.

CHEMICAL CONTROL

1. PURPOSE

The purpose of this procedure is to establish a uniform method to ensure that chemicals are controlled in accordance with specified regulatory requirements.

2. BACKGROUND

Chemicals used on meat processing plants must be approved by AQIS. It is important to check that only approved chemicals are ordered and those chemicals are the ones actually received. Storage must be such that there is no possibility of contamination of chemicals approved for food contact surfaces by othere that are hazardous to food.

These procedures are designed to assist in the prevention of improper use of chemicals and to comply with regulatory requirements specific to handling and storage of chemicals used on-plant.

3. SCOPE

This procedure applies to the purchase, handling and storage of chemicals, except those used in ancillary areas such as the workshop and office.

This procedure does not include conditions for use.

For conditions of use of hand soap see Personal Hygiene.

For conditions of use of cleaning chemicals see Cleaning and Sanitation.

For conditions of use of pesticides see Pest and Vermin Control.

For conditions of use of water treatments see Water Supply.

For conditions of use of lubricants see Plant Maintenance.

4. DEFINITIONS

Approved chemicals:	A chemical that has been formally approved for use on a meat processing establishment by AQIS as prescribed in the Prescribed Good (General) Orders (PGGO). The manufacturer of each chemical must be able to produce a copy of a letter of approval for that chemical.
PGGO Schedule 15:	Categories of Use and Restrictions on use of chemical compounds.
PGGO Schedule 13:	Chemical Compounds not requiring approval.

5. RESPONSIBILITIES

Plant Manager	• Ensures that resources and facilities are available to carry out the control procedures specified. • Takes part in management reviews.
Quality Assurance Manager	• Reviews the documents and records that are specific to Chemical Control. • Takes part in management reviews. • Arranges for repairs and maintenance at storage facilities. • Approves proposals for any chemicals to be included on the plant chemical list. • Conducts internal audits of purchase, handling and storage of chemicals.
Purchasing Officer	• Orders chemicals only from the approved plant chemicals list. • Informs QA manager of requests for chemicals to be included on the approved chemicals list. • Controls all purchase documentation. • Seeks competitive pricing from a credited supplier.
Storeman	• Deliver chemicals to designated storage facilities. • Checks all deliveries to ensure that the chemicals ordered are the chemicals received.

6. PROCEDURES AND ACTIONS

6.1 Purchase of Chemicals

Sources selected for the supply of chemicals shall be informally evaluated and approved by the Quality Assurance manager and Purchasing Officer.

A purchase requisition must be completed by the Department Head in which the chemicals are destined for use. Information on the requisition must include as applicable:

- the department for which the chemical(s) are to be used,
- the intended use or purpose of the chemical
- the previous supplier, if relevant,
- a clear and concise description of the chemical,
- the type, class, style, grade or other precise information about the chemical,
- the title, job number, specification, process requirement or other technical data,
- the requirements for inspection or certification by the supplier,
- signature of the authorised department head.

Any alteration or addition to an original requisition shall be clearly referenced to the original and be processed in the same way.

The Purchasing Officer must be in possession of the following before placing an order for chemical compounds;

i. a copy of the current AQIS Instrument of Approval (Chemical) for the chemical compound detailing its acceptance for use at meat processing establishments. This Instrument of Approval is to be provided by the supplier and is for use as a reference when ordering.

ii. a current list of compounds approved/non-approved that are stored on the plant.

The chemical compounds fall into 3 categories, namely:

i. those requiring an approval;

ii. specific chemicals having general approval;

iii. chemicals requiring no approval.

(**Note:** Suppliers must apply to AQIS to have their chemicals approved. Requirements for approval are detailed in Orders 122-135 of the Prescribed Goods (General) Orders as amended).

6.2 Approved chemicals list

Management shall maintain a list of approved chemicals and other chemicals used in edible production areas.

Where applicable, this list shall be provided upon request to the AQIS PMT.

This list must include;

- details of the chemical compound's use, or intended use;
- details of the place and manner of storage of the chemical compounds, and
- a copy of the instrument of approval for each of the chemical compounds.

A copy of the chemical compound, label should be included in the chemical register. This is particularly useful for identifying chemicals during internal audit or regulatory review.

6.3 Handling of Chemicals

- Chemicals must be used and handled in accordance with any conditions specified on the label and with conditions specified by sub order 111.3 EMO Vol.1.
- A limited number of responsible company personnel shall be assigned the task of dispensing chemicals.
- If during the course of their duties, any operator notices a difference in the physical property of a chemical, ie. colour, viscosity, clarity, etc., or the chemical appears to be contaminated in some way, then the chemical will be rejected from use, identified, and the incident reported to the QA Manager for follow up with the chemical company.
- Pumps, siphon hoses, and decanting containers must be labelled according to the specific chemical for which they will be used. These items must not be used for other chemicals.

- The storeman receives, prepares and distributes chemical compounds to the various departments and maintains the cleanliness of the section. Upon receival the sotreman checks to ensure that the chemical received is in fact the approved product that was originally ordered.
- A Chemical Log is maintained nominating all compounds and their usages. When new compounds are introduced an insertion is made. A deletion is made when product is no longer in use. The Chemical Log states the storage area of each chemical. Secure storage areas are provided for the isolation and protection of approved and non-approved chemicals prior to use. An inventory control system is used to ensure stock rotation and processing within the acceptable shelf-life of the product.

6.4 Storage of Chemicals

- Chemical compounds are stored in the chemical storeroom which is dust and vermin proof, used solely for that purpose and free from air connection with any potential airborne hazards. All chemicals must be stored off the ground.
- Chemicals used in sanitation and pest control must be stored only in rooms set aside for storage of chemicals. They must be stored completely separate from edible product ingredients, and from chemicals and packaging materials used with edible product.
- Chemicals used in pest control may be stored in the same store as chemicals used for sanitation, but must be stored sufficiently separately to ensure that cross contamination is not possible. 'Pesticide - Type B', 'Pesticide - Type C' and Pesticide - Type D' chemicals must be stored under lock and key, with keys being restricted to persons who are aware of the restrictions on the use of the chemicals.
- Chemicals used in sanitation and vermin control must be stored only in the identified containers in which they are received from the supplier.

7. MONITORING

QA officer shall conduct weekly monitoring of procedures, activities and documentation relating to purchase, handling and storage of chemical compounds.

8. CORRECTIVE ACTION

Corrective actions are designed to reinstate compliance with legislative requirements.

Responsible company representatives must be retrained if procedures are not followed, and chemicals withdrawn from use if potential hazards to products exists by using the chemicals.

9. VERIFICATION

The Quality Assurance Manager conducts monthly internal audits of procedures, activity, documentation, and weekly monitoring records.

Management reviews are conducted to consider the results of internal audits and the effectiveness of corrective action. The management reviews will produce a corrective action plan where repeat non-conformities are detected during internal Audit.

10. DOCUMENTS

Purchase Requisition.

Current list of chemical compounds on plant.

Letters of approval of chemicals by AQIS.

Chemical log.

HANDLING AND DISPOSAL OF WASTE MATERIAL

1. PURPOSE

The purpose of this procedure is to establish uniform methods for handling and disposal of waste products from production areas.

2. BACKGROUND

The risk of contaminating edible product must be minimised at all times. Any such contamination could result in decreased product shelf life and risks to human health. Methods for minimising these risks include maintaining conditions that will inhibit microbial growth and eliminate vermin. Removal of inedible waste products from processing areas at regular intervals is a further necessary step towards minimising the risk of product contamination.

3. SCOPE

This procedure applies to all activities which involve handling and disposal of waste products.

4. DEFINITIONS

Floor Labourer:	The individual whose task it is to remove inedible product or discarded packaging material from production areas.
Inedible Product:	Any product which is contaminated, treated or handled in such a way that it is no longer fit for human consumption.
Inedible red tub:	A red coloured container used for inedible material.

5. RESPONSIBILITIES

Plant Manager	• Ensures that resources are available to carry out handling and disposal of waste products from production areas. • Takes part in Management Reviews.
Quality Assurance Manager	• Reviews monitoring reports and corrective actions • Takes part in management reviews. • Arranges for repairs and maintenance relevant to handling and disposal of waste products from production areas. • Reviews and updates handling and disposal procedures.
Sectional Supervisor	• Initiates corrective action. • Ensures appropriate distribution of facilities and equipment. • Ensures that the department and areas of responsibility are maintained satisfactorily clean throughout out production.
Cleaning Operatives	• Performs all duties in accordance with the Work Instruction, particular attention is required to procedures

which are designed to prevent contamination of product and product contact surfaces.

6. PROCEDURES AND ACTIONS

The handling of waste product is in accordance with the Integrated Environmental Management System.

All waste products of carcase origin, including materials that are condemned or contaminated and are not salvaged must be collected and placed in an inedible red tub. Material in red tubs is transferred to the rendering department via inedible chutes.

The staff responsible for removing waste product must:

- Maintain a clean working environment in the processing areas by cleaning the floor of meat, fat and blood then emptying red tubs into inedible chutes.
- Removing discarded packaging material and carton materials.
- Impressions of the AI stamp on discarded outer wrapping or carton material must defaced before disposal.

Staff designated as floor cleaners must handle product off the floor. Floor cleaners or the floor cleaner's equipment must not come in contact with any person, product or product contact surface. If necessary ask operatives to move from area to be cleaned.

The floor cleaners must change clothes if their clothes become heavily soiled. They must wash their hands with soap and water after using equipment and before leaving the production area.

If the Floor Labourers or their equipment make contact with an edible product or surface, that surface is considered contaminated. All edible product at risk is treated as contaminated and is to be identified with a retain tag for re-work on the retain rail or handled as dropped meat.

Any contact surfaces contaminated are to be re-sanitised.

All cleaning equipment (brooms, squeegees and shovels) must be stored in designated areas.

All contaminated trimmings and condemned material, after being removed from the carcase or carcase part, must be placed in a receptacle designated for that purpose. This type of product must not be placed on the floor.

Inedible chutes, screws and conveyors are to be used to transport waste bones, fat and contaminated product.

6.1 Disposal

Inedible viscera (paunches etc.) are transported via a chute to the condemn room. Paunches are emptied, cleaned and transported to the byproducts department.

Bones, fat, blood etc. Is transferred to the rendering department.

Effluent from the plant flows over a static wedge wire screens and a saveall. All collected solids along with the solids from the yards settling pit and manure is transported to a composting area.

Effluent then flows to anaerobic ponds and eventually into an aerobic pondage system.

Water from the aerobic pond is used to wash the yards and irrigate paddocks.

Waste packaging materials and other like waste is removed from production areas to an industrial waste bin.

All other rubbish collected from various areas of the plant is emptied into the industrial waste bins. Wet and dry waste material is removed from the plant twice weekly. All industrial bins are closed to contain odours and reduce insect activity.

7. MONITORING

QA Officers monitor the performance of the Floor Labourer.

8. VERIFICATION

The QA Manager conducts a weekly review of all aspects of process control including handling and disposal of waste products.

Handling and disposal of waste products procedures and documentation are subject to internal audit.

Management reviews are conducted to consider results of internal audits and formulate corrective action plans for incidences of serious or repeat non conformance.

9. REFERENCES

Dropped Meat Procedure.

Hygiene and sanitiation procedures.

CALIBRATION OF THERMOMETERS AND TEMPERATURE GAUGES

1. PURPOSE

This procedure is to provide uniform instructions on methods and frequencies to be used to calibrate thermometers and temperature gauges.

2. BACKGROUND

Many processes and procedures in meatworks involve temperature measurement as a critical limit to demonstrate that procedures are under control in respect of food safety hazards. If temperature is used as a critical limit, there must be confidence in the control devices ie. thermometers and temperature gauges used to measure temperature. To provide this confidence, thermometers, temperature gauges, thermographs and temperature loggers must be calibrated against appropriate standards at fixed intervals. Each temperature measuring instrument must be clearly identifiable and its calibration status recorded and apparent to the user.

3. SCOPE

This procedure applies to all temperature measuring instruments used as control devices. These devices listed in the schedule in paragraph 6.2.

4. DEFINITIONS

Primary standard	• A mercury-in-glass certified thermometer .
Secondary standard	• A working thermometer calibrated against the primary standard at three points immediately before use and agreeing with the primary standards within specified limits.

5. RESPONSIBILITIES

Works Manager	• Ensures that equipment and resources are available for calibration of thermometers.
Quality Assurance Manager	• Ensures that calibrations are carried out according to the schedule and methods.
	• Ensures that operators who conduct calibrations are properly trained.
	• Ensures that the calibration register is properly maintained.
Quality Assurance Officer	• Conducts calibrations of thermometers according to the documented procedure and frequency.

6. PROCEDURES AND ACTIONS

6.1 General

- All temperature measuring instruments used as control devices on plant shall be calibrated to the established standard and in accordance with the approved calibration and maintenance schedule. The schedule shall include, as applicable, equipment location, number and type, frequency of calibration, calibration method, acceptance criteria and the action to be taken in the event of unsatisfactory results.
- The primary standard must be a NATA certified reference thermometer.
- All temperature measuring instruments shall have a unique identification. Portable thermometers must be marked with a unique identification (e.g. model identification and sequential number). Fixed temperature sensors may be identified by their location.
- Temperature measuring instruments should be labelled on the read-out unit to indicate the calibration status and corrections, if any, to be applied. If it is not practicable to label the instrument the instrument must be cross-referenced to the calibration log book and a calibration notice issued.
- Calibrations apply to unique combinations if sensors and read-out units. A separate calibration is required for each sensor used with a read-out unit.
- Care must be taken at all times to ensure that damage is not sustained nor the calibration upset during handling and use of temperature measuring instruments.
- All temperature measuring instruments shall be safeguarded to prevent unauthorised adjustments.

6.2 Schedule of temperature measuring instruments

The following table lists the thermometers in use, the frequency of calibration and calibration method.

Thermometer type	Number in use	Frequency of calibration	
		Single ice point calibration	Multi-point calibration
Digital stab thermometers	8	Two weeks	Three months
Portable electronic thermometer with plug-in sensor	2	Two weeks	Monthly
Portable temperature loggers	3	Monthly	Three months
Fixed return air sensors in chillers, freezers and boning room	12	Monthly	Six months
Temperature sensors in chillers for product monitoring	8	Monthly	Six months

In addition to the above schedule. All temperature measuring instruments should be calibrated before they are first used and in the event they are dropped or possibly damaged.

The calibration frequency takes into account:

- The risk of thermometers becoming out of calibration in use.
- Whether the instrument is used for measuring critical limits.
- The range of temperatures the instrument is used for.

6.3 Methods of calibration

Temperature measuring instruments are calibrated against fixed reference points such as melting ice (0°C) or saturated steam at atmospheric pressure (100°C). Alternatively, instruments can be calibrated against a reference thermometer.

Instruments should be calibrated over the range of temperatures they are used to measure. Thermometers, chiller sensors and loggers used to measure temperatures in chilled meat can be checked using the ice point method when a single point calibration is required.

Instruments used to measure temperature in frozen meat or high temperatures (eg. in the rendering department or steriliser temperatures) should be calibrated against a reference thermometer at the appropriate temperature.

6.3.1 Ice-point calibration

- Where possible, instruments should be brought to the laboratory or other suitable location for calibration.
- The instrument must be allowed to equilibrate to room temperature before it is calibrated. Equilibration may take about 2 hours.
- An insulated flask such as a wide-mouthed vacuum flask or a small esky is filled with broken ice. The ice should be made from reasonably pure water. Town drinking water is usually satisfactory but hard water or bore water is not satisfactory.
- The ice should be wet ie. starting to melt. If necessary, some water can be added to wet the ice. If the ice floats in a pool of water, there is too much water and the excess should be drained off. The ice mixture should be stirred frequently.
- Place the probe of the instrument to be calibrated in the centre of the ice alongside a standard reference thermometer. (Several instruments can be calibrated at the same time).
- Leave the probe in the ice until the instrument gives a steady reading. A steady reading is reached when there is no difference in two readings taken 1 minutes apart.
- The reference thermometer must read 0°C. If it does not, check that:
  - The water and ice have reasonable purity or use distilled water, if necessary,
  - there is not an excess of water in the container,
  - the ice mixture is stirred.
- Note the reading on the instrument being calibrated. The reading and any difference from 0°C is recorded in the calibration log book.

- If the instrument has an adjustable calibration, it should be set to read 0°C in melting ice. If the instrument cannot be adjusted, the difference between 0°C and the instrument can be used as a correction. The instrument should be labelled with the required correction.
- If a correction of more than 1.0°C is required, the instrument should be repaired or replaced.

6.3.2 *Multi-point and non-ice point calibration*

- This method is used for multi-point calibrations when required, and calibrations at temperatures other than 0°C.
- Multi-point calibrations are made at three temperatures. These temperatures are at or near the either end of the range of the expected working temperature, and at the typical working temperature.
- The calibrations are carried out in a stirred water bath. This can be a stirred insulated flask containing water at the required calibration temperature. Calibrations at below 0°C can be made in mixtures of water and alcohol. Calibrations above 100°C can be made in oil.
- Hold the temperature probe next to the reference thermometer in the stirred water bath. Allow the thermometers to reach a steady reading and record the temperature indicated by the reference thermometer and the calibrated thermometer in the calibration log book.
- If the calibrated instrument can be adjusted, adjust it to read the same as the reference thermometer at the three calibration points. If the calibrated instrument cannot be adjusted, readings can be corrected according to the difference between the instrument and the reference thermometer. A label must be attached to the instrument to show the required correction.
- If a correction of more than 1°C is required, the instrument should be repaired or replaced.

6.3.3 *Fixed thermometers or recorders*

- If instruments cannot be brought in the laboratory they must be calibrated *in situ*. This is done by taking the stirred water bath or insulated container to the fixed sensor.
- The same procedures for ice-point calibration or multi-point calibration are used to calibrate the instruments but the primary reference thermometer must not be taken out of the laboratory. A secondary reference must be made by calibrating an electronic thermometer against the primary reference using the multi-point calibration technique. The secondary reference thermometer must be calibrated immediately before it is used andit must agree with the primary reference thermometer within ± 0.3°C at the three calibration points.

6.3.4 *Records of calibration*

- All calibrations must be recorded in the calibration log book. Entries in the log book must include:
  - Description and type of thermometer.
  - Unique identification of thermometer.

- Date of calibration.
- Method of calibration.
- Deviations from reference thermometer.
- Calibration status (ie. corrections required or instrument satisfactory/unsatisfactory).
- Person who uses the thermometer.
- Signature of person conducting the calibration.

- If a label indicating calibration corrections cannot be attached to the readout unit of an instrument, the person who uses the instrument must be issued with a calibration notice showing the required corrections.

7. VERIFICATION

Procedures for calibration of thermometers and temperature gauges are subject to internal audit.

8. DOCUMENTATION

Calibration log books.

Calibration notices

WATER SUPPLY

1. PURPOSE

This procedure establishes uniform procedures for water treatment and testing and describe some of the required features of water reticulation.

2. BACKGROUND

Potable water is used extensively in the production of meat and as an ingredient in some meat products.

Non-potable water has some applications which are useful to the operation to optimise water utilisation.

3. SCOPE

This procedure applies to:

- Treatment and testing regimes for potable water.
- Required features of the water reticulation system.
- Some uses of non-potable water.

4. DEFINITIONS

Potable Water	Water which complies to the Australian Standard for drinking water.
Free Residual Chlorine	Quantity of uncombined chlorine available for antimicrobial action.
Hand wash water	Water with a temperature at discharge of 35°C to 45°C.
Steriliser Water	Water with a temperature at discharge of >82°C.

5. RESPONSIBILITIES

Plant Manager	• Provides sufficient resources to ensure that potable water is supplied consistently to production areas at the correct temperature, with adequate pressure and complying with microbiological parameters.
	• Takes part in management reviews.
Quality Assurance Manager	• Ensures that potable water testing, ie. chlorine residue, temperature, and microbiological testing are conducted at the frequency specified.

- When necessary, initiates rapid and effective corrective action.
- Maintains on file a letter from the local water supply authority confirming that an adequate supply of potable water is available.
- Takes part in management reviews.

Maintenance Supervisor

- When necessary installs a reliable microbial treatment system with alarm devices.
- Ensures that alarms are fitted to detect the minimum acceptable level of chemical treatment or water pressure and that alarms are triggered at the company target level for chemical concentration in the water.
- Prepares a water distribution map.
- Applies and maintains markings on water mains in accordance with the Australian Standard.
- Oversees plumbing reviews, maintenance and construction work to ensure water supply is not contaminated and complies with current industry standards.
- Controls the regime for draining and cleaning in-plant storage tanks.
- Takes part in management reviews.

6. PROCEDURES AND ACTIONS

6.1 Potable Water Reticulation

- The reticulation system must be designed and installed to ensure there is no mixing of potable and non-potable water and that back siphonage of polluted or used water cannot occur.
- A 2 mm hole is drilled in the pipe feeding all immersion sterilisers. This hole should be above the operational level of the steriliser and positioned so that any water spraying from the hole is contained in the steriliser and not directed on to the floor.
- Water troughs in livestock yards and pens should be fed with a pipe that discharges above the operating level of the trough.
- Unused ends in water mains where water could stagnate should be eliminated. If this is impossible, weekly flushing at full volume through all outlets is required.
- Hot water hoses supplying spray steriliser units must be fitted with an in-line thermometer for continuous water temperature display.
- All waste water (and splash) must be contained inside drainage pipes or catchments and not directed across the floor.

- Water mains identified in accordance with the Australian Standard shall be marked at intervals not greater than 8 meters, and adjacent to branches, junctions, valves, walls and control points.
- A map of the water reticulation system shall be prepared and where necessary, provided to the AQIS PMT.
  This map should show:
  - Location of potable water lines in each production and amenities area.
  - Water treatment installations.
  - Location of water storage tanks and contact time with chemicals in the storage tanks.
  - Location of water sampling points (individually numbered).
  - Location of all non-potable water mains.
- If the water reticulation system in the production and amenities areas is other than a ring main, then all water outlets must be shown on the map.
- In-plant storage tanks must be provided with an effective cover to prevent entry of insects and ingress of rain water, dust, leaves etc.
- Use of non-potable water is defined in EMO 94.1.

6.2 *Water treatments*

- There are numerous options for microbial water treatments, however, chlorine remains the most widely used option for meat processors.
- Where in-plant chlorination is installed, free residual chlorine must be maintained above 0.25ppm. This figure is a critical limit, so a target level of 0.5ppm is prudent to allow for some drop in residual chlorine with disrupted production.
- Chlorine concentrations greater than 5ppm must be approved by the regional secretary of the Industry Regulator.
- The effectiveness of chlorine as a microbial treatment for water is dependent on pH and temperature of the water supply being treated.
- Concentration of chlorine shall be increased during the summer months in areas of high pH water supplies.

7. MONITORING

- Water temperatures are checked throughout the day by production supervisors. Water temperatures are recorded pre-operationally and then in accordance with HACCP monitoring plans.
- Where in-plant chlorination is installed, potable water supplies must be sampled and checked by an establishment employee for an acceptable free residual chlorine level each day at least twenty minutes before slaughtering or the production of edible product commences.

- Throughout the day while slaughtering, production of edible product or plant sanitation is being undertaken, the water must be sampled and checked not less frequently than every two hours.
- Where applicable, the records of tests of water treatment levels are to be presented to AQIS PMT.
- Monthly water tests are submitted to a NATA accredited laboratory for microbiological (i.e. coliforms, E.coli and TPC) and some physical analysis.
- The point of collection of samples must be varied where possible so as to ensure that results are representative of the water being used throughout the establishment.
- In EU listed plants, management must hold a copy of physico-chemical testing undertaken on at least an annual basis by the relevant Water Supply authority or by an approved laboratory.
- Annual testing for sulphite reducing Clostridia spp and faecal streptococci is also required.
- A QA officer shall monitor the water reticulation system for possible sites of contamination, sediment build-up between scheduled cleaning of the storage tanks and the installation of effective back siphonage devices.

Exporting companies need to be aware of the customer country's guidelines for specific parameters of water quality. Temperature, turbidity, dissolved salts etc.

8. CORRECTIVE ACTIONS

Management must be pro-active to maintain the potability of the water supply. In the event of an unsatisfactory analysis, management must re-test immediately from the same sample site.

Management shall vigorously assess the on-plant reticulation system to eliminate the source of the contamination. All storage areas, pipe junctions, valves, blind ended pipes, back siphonage devices should be checked.

Contaminated water will need to be hyper chlorinated and flushed through the reticulation system.

The latest analysis report from the water supply authority should be obtained and be included in the record of the corrective action.

9. VERIFICATION

- QA Manager reviews analytical reports and reports of monitoring of the water supply system and ensures corrective action is taken when required.
- Water reticulation supply, treatment, testing procedures and documents are subject to internal audit.
- Findings of internal audit are subject to management review.

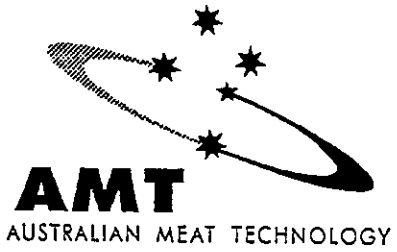
10. REFERENCES

- Export Meat Orders.
- Construction and Equipment Guidelines for Export Meat.
- Australian Standard for Drinking Water.

11. DOCUMENTS

- Residual Chlorine Log.
- Ancillary Areas Monitoring Report.
- Laboratory Analysis Reports.
- Corrective Action Plan.

Attachment D: Generic references for validation of microbiological critical limits



Review of
Export Meat Orders
Chilling requirements

Prepared for

Meat Industry Council

by

G. Brauns

Export Meat Orders Chilling requirements

Background

Australian Meat Technology was asked to assemble data regarding the validation of the Export Meat Orders time/temperature requirements for the primary chilling, holding and transport of goods produced in Export Meat plants,

Scope

To undertaken an objective review of the Export Meat Orders (EMO) and assemble references and papers which assist in the validation of the various requirements of the EMO's which pertain to the microbiological status of meat. The review of the EMO was limited to the primary chilling, holding, loading and transport of fresh meat carcase, portion of carcases and carcase parts.

Methodology

A selected search and review of scientific and technical literature was undertaken though Australian Meat Technology and CSIRO library facilities, in order to identify and supply papers that validate the time/temperature conditions specified in the Export Meat Orders.

Sections of the EMO's were evaluated on their time/temperature requirements based on their ability to minimise or prevent the growth of food safety relevant bacteria. Papers which validate particular EMO's were the referenced.

Results

The Export Meat Orders relating to the primary chilling, holding and transport of goods from an export registered works, were assessed in regarding their ability to minimise or prevent to growth of food safety bacteria.

Attached is a itemised table of the relevant Export Meat Orders, comments regarding food safety and the particular reference number, the list of references and the reference papers.

Conclusion

The Export Meat Orders, when used in conjunction with a HACCP based quality assurance system, will provide the desired food safety outcomes.

In the main, the Export Meat Orders were not designed to be prescriptive and many are not critical limits at genuine critical control points.

The Export Meat Orders that do relate to specific critical limits are (sometimes with minor adjustments) prescriptive enough to minimise or prevent the growth of food safety relevant bacteria.

The EMOs should be simplified and made easier to read. Consideration should be given to rewriting the Export Meat Orders to make them more appropriate for industry to use in conjunction with MSQA and pre requisite programs.

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Attachment E: US example generic beef slaughtering HACCP model sourced from the International Meat and Poultry HACCP Alliance.

GENERIC HACCP MODEL FOR

BEEF SLAUGHTER

Developed:
June 19-21, 1996
Kansas City, Missouri

Submitted to

USDA, Food Safety and Inspection Service

by the

International Meat and Poultry HACCP Alliance

on

September 9, 1996

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GENERIC HACCP MODEL FOR BEEF SLAUGHTER

Introduction:

Hazard Analysis Critical Control Point (HACCP) is a systematic, scientific approach to process control. It is designed to prevent the occurrence of problems by ensuring that controls are applied at any point in a food production system where hazardous or critical situations could occur. Hazards can include biological (pathological and microbiological for beef slaughter), chemical or physical contamination of food products.

The United States Department of Agriculture (USDA) published a final rule in July 1996 mandating that HACCP be implemented as the system of process control in all USDA inspected meat and poultry plants. As part of its effort to assist establishments in the preparation of plant-specific HACCP plans FSIS determined that a generic model for each process defined in the regulation will be made availab.. for use by the industry.

In May 1996, the U.S. Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS) awarded Contract Number 53-3A94-6-04 to the International Meat and Poultry HACCP Alliance for the development of ten generic HACCP models. The ten models developed were:

1. Not Heat Treated, Shelf-Stable (dried products, those controlled by water activity, pH, freeze dried, dehydrated, etc.)
2. Heat Treated, Shelf-Stable (rendered products, lard, etc.)
3. Heat Treated Not Fully Cooked, Not Shelf-Stable (ready to cook poultry, cold smoked and products smoked for trichinae, partially cooked battered, breaded, char-marked, batter set, and low temperature rendered products, etc.)
4. Products with Secondary Inhibitors, Not Shelf-Stable (products that are fermented, dried, salted, brine treated, etc., but are not shelf-stable)
5. Irradiation (includes all forms of approved irradiation procedures for poultry and pork)
6. Fully Cooked, Not Shelf Stable (products which have received a lethal kill step through a heating process, but must be kept refrigerated. This includes products such as fully cooked hams, cooked beef, roast beef, etc.).
7. Beef Slaughter
8. Pork Slaughter
9. Poultry Slaughter
10. Raw Products - not ground (all raw products which are not ground in their final form. This includes beef trimmings, tenderized cuts, steaks, roasts, chops, poultry parts, etc.)

USDA developed three additional models:

1. Raw, Ground
2. Thermally Processed/Commercially Sterile
3. Mechanically Separated Species/Deboned Poultry

This document contains the generic HACCP model for the process category titled: **Beef Slaughter**

In order to develop this model, a literature review and an epidemiological assessment of the products selected were performed to present an overview of the microbiological characteristics and profile of the product. This information then was reviewed by a team of industry, academic, public health officials,

and consumer representatives. The team met in a workshop in Kansas City, Missouri on June 19-21, 1996. Subsequent to the workshop, this generic HACCP model was reviewed by small business establishments for clarity and usability, and it was submitted to an expert peer review panel for technical review.

Generic HACCP plans serve as useful guidelines; however, it is impossible for a generic model for to be developed without it being too general. Therefore, it is incumbent on each plant's HACCP Team to tailor this model to fit products in each plant, based on the knowledge about the process. Several points should be considered when using this model to develop specific HACCP plans.

All plants shall have Sanitation Standard Operating Procedures (SSOPs). Good Manufacturing Practices (GMPs) (FDA, 21 CFR 110; Appendix 1) and Standard Operating Procedures (SOPs) may be in place as the foundation of the HACCP program. Good Manufacturing Practices are minimum sanitary and processing requirements applicable to all companies processing food. Standard Operating Procedures (SOPs) are step-by-step directions for completing important plant procedures. SOPs should specifically describe the method for conducting and controlling the procedure. SOPs should be evaluated regularly (i.e., daily) to confirm proper and consistent application, and modified as necessary to ensure control.

Each generic model can be used as a starting point for the development of your plant-specific plan reflecting your plant environment and the specific processes conducted. The generic model is not intended to be used "as is" for your plant-specific HACCP plans.

The generic models designed for use in developing a plant-specific HACCP plan are defined according to process category. In order to select the model or models that will be most useful for the activities performed in your plant, the following steps should be taken.

If a model for a slaughter operation is required, select the model for the appropriate species. If a model for a processed product or products is required, make a list of all products produced in the plant. Examine the list and group all like products according to common processing steps and equipment used. Compare these to the list of Process Models in Appendix 2. After reviewing and grouping the products produced, you will know the number of models that are needed to assist in developing your plant-specific plans.

If an establishment is a combination plant, i.e. conducting both slaughter and processing activities, the two models can be merged into a plant-specific plan. In this case, over-lapping critical control points (CCPs) can be combined as long as all significant hazards are addressed.

Seven Principles of HACCP:

The following seven principles of HACCP were adopted by the National Advisory Committee on Microbiological Criteria of Foods (NACMCF, 1992):

1. Conduct a hazard analysis. Prepare a list of steps in the process where significant hazards occur and describe the preventive measures.
   Three types of hazards:
   Biological (B)— primarily concerned with pathogenic bacteria, such as *Salmonella*, *Staphylococcus aureus*, *Campylobacter jejuni*, *Clostridium perfringens*, *Clostridium botulinum*, *Listeria monocytogenes*, and *Escherichia coli* O157:H7; also should consider *Trichinella sprialis*, and other parasites, as well as potential pathological concerns.
   Chemical (C)— toxic substances or compounds that may be unsafe for consumption; i.e., cleaners, sanitizers, pesticides, insecticides, rodenticides, paint, lubricants, etc.

Physical (P)— foreign objects which may injure the consumer; i.e., rocks, stones, wood, metal, glass, nuts, bolts, screws, plastic, knife blades, etc.

2. Identify the critical control points (CCPs) in the process. A critical control point is defined as a point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to an acceptable level.

3. Establish critical limits for preventive measures associated with each identified CCP. A critical limit is defined as a criterion that must be met for each preventive measure associated with a CCP. Each CCP will have one or more preventive measures that must be properly controlled to assure prevention, elimination, or reduction of hazards to acceptable levels. Each preventive measure has associated with it critical limits that serve as boundaries of safety for each CCP.

4. Establish CCP monitoring requirements. Establish procedures for using the results of monitoring to adjust the process and maintain control.

5. Establish corrective action(s) to be taken when monitoring indicates that there is a deviatic from an established critical limit.

6. Establish effective record-keeping procedures that document the HACCP system.

7. Establish procedures for verification that the HACCP system is working correctly.

Specifics about this Generic Model:

1. Products Included In This Model. This model deals only with beef slaughter. The product samples include steer/heifer carcasses and cow carcasses.

2. Items Addressed. This model does not address certain aspects of product safety, such as Sanitation Standard Operating Procedures (SSOPs). Good Manufacturing Practices (GMPs) and Standard Operating Procedures (SOPs) may be in place as the foundation of HACCP.

3. Critical Control Points. The Critical Control Points in this model were established by the team members of the workshop. Some products or processes may require fewer or more CCPs depending on the individual operation.

4. Product Flow. In the product flow, the general processes were included; however, order of flow varies. The product flow of every HACCP plan should be specific and accurately reflect the processes involved at each plant.

5. Safety vs. Quality. Several parameters have been discussed to ensure a safe product. Only parameters relating to product safety were discussed. Quality issues were not addressed in this model.

6. Critical Limits. Critical limits selected must be based on the best information available to provide a safe product and yet be realistic and attainable. Processors must keep in mind that any product which does not meet a critical limit must have a Corrective Action taken on the product before being released from the plant.

7. Process Authority. Reference may have been made about a "Process Authority" in this model. A Process Authority may be an in-plant employee who has had specialized training, an outside consultant, or other professional.

8. Record-keeping. Record-keeping is an important part of the HACCP plan. Lack of accurate, current records may be cause for withholding or suspending inspection from a plant.

9. Chain of Custody. Chain of custody refers to the point at which a plant gains control of the meat. This is particularly important to know the history of incoming meat products. Requiring a HACCP plan from the supplier will in effect, extend the chain of custody to the supplier.

10. Sampling Procedures. Each plant must establish a sampling plan to verify critical control points (biological, chemical and physical) in the operation. The procedures will be based on prior knowledge about the problem areas and not necessarily on random testing. A Process Authority may help establish these sampling procedures which are most likely to identify a problem if it exists.

USING THIS GENERIC MODEL TO DEVELOP AND IMPLEMENT A HACCP PROGRAM

Getting Started: The plant should establish a HACCP team which includes at least one HACCP trained individual, and then develop a flow chart for each product (or process category). In addition, a training program should be completed for all employees. It is important for all employees to have ownership in the HACCP plan and to participate in its development as appropriate. It also is important that the employees be given the authority to stop production if the process becomes out of control. This empowerment is critical to make the HACCP program a successful one. Once HACCP is established, it must be continually evaluated, upgraded, and modified. Experience in working a HACCP plan will be helpful in continual improvement in the plan. In effect, the HACCP program is a long-term commitment to improving the safety of the product by controlling the process.

The NACMCF has 12 steps (five preliminary steps listed below and the seven principles previously listed) in developing a HACCP plan.

PRELIMINARY STEPS:

1) Assemble the HACCP team.
2) Describe the food and its method of distribution.
3) Identify the intended use and consumers of the food.
4) Develop a flow diagram which describes the process.
5) Verify the flow diagram.

Then apply the seven principles beginning with conducting a hazard analysis.

The following steps should be considered when developing an effective HACCP system.

Before developing the HACCP system it is important to ensure that an adequate sanitation system (sanitation standard operating procedures - SSOPs) is in place for compliance with FSIS regulation. GMPs and SOPs are also important because they establish basic operational parameters for the production of safe food.

Assembling the HACCP Team: An important step in developing a plan is to gain management commitment and assemble a HACCP team. Top management must be fully committed to product safety through HACCP to make the program effective. After commitment is obtained, the HACCP team should be assembled. The team should consist of individual(s) from all aspects of production and should include at least one HACCP trained individual.

Product Description. The description should include the products within the process, their distribution, intended use, and potential consumers. This step will help ensure that all areas of concern are addressed. If a particular area on the example form is not applicable to your process, then eliminate it from your description. The description for the Beef Slaughter is included in this model.

Flow Diagram. The HACCP team should develop and verify a flow diagram for production of the product(s). A simple flow diagram which includes every step of production is necessary. The flow diagram should be verified for accuracy and completeness by physically walking through each step in the diagram on the plant floor. The purpose of the flow diagram is to provide a clear, simple description of the steps in the process which are directly under the control of the facility. This model contains a generic flow diagram for Beef Slaughter.

Hazard Analysis. A hazard has been defined as any biological (B), chemical (C) or physical (P) property that may cause a food to be unsafe for human consumption. The hazard analysis is one of the most critical steps in the development of a HACCP plan. The HACCP team must conduct a hazard

analysis and identify steps in the process where significant hazards can occur. The significant hazards must be "of such a nature that their prevention, elimination, reduction or control to acceptable levels is essential to the production of safe food." (NACMCF, 1992) The team should focus on risk and severity as criteria for determining whether a hazard is significant or not. Risk, as defined by the National Advisory Committee, is "likelihood of occurrence." "The estimate of risk is usually based on a combination of experience, epidemiological data, and information in the technical literature." (NACMCF, 1992). Severity is the potential magnitude of the consequences to the consumer if the hazard is not adequately controlled. Hazards that are not significant or not likely to occur will not require further consideration in the HACCP plan.

Appendix 3 provides a list of example food safety hazards as identified in the Pathogen Reduction; Hazard Analysis Critical Control Point (HACCP) Systems regulation (USDA, 1996).

The hazard analysis and identification of associated preventive measures accomplishes the following:

Identifies hazards of significance and associated preventive measures.
The analysis can be used to modify a process or product to further assure or improve food safety.
The analysis provides a basis for determining CCPs, principle 2.

Critical Control Point (CCP): A CCP is any point, step, or procedure at which control can be applied so that a food safety hazard can be prevented, eliminated, reduced, or controlled to acceptable levels. Information developed during the hazard analysis should enable the HACCP team to identify which steps in the process are CCPs. A decision tree, such as the NACMCF Decision Tree (Appendix 4) may be useful in determining if a particular step is a CCP for an identified hazard.

The CCPs discussed in this generic model should be considered as examples. Different facilities preparing the same product can differ in the risk of hazards and the points, steps, or procedures which are considered CCPs. This can be due to differences in each facility layout, equipment, selection of ingredients, or the production process that is being used. Plant-specific HACCP plans may include additional or fewer CCPs than this model based on their individual process.

Critical Limit: A critical limit is a criterion that must be met for each preventive measure associated with a CCP. Therefore, there is a direct relationship between the CCP and its critical limits that serve as boundaries of safety. Critical limits may be derived from sources such as regulatory standards and guidelines, scientific literature, experimental studies, and advice from experts. The HACCP worksheet provided in this model summarizes the critical limits for each CCP. Critical limits must be based on the best information available at the time to provide a safe product and yet must be realistic and attainable. Establishments must keep in mind that any product which does not meet the critical limit must have a Corrective Action taken. Corrective actions may be as simple as re-processing or re-packaging or may require destroying the product.

Monitoring: Monitoring is a planned sequence of observations or measurements to assess whether a CCP is under control and produces an accurate record for future use in verification. Monitoring serves three purposes:

1) Monitoring is essential to food safety management in that it tracks the systems operation.
2) Monitoring is used to determine when there is a loss of control and a deviation occurs at a CCP, exceeding the critical limit. Corrective action must then be taken.
3) Monitoring provides written documentation for use in verifying the HACCP plan.

Because of the potential serious consequences of a critical defect, monitoring procedures must be effective. Continuous monitoring is possible with many types of equipment, and it should be used when possible.

Individuals monitoring CCPs must:

1) Be trained in the technique used to monitor each preventive measure;
2) Fully understand the purpose and importance of monitoring;
3) Have ready access to the monitoring activity;
4) Be unbiased in monitoring and reporting; and
5) Accurately report the monitoring activity.

All records associated with monitoring must be signed or initialed, dated, and the time recorded by the person conducting the monitoring activity.

Corrective Actions: Corrective actions are procedures to be followed when a deviation occurs. Because of variations in CCPs for different products and the diversity of possible deviations, specific corrective action plans must be developed for each CCP. The actions must demonstrate that the CCP has been brought under control and that the product is handled appropriately.

Record-Keeping: Record keeping is a critical aspect of the HACCP system. Records must be accurate and reflect the process, the deviations, the corrective actions, etc. Lack of accurate, current records may be cause for withholding or suspension of inspection from the plant.

It is also important that all HACCP records dealing with CCPs and corrective actions taken, be reviewed on a daily basis by an individual who did not produce the records and who has completed a course in HACCP, or the responsible establishment official who must sign or initial, date, and record the time all records are reviewed. The HACCP plan and associated records must be on file at the meat and/or poultry establishment.

Example forms have been included in this model. It may be beneficial to combine forms as possible to reduce the amount of paperwork.

Verification: Verification consists of the use of methods, procedures or tests in addition to those used in monitoring to determine that the HACCP system is in compliance with the HACCP plan and whether the HACCP plan needs modification. There are three processes involved.

1) The scientific or technical process to verify that critical limits at CCPs are satisfactory — review of critical limits to verify that the limits are adequate to control hazards that are likely to occur.
2) Process verification to ensure that the facility's HACCP plan is functioning effectively
3) Documented periodic reassessment, independent of quality audits or other verification procedures, that must be performed to ensure the accuracy of the HACCP plan.

Sanitation SOPs: According to USDA's Pathogen Reduction/HACCP regulation (USDA, 1996), effective establishment sanitation is essential for food safety and to successfully implement HACCP. There are direct and substantial links between inadequate sanitation and the contamination of meat and poultry products by pathogenic bacteria. Sanitation SOPs are necessary because they clearly define each establishment's responsibility to consistently follow effective sanitation procedures and substantially minimize the risk of direct product contamination and adulteration.

Microbial testing for indicator organisms can be used to validate CCP effectiveness, and to establish in-plant trend analysis. Microbial testing should be part of a sanitation program in order to validate effectiveness. Microbial testing does not indicate that the product is safe, but it is used to verify that the process was in control.

PROCESS CATEGORY DESCRIPTION

WORKSHOP LOCATION: Kansas City, Missouri

THE FOLLOWING QUESTIONS NEED TO BE ANSWERED WHEN DEVELOPING THE PROCESS CATEGORY DESCRIPTION:

COMMON NAME:
Beef Carcass (steer/heifer/cow/bull)
Beef Variety Meats
Beef Primals
Beef Trim

HOW IS IT TO BE USED?

Beef Carcass - fabricate into beef primals, variety meats, and beef trim
Beef Variety Meats - used in ground beef patties, processed meats
Beef Primals - further process into bone-in and bone-less beef cuts
Beef Trim- further process into ground beef and processed meats

TYPE OF PACKAGE?

Beef Carcass - not applicable
Beef Variety Meats - vacuum package and/or boxed
Beef Primals - vacuum packaged and or paper wrapped
Beef Trim - vacuum packaged and/or boxed

LENGTH OF SHELF LIFE, AT WHAT TEMPERATURE?

Shelf-life will vary depending on type of package, temperature of storage, type of product and initial microbial load. For example: (a) vacuum packaged product at 36°F, with a microbial load of 2- 3 log may have a shelf-life of 45-60 days; (b) trim in a combo for fresh ground product at 36°F with a micobial load of 2-3 log may have a shelf-life of 4-5 days.

WHERE WILL IT BE SOLD?

Wholesale
Retail
Food Service
Domestic and international markets

LABELING INSTRUCTIONS:

Beef Carcass - Not applicable
Beef Variety Meats - "Keep Refrigerated" or "Keep Frozen" and safe food handling label
Beef Primals - - "Keep Refrigerated" or "Keep Frozen" and safe food handling label, if required
Beef Trim - - "Keep Refrigerated" or "Keep Frozen" and safe food handling label, if required

IS SPECIAL DISTRIBUTION CONTROL NEEDED?

No special distribution issues — Control temperature per labeling instructions - "Keep Refrigerated" or "Keep Frozen"

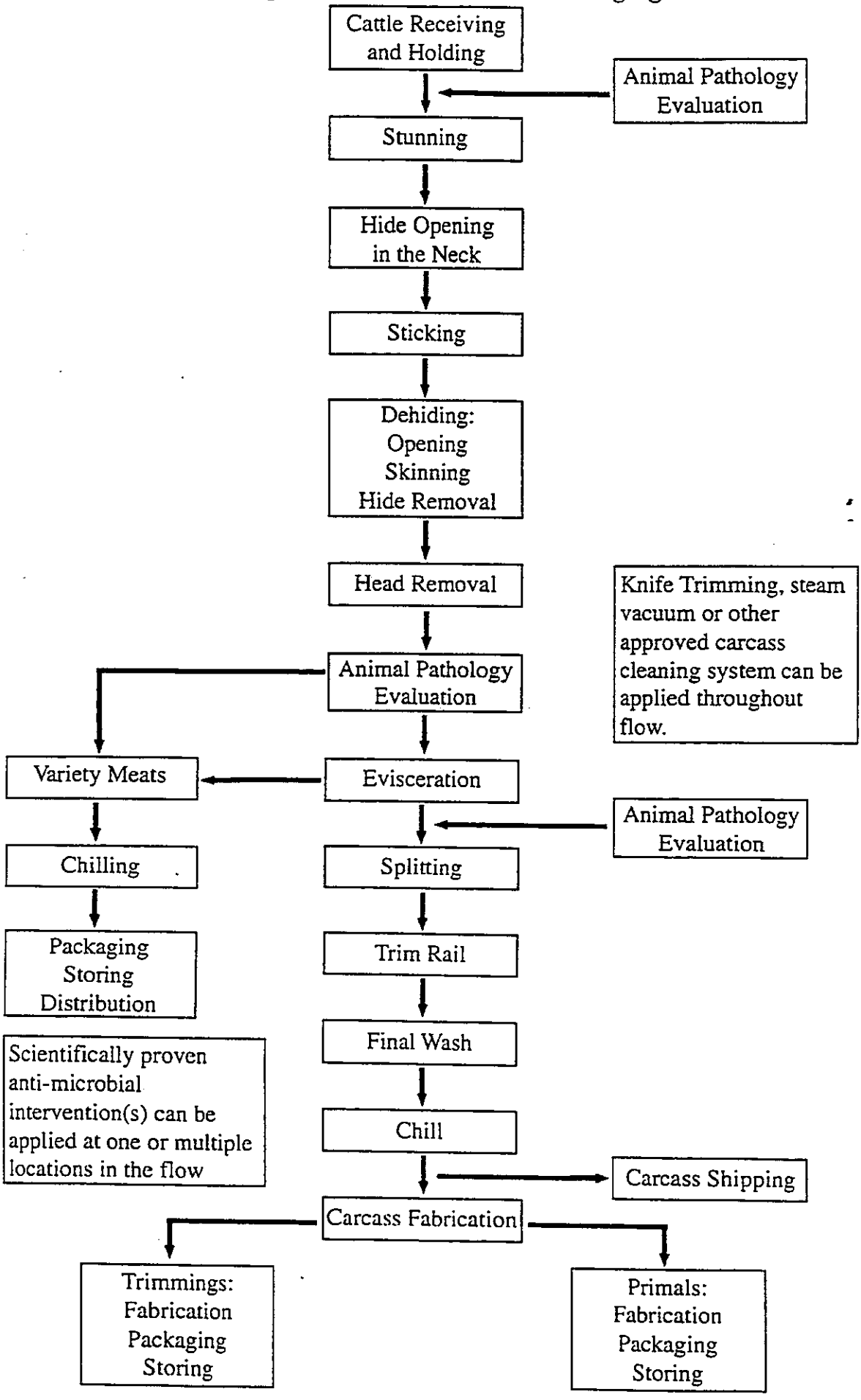
LIST PRODUCT CATEGORIES AND INGREDIENTS

PRODUCT CATEGORY: Beef Slaughter (includes: steer/heifer/cow/bull carcasses, beef primals, trim, and variety meat)

WORKSHOP LOCATION: Kansas City, Missouri

MEAT AND MEAT BYPRODUCTS	NONMEAT FOOD INGREDIENTS	BINDERS/EXTENDERS
Live Cattle	Tripe - variety meat has sodium hydroxide or hydrogen peroxide Potable water Carbon dioxide Chlorine may be used in some injected spray chill systems.	
SPICES/FLAVORINGS	RESTRICTED INGREDIENTS	PRESERVATIVES/ ACIDIFIERS
OTHER		
Approved packaging material.		

Beef Slaughter, Fabrication and Packaging



Hazard Analysis Worksheet:

The Hazard Analysis Worksheet format used in this model is an example format. Alternative forms can be used for the hazard analysis.

This worksheet should be used in two steps.

The first step, is to review each process step listed in the Process Flow Diagram and identify all potential hazards that can be introduced or enhanced at this step. Chemical, physical, and biological hazards should all be addressed. It is recommended that you list all potential hazards for each process step before moving to column two.

The second step, is to determine if the potential hazard is significant. The significant hazards must be "of such a nature that their prevention, elimination, reduction, or control to acceptable levels is essential to the production of safe food." (NACMCF, 1992) The team should focus on risk and severity as criteria for determining whether a hazard is significant or not. Risk, as defined by the National Advisory Committee, is "likelihood of occurrence." "The estimate of risk is usually based a combination of experience, epidemiological data, and information in the technical literature." (NACMCF, 1992). Severity is the potential magnitude of the consequences to the consumer if the hazard is not adequately controlled. Hazards that are not significant or not likely to occur will not require further consideration in the HACCP plan.

It is important that you justify your decision for determining if a hazard is or is not significant. This will help you document your rationale for making decisions and is a useful tool when you re-validate or revise your HACCP plan.

The fifth column, addresses preventive measures. For each significant hazard, identify preventive measures, if they exist. A preventive measure is a physical, chemical, or other means which can be used to control an identified food safety hazard.

It is recommended that you complete columns 1 through 5, before starting on column 6. Column six asks, "Is this step a critical control point (CCP)?" A CCP is any point, step, or procedure at which control can be applied so that a food safety hazard can be prevented, eliminated, reduced, or controlled to acceptable levels. Information developed during the hazard analysis should enable the HACCP team to identify which steps in the process are CCPs. A decision tree, such as the NACMCF Decision Tree (Appendix 4) may be useful in determining if a particular step is a CCP for an identified hazard. The hazards identified during the development of this model were subjected to a decision tree by the team members. CCPs must be carefully developed and documented and must be for product safety only. Different facilities preparing the same product can differ in the risk of hazards and the points, steps, or procedures which are CCPs.

The CCPs identified in this model are for illustrative purposes only. Individual plant process will determine the CCPs identified for plant-specific plans. Remember that Sanitation Standard Operating Procedures are essential prerequisites to HACCP.

HAZARD ANALYSIS

Ingredient/Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant? Risk:Severity	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Animal Receiving and Holding	C: Antibiotics, residues, pesticides P: Foreign material (needles, buckshot, etc.) B- Microbiological - bacterial pathogens	C: No P: No B: Yes	C: Low risk/low incidence, based on National Residue Monitoring Program (USDA, 1989) and Smith et al. (1994). P: Low incidence; based on National Beef Quality Audits conducted 1991 and 1995. B: Live animals are a known source of pathogens.	B: SOP should be written to define procedure for addressing fecal contamination on animals during receiving and holding (i.e., proper feed withdrawal to reduce gut fill, potential handling of animals to reduce mud/feces from mud-caked animals prior to entering the knocking shoot, etc.)	No
Stunning	C: Not applicable P: Not applicable B: Microbiological	B: No	Hemorrhagic tissue and brains contaminated with material are to be condemned (USDA, 1982) due to potential health hazards. Low risk.		No
Bleeding*	C: Not applicable P: Not applicable B: Not applicable				No

*Bleeding is for blood removal only. Opening the hide prior to bleeding is included in dehiding. If this process is not treated as two separate steps then it must be addressed and evaluated as one process. Also special procedures must be considered for Kosher slaughter.

Ingredient/Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant? Risk:Severity	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Dehiding: Opening (only penetration of the skin from the outside to the inside): Rip - leg, midline and front shank Cap/bung Wet udder removal Foot removal Dehorning Head Skinning Skinning Rump Low Backing High Backing Flanking	P: Not applicable C: Not applicable B: Microbiological - bacterial pathogens	B: Yes	Hide contamination is a known source of pathogens. Low risk - when skinning is properly performed, it is unlikely that external surface will contact the carcass to allow contamination. Corrective actions associated with Sanitation SOPs should address skinning defects.	The operational Sanitation Standard Operating Procedures (SSOPs) should address washing/sanitizing knife and hands between each hide-opening cut and/or prior to initiating skinning to prevent contamination. (Example SSOP included in Appendix) Potential hazards should be controlled through the SSOPs, and the application of a microbiological intervention(s) later in the process. Recommend that the establishment should develop a written SOP for the entire dehiding process to demonstrate the proper skinning procedure.	No *(If you do not have microbiological intervention(s) in place or methods for preventing/ reducing potential contamination at this step or at a later point in the process then you may determine this is a CCP.)*
Dehiding: Hide Removal (any mechanical hide puller requires an evaluation of contribution to microbiological contamination.) Side puller Down puller	C: Not applicable P: Not applicable B: Microbiological-bacterial pathogens	B: Yes	Exterior surface of the hide and the environment may be a source of pathogens. Proper operation of hide puller should preclude product contamination. Routine adjustments to the process should be conducted as needed to maintain proper conditions.	Recommend evaluating and controlling air flow to reduce aerosol contamination. Potential hazards should be controlled through the application of SSOPs designed to prevent direct contamination, and through the use of microbiological intervention(s) later in the process.	No *(If you do not have microbiological intervention(s) in place or methods for preventing/ reducing potential contamination at this step or at a later point in the process then you may determine this is a CCP.)*

Ingredient/Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant? Risk:Severity	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Head Removal	C: Not applicable P: Not applicable B: Microbiological - bacterial pathogens	B: No	B: Potential for introducing pathogens from GI tract onto the carcass when cutting esophagus (Rasmussen et al., 1993); however, risk is low.	Operational Sanitation Standard Operating Procedure (SSOP) should clearly address cleaning/sanitizing of knife to prevent cross contamination. *(Recommend that research should be initiated to evaluate additional interventions such as washing, organic rinse, etc. for heads)*	No
Evisceration: Brisket split Rod and secure weasand Bunging/Bagging Pre-gutting (bladder removal) Gastrointestinal (GI) tract removal Pluck removal Liver removal	C: Not applicable P: Not applicable B: Microbiological-bacterial pathogens	B: Yes	B: Contents of the gastrointestinal (GI) tract are potential source of enteric pathogens; however, sanitary dressing procedures should address contamination at this point.	Sanitary Dressing Procedures should be written to define procedures for properly eviscerating carcass to contain GI contents and address potential mistakes (puncture/breakage) in the process which may cause carcass contamination. Apply approved intervention(s) to remove contamination (i.e.: trim cavity). Potential hazards should be controlled through proper evisceration and the application of microbiological intervention(s) later in the process. *Recommend:* *Brisket split - sanitize between carcasses; bunging/bagging -- bag and tie to prevent fecal contamination; pre-gutting - remove bladder to prevent spilling; evisceration -- to prevent puncture and breakage.*	No *(If the establishment does not have microbiological intervention(s) in place or methods for preventing/ reducing potential contamination at this step or at a later point in the process then you may determine this is a CCP.)*

Ingredient/Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Splitting	C: Not applicable P: Not applicable B: Microbiological - bacterial pathogens	No	Potential cross contamination between carcasses; low probability of occurrence.	Operational Sanitation Standard Operating Procedures (SSOPs) should clearly address cleaning/sanitizing of saw between carcasses to prevent cross contamination.	No
Trim Rail	C: Not applicable P: Not applicable B: Microbiological - bacterial pathogens	Yes	Potential identification and removal of visible fecal contamination; however, not all contamination can be identified using a visual inspection; the addition of microbial intervention(s) has been added at a later step to help reduce the potential risk of contamination.	Physically remove visible fecal contamination by trimming.	No *(If the establishment does not have microbiological intervention(s) in place or methods for preventing/ reducing potential contamination at this step or at a later point in the process then you may determine this is a CCP.)*
Cleaning Systems Implemented Prior to Carcass Wash *(may implement one or more of these processes remove visible fecal contamination)*	C: Not applicable P: Not applicable B: Microbiological - bacterial pathogens	Yes	Potential for residual contamination.	Sanitation SOP to physically removing visible fecal contamination by using cleaning system(s) prior to carcass wash. *Recommend that contamination be removed as soon as possible after it occurs to control microbial attachment.*	No *(If you do not have microbiological intervention(s) in place or methods for preventing/ reducing potential contamination at this step or at a later point in the process then you may determine this is a CCP.)*
Carcass Wash	C: Not applicable P: Not applicable B: Microbiological - bacterial pathogens	Yes	Potential for residual contamination, not all contamination can be identified using a visual inspection; the addition of microbial intervention(s) has been added at a later step to help reduce the potential risk of contamination.	Physically remove visible contamination by washing carcass	No

Ingredient/Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant? Risk:Severity	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Spinal Cord Removal	C: Not applicable P: Not applicable B: Microbiological	Unknown at this time.	Not enough scientific evidence to sufficiently address this issue.		No
Interventions (Scientifically proven anti-microbial interventions)	C: Chemical P: Not applicable B: Microbiological	C: No B:Yes	C: Must use only approved sources of chemical intervention(s). B: Potential for residual microbiological contamination.	Proper operation of the intervention technology (i.e., heat, chemical, etc.) to reduce the presence of vegetative foodborne pathogens.	Yes CCP 1-B
Chill Load Hold Unload Grade/sort/store	P: Not applicable C: Not applicable B: Microbiological - bacterial pathogens	B -Yes	Improper chilling may allow for growth of bacterial pathogens.	Proper chilling in an appropriate time period to reduce likelihood of pathogen growth.	Yes CCP - 2-B
Fabrication - Pre-Trim	C: Not applicable P: Not applicable B: Microbiological - bacterial pathogens	B: Yes	Potential for contamination by environmental pathogens, and cross contamination.	Some of the following items may be addressed in SSOPs to prevent contamination of the product: *Control air flow* *Control traffic/people flow*	No
Fabrication -- Primal Manufacturing	C: Hydraulic oil, sanitizers, etc. P: Foreign material (i.e., metal) B: Microbiological-bacterial pathogens.	C: No P: No B- Yes	C: Low incidence/low severity P: Low incidences/low severity B- Contamination by environmental pathogens and identification of abscesses.	Some of the following items may be addressed in SSOPs to prevent contamination of the product: *Control air flow* *Control traffic/people flow* Abscess removal	No

Ingredient/Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant? Risk:Severity	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Packaging of Primals	C: Chemical residues in package material P: Not applicable B: Not applicable	C: No	C: Low risk/low incidence. Use approved suppliers, vendor certification and approved materials.		No
Cold Storage of Primals	C: Not applicable P: Foreign material (i.e. - wood from pallet) B: Microbiological - bacterial pathogens	P: No B: Yes	P: Packaged product; low risk/ low severity B: Potential for increased pathogen growth if temperature is not properly controlled.	B: Proper storage temperature sufficient to prevent pathogen growth.	Yes CCP- 3-B
Manufacturing/ Packaging of Trim and Storing of Trim	C: Chemical residues in packaging material P: Foreign material B: Microbiological-bacterial pathogens	C: No P: Yes B: Yes	C: Low risk/low severity P: Based on plant history of occurrence for potential contamination with bone, metal, plastic, and other foreign material. B: Potential introduction of environmental pathogens and potential for growth.	P: Metal detetion of large combos would not necessarily be significant; however, if the establishment is producing chubs or small packages then you may want to include the use of a metal detector or defect picker, and may want to include it as a CCP. B: Some of the following items may be addressed in SSOPs to prevent contamination of the product: *Control air flow* *Control traffic/people flow*	No
Storing of Trim	C: Not applicable P: Foreign material B: Microbiological	P: No B: Yes	P: Packaged product, low risk B: Potential for growth of pathogens.	B: Proper storage temperature sufficient to prevent pathogen growth.	B - Yes CCP -4 -B

Ingredient/Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant? Risk:Severity	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Manufacturing of Variety Meats: Head meat Cheek meat Weasand Heart Tongue Liver Tail Sweet breads Tendons Brain Tripe Testicles Large intestine Small intestine	C: Not applicable P: Foreign materials (bone) B: Microbiological - bacterial pathogens	C: No P: No B: Yes	C- Low risk/ low incidences P: Low risk/low incidence B: Variety meats may contain pathogens and are handled while hot, creating a potential microbiological hazard.	Procedures for properly handling variety meats to prevent potential bacterial pathogen contamination and growth should be written. For example, steps for the cleaning of intestines, etc. *Note: Current inspection relies on visible evaluation of heads which may or may not identify potential food safety problems; therefore, interventions should be developed to decontaminate the whole head.*	No
Packaging of Variety Meats	C: Petroleum products, chemical residue of packaging material P: Foreign material B: Not applicable	C: No P: No B: No	C: Low risk/low severity P: Low risk/low severity. This determination should be based on plant history of contamination.		No
Chilling/Storing of Variety Meats	C: Not applicable P: Not applicable B: Microbiological - bacterial pathogen	P: No B: Yes	B: Potential for growth of bacterial pathogens..	Proper control of time and temperature to prevent bacterial pathogen growth.	Yes CCP - 5-B
Animal Pathology Evaluation (occurs at multiple points throughout the process -- see flow diagram.)	C: Not applicable P: Not applicable B: Pathology	B: Yes	Animals are known sources of pathological abnormalities which can contain pathogens.	Inspection for antemortem condition, head, viscera and carcass postmortem inspection to prevent pathological conditions.	No

HACCP Worksheet:

The HACCP Worksheet format used in this model is an example format. Alternative forms can be used for the HACCP plan.

The first three columns of the form, identify the process step associated with the CCP, allows for CCP identification (number and type of hazard), and provides a description of the CCP. Columns four through eight are used to indicate the establishment's critical limits, monitoring procedures, corrective actions, recordkeeping methods, and verification procedures for each CCP.

A critical limit is a criterion that must be met for each preventive measure associated with a CCP. Critical limits may be derived from sources such as regulatory standards and guidelines, scientific literature, experimental studies, and advice from experts. Critical limits must be based on the best information available at the time to provide a safe product and yet must be realistic and attainable. Establishments must keep in mind that any product which does not meet the critical limit must have a Corrective Action taken. Corrective actions may be as simple as re-processing or re-packaging or may require destroying the product.

Monitoring procedures should include a planned sequence of observations or measurements to assess whether a CCP is under control and produce an accurate record for future use in verification. Monitoring serves three purposes:

1) Monitoring is essential to food safety management by tracking the systems operation.
2) Monitoring is used to determine when there is a loss of control and a deviation occurs at a CCP, exceeding the critical limit. Corrective action must then be taken.
3) Monitoring provides written documentation for use in verifying the HACCP plan.

All records associated with monitoring must be signed or initialed, dated, and the time recorded by the person conducting the monitoring activity.

Corrective actions are procedures to be followed when a deviation occurs. Because of variations in CCPs for different products and the diversity of possible deviations, specific corrective action plans must be developed for each CCP. The actions must demonstrate that the CCP has been brought under control and that the product is handled appropriately. Corrective action records must be signed, dated, and the time of action recorded by the individual responsible for taking the action.

Record keeping is a critical aspect of the HACCP system. Records must be accurate and reflect the process, the deviations, the corrective actions, etc. Lack of accurate, current records may be cause : withholding or suspension of inspection from the plant. It is also important that all HACCP records dealing with CCPs and corrective actions taken, be reviewed on a daily basis by an individual, who did not produce the records and who has completed a course in HACCP, or the responsible establishment official who must sign or initial, date, and record the time all records are reviewed. The HACCP plan and associated records must be on file at the meat and/or poultry establishment.

Example recordkeeping forms have been included in this model. It may be beneficial to combine forms as practical to reduce the amount of paperwork.

Verification consists of the use of methods, procedures, or tests in addition to those used in monitoring to determine that the HACCP system is in compliance with the HACCP plan and whether the HACCP plan needs modification. Verification involves:

1) The scientific or technical process to verify that critical limits at CCPs are satisfactory — review of critical limits to verify that the limits are adequate to control the hazards and that are likely to occur.
2) Process verification to ensure that the facility's HACCP plan is functioning effectively.
3) Documented periodic revalidation, independent of quality audits or other verification procedures, that must be performed to ensure the accuracy of the HACCP plan.

EXAMPLE: SANITATION SOP (applied at dehiding)

Process Step	Sanitation SOP Description	Sanitation SOP Objectives	Establishment Monitoring:	Corrective Action	SOP Records
Dehiding	Insert knife. Cut pattern mark from inside to outside allowing only knife contact with hide surface. Wash hands. Wash and sanitize knife between each hide opening and/or prior to initiating skinning. (Recommend two knives for sanitizing purpose.) Repeat process for each hide opening and/or prior to initiating skinning.	Prevent contamination from hide onto carcass surface. Prevent cross-contamination between carcasses. Example: No more than 0 operator failure (washing hands and wash/sanitize knife) per 5 evaluations of operator. For example: Defect = presence of hide contaminant. No more than 5 in 10 carcasses for Type I defect (hair and unidentifiable specks. No more than 1 in 10 carcasses with Type II defects (feces or ingesta).	Evaluate 3 times per shift for proper procedure and presence of defects. Evaluation by supervisor or sanitation coordinator.	If sanitation objectives are exceeded then take one or more of these steps. 1. Assess problem/determine cause. 2. Repair equipment. 3. Adjust crewing or line speed. 4. Retrain, discipline or replace employee. 5. Re-evaluate in 30 minutes. 6. Non-compliant product must be reconditioned and reinspected to meet carcass finished product standards.	Kill floor SOP log. Finished product (carcass AQL) standard. *All records must be signed and dated.

Process Step	CCP/ Hazard Number	CCP Description	Critical Limits	Establishment Monitoring	Corrective Action	HACCP Records	HACCP System Verification
Variety Meats	CCP - 5B	Chilling of Variety Meats	Surface temperature of 40°F or less within 24 hours. *(See explanation for temperature selection in CCP - 2)*	Monitor defined refrigeration parameters: a. suction pressure and coil temperature, etc. b. equipment operations, i.e. fans. c. box/pallet spacing. OR Monitor product temperature daily in sufficient quantity to demonstrate control. **All monitoring procedures must be completed by personnel responsible for the function.	Hold product, evaluate significance of deviation, determine product disposition (i.e., cook, condemn, etc.) Notify HACCP coordinator or trained designated employee. Identify cause and prevent reoccurrence. If needed, notify maintenance to adjust refrigeration parameters to bring temperature into compliance. If needed, adjust box/pallet spacing and retrain employees.	Variety Meat Temperature log Calibration log Deviation/ corrective action log. Verification log. Hold summary log	HACCP coordinator or trained designated employee must daily review HACCP records prior to shipping product. Periodically calibrate thermometers (i.e., weekly) Quarterly documentation of refrigeration parameters to achieve established limits.

Process Step	CCP/ Hazard Number	CCP Description	Critical Limits	Establishment Monitoring	Corrective Action	HACCP Records	HACCP System Verification
Storing/ Shipping Temperature of Trim	CCP - 4B	Trim temperature	Average internal product temperature ≤40°F; maximum of one individual temperature above 47°F after equilibration. *(See explanation for temperature selection in CCP - 2)*	Product temperature. (Take three temperatures per combo from 2 combos per lot or 2 pallets per load.) Temperature taken by loading dock personnel or QA personnel. **All monitoring procedures must be completed by personnel responsible for the function.	Re-ice product if between 40-47°F. If greater than 47°F then retain product for disposition (either cook or condemn)	Trim product temperature log Calibration log Deviation/ Corrective Action log Verification log Hold summary log	HACCP coordinator or trained designated employee must daily review HACCP records prior to shipping product. Periodically calibrate thermometers (i.e., weekly) Quarterly documentation of refrigeration parameters to achieve established limits.

Process Step	CCP/ Hazard Number	CCP Description	Critical Limits	Establishment Monitoring	Corrective Action	HACCP Records	HACCP System Verification
Cold Storage of Primals	CCP - 3B	Maintain product temperature	Room temperature ≤40°F (excluding defrost cycle temperatures.)	Room temperature. Recommend continuous temperature recorder. If not available, then check room temperature every 2 hours. OR Monitor established refrigeration parameters (i.e., coil temperature, air flow, spacing, etc.) **All monitoring procedures must be completed by personnel responsible for the function.	Check product temperature, if product surface temperature is greater than 50°F for longer than 4 hours , or if product surface temperature exceeds 60°F then retain product for disposition (i.e., either cook or condemn). (Buchanan, 1994). Notify plant designee. Identify cause and prevent reoccurrence. If needed, notify maintenance to adjust refrigeration parameters to bring temperature into compliance.	Cold Storage Temperature Log Calibration log Deviation/Corrective Action Log (Deviation log should include product temperatures) Verification log. Hold summary log.	HACCP coordinator or trained designated employee must daily review HACCP records prior to shipping product. Periodically calibrate thermometers (i.e., weekly) Quarterly documentation of refrigeration parameters to achieve established limits.

Process Step	CCP/ Hazard Number	CCP Description	Critical Limits	Establishment Monitoring	Corrective Action	HACCP Records	HACCP System Verification
Carcass Chill	CCP - 2B	Chilling of carcass	Establish refrigeration parameters for suction pressure, coil temp., equipment operations, etc. to reach a carcass surface temperature of 40°F or less within 24 hours. Carcasses cannot touch each other. *Note: Insufficient scientific data exist regarding the growth of pathogens during carcass chilling. However, the chilling parameters provided above will control quality and limit the growth rates of even psychotrophic spoilage organisms. Therefore, these parameters are more than sufficient to prevent growth of mesophilic enteric bacterial pathogens.*	Monitor defined refrigeration parameters: a. suction pressure and coil temperature, etc. b. equipment operations, i.e. fans. c. carcass spacing d. continuous spray chill temperature and intervals <u>OR</u> Carcass surface temperature. Measure 5 randomly spaced/day/hot box and check carcass spacing. Temperature taken 1 mm under faschia on the inside round. **All monitoring procedures must be completed by personnel responsible for the function.	Hold product, evaluate significance of deviation, determine product disposition (i.e., reprocessing, cook, condemn, etc.) Notify plant designee. Identify cause and prevent reoccurrence. If needed, notify maintenance to adjust refrigeration parameters to bring temperature into compliance. If needed, adjust carcass spacing and retrain employees.	Carcass chill log. Calibration log. Deviation/corrective action log. Verification log. Hold summary log.	HACCP coordinator or trained designated employee must daily review HACCP records prior to shipping product. Periodic calibration of thermometers (i.e. weekly) Quarterly documentation of refrigeration parameters to achieve established limits. Daily carcass temperature checks should be taken to verify that 40°F is reached.

INDUSTRY WORKSHOP HACCP MODEL
PRODUCT CATEGORY: Beef Slaughter — Product Examples: Steer/Heifer Carcass and Cow/Bull Carcass
WORKSHOP LOCATION: Kansas City, Missouri

Process Step	CCP/ Hazard Number	CCP Description	Critical Limits	Establishment Monitoring	Corrective Action	HACCP Records	HACCP System Verification
Interventions (Scientifically proven anti-microbial interventions)	CCP-1B	Demonstrated efficacy against bacterial pathogens in a peer reviewed scientific publication	**Operational parameters defined by the efficacy study for the specific intervention.	Monitor operation parameters of intervention as often as necessary **All monitoring procedures must be completed by personnel responsible for the function.	Retain product. Re-exposure to intervention. Re-check compliance of operational parameters. Re-check process. Multiple interventions tied together; if one interventions is down, an alternative intervention should be implemented.	Intervention parameter records. Calibration log Deviation/ Corrective Action log Verification log	HACCP coordinator or trained designated employee must daily review HACCP records prior to shipping product. Periodic equipment calibration (i.e., weekly) Periodic (i.e., monthly) indicator testing before and after intervention to confirm efficacy. (Traditional indicators have included aerobic plant counts, coliforms and E. coli; however, any organism or group of organisms may serve as an indicator organism if it has been shown through plant collected data to be correlated with hazard reduction or organism control.)

**Individual interventions will have their own specific requirements; therefore, critical limits, monitoring needs, records, and verification procedures must be set accordingly for intervention.

EMO No	Provision	Comments	References
384.2	The prescribed goods referred to in sub-order 384.1 shall not be removed from a refrigeration chamber for loading unless the meat temperature of the goods is --		
	(a) in the case of frozen goods -- not more than minue 10°C;	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	1,
	(b) in the case of chilled edible offal -- (i) where exported by ship, not less than minus 1.5 °C and not more than 0°C; or (ii) where exported by aircraft, not less than minus 1.5 °C and not more than 0°C; or	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	9,10
	(c) in the case of chilled goods -- (i) where exported by ship, not less than minus 1.5 °C and not more than 3°C; or (ii) where exported by aircraft, not less than minus 1.5 °C and not more than 4°C;	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	1,2,3,4
	(d) In the case of a more restrictive temperature required by a foreign country --at or below than temperature.		

EMO No	Provision	Comments	References
372.2	Where a statement indicating the temperature at which the goods are to be stored is included in the trade description the statement shall --		
	(a) in the case of chilled goods -- indicate the temperature at which the goods should be stored and the temperature stated shall be within the range of minus 1.5 °C to 3°C.	As validated by the references, the requirement is sufficiently prescriptive to minimise food safety relevant bacteria multiplying	1,2,11,18,19
	(b) in the case of frozen goods -- indicate the maximum temperature at which the goods should be stored and the temperature stated shall be not more than minus 12°C, except that in the case of goods packed before 1 July 1987, the temperature stated shall be not more than minus 10 °C.	As Validated by the references, the requirement prevents food safety relevant bacteria from increasing.	11,18,19
	(c) in the case of refrigerated meat product --indicate the maximum temperature at which the goods should be stored and the temperature stated shall be not more than 4°C.	Validated by the references, the requirement prevents food safety relevant bacteria from increasing.	1,2,3,4,7,8,

EMO No	Provision	Comments	References
384.1	**Temperature of prescribed goods at time of removal from refrigeration chamber** Subject to sub-order 384.2, where prescribed goods are to be loaded into a ship, aircraft or container system unit for export, the goods shall have been reduced in temperature in accordance with the requirements of these Orders before loading	**Refer to order 384.2**	

EMO No	Provision	Comments	References
cont 288.1	(e) in the case of chilled vacuum packaged goods reduced in temperature in accordance with paragraph 250A.3(b) -- under refrigeration that ensures that the goods are held at an air temperature of not more than 3°C (f) in the case of chilled goods referred to in sub-order 250.2 or paragraph 250A.2 (c) -- under conditions that -- (i) ensure that the temperature and times specified in sub-order 250.2 or paragraph 250A.2(c) are complied with ; and (ii) an authorised officer has reasonable grounds to believe will not affect the goods in any way.	As validated by the references, the requirement is sufficiently prescriptive to prevent multiplication of food safety relevant bacteria. As validated by the references, the requirement is sufficiently prescriptive to prevent multiplication of food safety relevant bacteria	1,2,3,6,9,11

EMO No	Provision	Comments	References
288.2	**Refers to other provisions in the orders**	Refer to 288.1	

EMO No	Provision	Comments	References
cont 288.1	(c) in the case of goods reduced in temperature in accordance with sub-order 257.2 paragraph 258.1(b) or order 411 -- under conditions that ensure that the meat temperature of the goods does not rise above minus 10°C during transport;	As validated by the references, this requirement prevents food safety relevant bacteria from increasing	1,2,3,4,6,9, 11
	(d) in the case of goods that are derived from boning and packing into a carton -- under conditions that -- (i) ensure that the temperature and times specified in order 273, 275, 277, 278, 280 or 281 are complied with; and (ii) an authorised officer has reasonable grounds to believe will not affect the goods in any way.	Goods can be loaded out and transported between establishments in a manner which could lead to risk, particularly carton meat which is to be frozen, since the order does no specify a maximum meat temperature. Rather, for product to be frozen, the air temperature during transport must be not greater the 10°C and the meat temperature must be reduced to -6°C or below within 48 hours of boning, subject to the meat temperature at boning being in accordance with EMO 250. (However in practice due to short transport times and sufficiently low meat temperatures, it is unlikely that the growth of E. coli or other pathogens will be measurably increased.).	1,2,3,6,9,11

EMO No	Provision	Comments	References
288.1	**Temperature during Transport**		
	Prescribed goods that have been reduced in temperature shall be transferred between registered establishments only under the following conditions:	Load out temperatures and temperatures during transport between registered establishments are not prescriptive. They permit loadout at a deep butt temperature 20°C (except for Korean beef, 16°C) without any requirements for surface temperature - providing the transportation refrigeration ensures the goods are held at an air temperature of not more than 10°C. Under conditions permitted, equilibration during lengthily transport could lead to the surface temperature being above 7°C for significant periods of time. (However in practice transport times are relatively short). As validated by the references, this requirement prevents food safety relevant bacteria from increasing	1,2,3,6,9,11
	(a) in the cases of goods reduced in temperature in accordance with order 250 - under refrigeration that ensures that the goods are held at an air temperature of not more than 10°C during transport.		
	(b) in the cases of goods reduced in temperature in accordance with order 251 --- under refrigeration that ensures that the goods are held at an air temperature of not more than -- (i)1°C during transport for vacuum packaged goods; or (ii) 7°C during transport for other goods;		1,2,3,4,6,9, 11

EMO No	Provision	Comments	References
283	**Contents of Programme** The programme submitted under Order 282 shall ensure that -- (a) carcases, portions of carcase, or parts of carcases that are to be hot boned; and (b) prescribed goods derived from hot boning, are handled in accordance with any conditions or restrictions in the Export Meat Manual.	Refer to Comments in 282	3,8

EMO No	Provision	Comments	References
284	**Room in which hot boning takes place**	Will prevent food safety relevant bacteria of growing	3,8

EMO No	Provision	Comments	References
273.3	**Chilling or freezing of boned Goods** Prescribed goods derived from the boning of chilled carcases, portions of carcases or carcases parts shall, when placed under refrigeration after being vacuum packed for -- (i) Chilling, be chilled in accordance with paragraph 273.1 (a) and held for a period no longer than that specified in order 380, at a temperature of not more than 3°C and not less than minus 1.5°C (ii) freezing, be frozen in accordance with paragraph 273.1(b)(i) ; or (iii) ageing and then freezing, be chilled in accordance with paragraph 273.1(a) and then reduced to and held at temperature of not more than 3°C and not less than minus 1.5°C for a period no longer than 8 weeks and then frozen to a meat temperature of not more than minus 10 °C within 48 hours of being placed under refrigeration for freezing.	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	1,2,4,11,14, 16,17,19

EMO No	Provision	Comments	References
282	**Programme to be submitted for approval before commencement** Where carcases, portions of carcases or carcase parts are to be boned without having first been reduced to a meat temperature specified in Order 250, the operation shall not commence until programme has been submitted to, and approved by, the Secretary in accordance with Part 17	Refer to AQIS Notice 94/2 which is sufficiently prescriptive to minimise food safety relevant bacteria multiplying	1,2,3

EMO No	Provision	Comments	Reference
273.2	**Chilling or freezing of boned Goods** Where it is intended that prescribed goods that have been chilled in accordance with paragraph 273.1 (a) are to be subsequently frozen the - (a) approval of the authorised officer in charge of the establishment shall be obtained to freeze the goods; (b) goods shall be placed under refrigeration for freezing within 96 hours of the time the goods were placed under refrigeration for chilling (c) goods shall be reduced to a meat temperature of not more than minus 10° C within 48 hours of being placed under refrigeration for freezing; (d) occupier of the establishment shall make an application to the Secretary to change the trade description applied to the goods in accordance with order 64 of the Prescribed Goods (general) Orders.	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	13,16,17

EMO No	Provision	Comments	References
273.1	**Chilling or Freezing of Boned Goods** Prescribed goods derived from the boning of chilled carcases, portions of carcases or carcase parts, when placed under refrigeration without being in a vacuum packed, shall, if intended for export, as- (a) chilled goods- be at a meat temperature of not more than 7°C within 20 hours of the time boning was completed; or	As validated by the references, the requirement is sufficiently prescriptive to minimise food safety relevant bacteria multiplying Without a time requirement the requirement will not in itself prevent the possibility of food safety relevant bacteria from multiplying	1,2,3,4,5,6, 7,11,13,14, 15,17
	(b) frozen goods- (i) be reduced to a meat temperature of not more than -6°C within 48 hours of the time boning was completed and further reduced to a meat temperature of not more than -10°C within 80 hours of the time boning was completed;	As validated by the references, the requirement prevents food safety relevant bacteria from increasing	
	(ii) in the case of meat boned and packed while at a meat temperature of not more than 7°C and maintained at or below that temperature, be placed under refrigeration for freezing within 24 hours of the time boning was completed and reduced to a meat temperature of - 10°C within 48 hours of be placed under refrigeration for freezing; or	As validated by the references, the requirement is sufficiently prescriptive to minimise food safety relevant bacteria multiplying	
	(iii) in the case of a carton of meat that is not completely filled, be- (A) reduced to a meat temperature of not more that 7°C within 20 hours of boning being completed and maintained at or below that temperature; and (B) filled and placed under refrigeration for freezing within 96 hours of boning being completed and reduced to a meat temperature of not more than -10°C within 48 hours	As validated by the references, the requirement is sufficiently prescriptive to minimise food safety relevant bacteria multiplying	

EMO No	Provision	Comments	References
272	**Handling of boned goods** Prescribed goods derived from the boning of carcases, portions of carcases or carcase parts that have been chilled to the temperature specified in order 250 shall be (a) placed under refrigeration for further chilling for freezng in accordance with order 273 within 2 hours of the time boning was completed; or (b) incorporated into a meat product provided processing of the product commences within 2 hours of the time boning was completed.	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	3,5,7

EMO No	Provision	Comments	References
270	**Area in which boning takes place** Where presecribed goods in the form of carcases, portions of carcases and carcase parts are to be boned, all procedures including -- (a) readying for boning or trimming (b) boning; (c) packing; or (d) holding of goods -- (i) awaiting readying for boning; or (ii) that have been readied for boning shall be undertaken in an area that --		
	---- f) is controlled at a temperature of not more than 10°C while prescribed goods are present ; and	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	3,5,7,13
	--- except that, where the temperature of the area has risen to not more than 12 °C the authorised officer in charge at the registered establishment may permit prescribed goods to remain in that area in accordance with the Export Meat Manual.	As validated by the references, the requirement is sufficiently prescriptive to minimise food safety relevant bacteria multiplying	5,15

EMO No	Provision	Comments	References
264	**Operation of refrigerated chamber** The refrigerated chamber shall be operated -- (a) in a manner that ensures the uniform treatment of the prescribed goods, and (b) in the case of thawing -- at a temperature that ensures (i) the meat temperature if the prescribed goods does not rise above 7°C; and (ii) the surface temperature of the goods does not rise above 10°C or (c) in the case of tempering -- at a temperature that ensures that the temperature at any point within the prescribed goods does not rise above minus 2°C.	As validated by the references, the requirement minimises food safety relevant bacteria from increasing.	1,2,3,4,5,7, 13

EMO No	Provision	Comments	References
258.2	Edible offal that has been chilled in accordance with order 251 shall not be placed under refrigeration for freezing if -- a) in the case of items of vacuum packed offal that have been handled in accordance with sub-order 251.2, more than 14 days; or (b) in all other cases, more than 96 hours, Have elapsed from the time the edible offal was first placed under refrigeration for chilling.	As validated by the references, the requirement is sufficiently prescriptive to minimise food safety relevant bacteria multiplying	9,11

EMO No	Provision	Comments	References
259.1 259.2 259.3	**Restrictions on Freezing of chilled carcases etc**	Refer to 250.2(b); 250 A.3(a)	

EMO No	Provision	Comments	References
259A	**Freezing of Certain Vacuum Package Goods**	Refers to 257A.2 and 259.3(c) and 259.3(d)	

EMO No	Provision	Comments	Reference
257A.2	Where chilled vacuum packed goods are held in chilled storage for ageing then freezing, those goods shall not be frozen unless the goods -- (a) have been held in chilled storage in accordance with paragraph 250.2(b), for a period not longer than 8 weeks; and (b) are frozen to a meat temperature of minus 10 °C within 48 hours of being placed under refrigeration for freezing.	As validated by the references, the requirement prevents food safety relevant bacteria from increasing.	4,6,

EMO No	Provision	Comments	References
258.1	**Freezing of edible offal** Following handling and treatment in accordance with sub-order 234.3 or 234.4, edible offal, unless handled as specified in order 251 or sub-order 258.2, shall be frozen and shall be -- (a) placed under refrigeration in the chamber in which freezing is to take place within 2 hours of removal from the carcase during dressing; and (b) reduced to a meat temperature of not more than minus 10°C within 48 hours from the time the offal was placed under refrigeration for freezing.	Without a time requirement to reach 7°C, this requirements will not in itself prevent the possibility of food safety relevant bacteria from multiplying	6,9,10,20

EMO No	Provision	Comments	Reference
257.2	**Freezing of carcases, etc** Prescribed goods in the form of carcases, portions of carcases and carcase parts placed in a freezer shall be reduced in temperature, from the time that they were first placed under refrigeration for freezing, to a meat temperature of not more than minus 10°C within -- (a) 80 hours for cattle, calves of more than 40 kg, buffalo and solipeds; (b) 60 hours for pigs and deer; or (c) 48 hours calves of not more than 40 kg, sheep, lambs and goats.	Without a time requirement to reach 7°C surface, this requirements will not in itself prevent the possibility of food safety relevant bacteria from multiplying. However, the requirement to reach a prescribed meat temperature in practice prevents food safety relevant bacterial growth.	7,8

EMO No	Provision	Comments	Reference
257A.1	**Freezing of wrapped carcases, etc.** Prescribed goods in the form of carcases, portions or carcases or carcases parts, including goods chilled inaccordance with order 250, maybe wrapped or packed before, or in the course of, freezing, provided -- (a) subject to paragraph 257A1.(b), freezing is in accordance with sub-order 257.2 and b) in the case of packing in a carton i) packing in a carton does not take place until the meat temperature has been reduced to 20°C or lower and ii) the goods are reduced in temperature to a meat temperature of -- (A) not more than minus 6°C within 48 hours; and (B) not more than minus 10°C within 80 hours, of packing in a carton	Without a time requirement, these requirements will not in itself prevent the possibility of food safety relevant bacteria from multiplying. (However, in practice the requirements prevent food safety relevant bacteria from increasing.)	7,8 1,2,3,7

Attachment F: US example generic Pork slaughtering HACCP model sourced from the International Meat and Poultry HACCP Alliance.

GENERIC HACCP MODEL FOR

PORK SLAUGHTER

Developed:
June 18-20, 1996
Kansas City, Missouri

Submitted to

USDA, Food Safety and Inspection Service

by the

International Meat and Poultry HACCP Alliance

on

September 9, 1996

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GENERIC HACCP MODEL FOR PORK SLAUGHTER

Introduction:

Hazard Analysis Critical Control Point (HACCP) is a systematic, scientific approach to process control. It is designed to prevent the occurrence of problems by ensuring that controls are applied at any point in a food production system where hazardous or critical situations could occur. Hazards can include biological (pathological and microbiological for beef slaughter), chemical or physical contamination of food products.

The United States Department of Agriculture (USDA) published a final rule in July 1996 mandating that HACCP be implemented as the system of process control in all USDA inspected meat and poultry plants. As part of its effort to assist establishments in the preparation of plant-specific HACCP plans, FSIS determined that a generic model for each process defined in the regulation will be made available for use by the industry.

In May 1996, the U.S. Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS) awarded Contract Number 53-3A94-6-04 to the International Meat and Poultry HACCP Alliance for the development of ten generic HACCP models. The ten models developed were:

1. Not Heat Treated, Shelf-Stable (dried products, those controlled by water activity, pH, freeze dried, dehydrated, etc.)
2. Heat Treated, Shelf-Stable (rendered products, lard, etc.)
3. Heat Treated Not Fully Cooked, Not Shelf-Stable (ready to cook poultry, cold smoked and products smoked for trichinae, partially cooked battered, breaded, char-marked, batter set, and low temperature rendered products, etc.)
4. Products with Secondary Inhibitors, Not Shelf-Stable (products that are fermented, dried, salted, brine treated, etc., but are not shelf-stable)
5. Irradiation (includes all forms of approved irradiation procedures for poultry and pork)
6. Fully Cooked, Not Shelf Stable (products which have received a lethal kill step through a heating process, but must be kept refrigerated. This includes products such as fully cooked hams, cooked beef, roast beef, etc.).
7. Beef Slaughter
8. Pork Slaughter
9. Poultry Slaughter
10. Raw Products - not ground (all raw products which are not ground in their final form. This includes beef trimmings, tenderized cuts, steaks, roasts, chops, poultry parts, etc.)

USDA developed three additional models:

1. Raw, Ground
2. Thermally Processed/Commercially Sterile
3. Mechanically Separated Species/Deboned Poultry

This document contains the generic HACCP model for the process category titled: **Pork Slaughter**

In order to develop this model, a literature review and an epidemiological assessment of the products selected were performed to present an overview of the microbiological characteristics and profile of the product. This information then was reviewed by a team of industry, academic, public health officials,

and consumer representatives. The team met in a workshop in Kansas City, Missouri on June 18-20, 1996. Subsequent to the workshop, this generic HACCP model was reviewed by small business establishments for clarity and usability, and it was submitted to an expert peer review panel for technical review.

Generic HACCP plans serve as useful guidelines; however, it is impossible for a generic model for to be developed without it being too general. Therefore, it is incumbent on each plant's HACCP Team to tailor this model to fit products in each plant, based on the knowledge about the process. Several points should be considered when using this model to develop specific HACCP plans.

All plants shall have Sanitation Standard Operating Procedures (SSOPs). Good Manufacturing Practices (GMPs) (FDA, 21 CFR 110; Appendix 1) and Standard Operating Procedures (SOPs) may be in place as the foundation of the HACCP program. Good Manufacturing Practices are minimum sanitary and processing requirements applicable to all companies processing food. Standard Operating Procedures (SOPs) are step-by-step directions for completing important plant procedures. SOPs should specifically describe the method for conducting and controlling the procedure. SOPs should be evaluated regularly (i.e., daily) to confirm proper and consistent application, and modified as necessary to ensure control.

Each generic model can be used as a starting point for the development of your plant-specific plan reflecting your plant environment and the specific processes conducted. The generic model is not intended to be used "as is" for your plant-specific HACCP plans.

The generic models designed for use in developing a plant-specific HACCP plan are defined according to process category. In order to select the model or models that will be most useful for the activities performed in your plant, the following steps should be taken.

If a model for a slaughter operation is required, select the model for the appropriate species. If a model for a processed product or products is required, make a list of all products produced in the plant. Examine the list and group all like products according to common processing steps and equipment used. Compare these to the list of Process Models in Appendix 2. After reviewing and grouping the products produced, you will know the number of models that are needed to assist in developing your plant-specific plans.

If an establishment is a combination plant, i.e. conducting both slaughter and processing activities, the two models can be merged into a plant-specific plan. In this case, over-lapping critical control points (CCPs) can be combined as long as all significant hazards are addressed.

Seven Principles of HACCP:

The following seven principles of HACCP were adopted by the National Advisory Committee on Microbiological Criteria of Foods (NACMCF, 1992):

1. Conduct a hazard analysis. Prepare a list of steps in the process where significant hazards occur and describe the preventive measures.
   Three types of hazards:
   Biological (B)— primarily concerned with pathogenic bacteria, such as *Salmonella*, *Staphylococcus aureus*, *Campylobacter jejuni*, *Clostridium perfringens*, *Clostridium botulinum*, *Listeria monocytogenes*, and *Escherichia coli* O157:H7; also should consider *Trichinella sprialis*, and other parasites, as well as potential pathological concerns.
   Chemical (C)— toxic substances or compounds that may be unsafe for consumption; i.e., cleaners, sanitizers, pesticides, insecticides, rodenticides, paint, lubricants, etc.

Physical (P)— foreign objects which may injure the consumer; i.e., rocks, stones, wood, metal, glass, nuts, bolts, screws, plastic, knife blades, etc.

2. Identify the critical control points (CCPs) in the process. A critical control point is defined as a point, step or procedure at which control can be applied and a food safety hazard can be prevented, eliminated or reduced to an acceptable level.

3. Establish critical limits for preventive measures associated with each identified CCP. A critical limit is defined as a criterion that must be met for each preventive measure associated with a CCP. Each CCP will have one or more preventive measures that must be properly controlled to assure prevention, elimination, or reduction of hazards to acceptable levels. Each preventive measure has associated with it critical limits that serve as boundaries of safety for each CCP.

4. Establish CCP monitoring requirements. Establish procedures for using the results of monitoring to adjust the process and maintain control.

5. Establish corrective action(s) to be taken when monitoring indicates that there is a deviation from an established critical limit.

6. Establish effective record-keeping procedures that document the HACCP system.

7. Establish procedures for verification that the HACCP system is working correctly.

Specifics about this Generic Model:

1. Products Included In This Model. This model deals only with pork slaughter. The product samples include skin-on carcasses and skinned hot boned pork, and the following related products: Pork Heads (snout, tongue, cheek meat, ears, pate, brains, and lips); Pluck (heart, liver, and kidney); and Viscera (stomach, large intestines, small intestines, uteri and rectum).

2. Items Addressed. This model does not address certain aspects of product safety, such as Sanitation Standard Operating Procedures (SSOPs). Good Manufacturing Practices (GMPs) and Standard Operating Procedures (SOPs) may be in place as the foundation of HACCP. The following is a list of recommended pre-requisite programs prior to the implementation of HACCP:

a. Sanitation Standard Operating Procedures (required by FSIS)
b. Good Manufacturing Practices
c. Pest Control
d. Preventive maintenance and calibration of equipment
e. Potable water supply (including ice used in or on the product)
f. Purchasing specifications for raw materials and related letters of guarantee
g. Temperature control programs for refrigerated rooms and vehicles
h. Training/education of employees regarding employee hygiene, HACCP policy and responsibility.
i. Recall procedures, including tracking ability of raw materials (including animals) and finished product through distribution (labeling and coding).

3. Critical Control Points. The Critical Control Points in this model were established by the team members of the workshop. Some products or processes may require fewer or more CCPs depending on the individual operation.

4. Product Flow. In the product flow, the general processes were included; however, order of flow varies. The product flow of every HACCP plan should be specific and accurately reflect the processes involved at each plant.

5. Safety vs. Quality. Several parameters have been discussed to ensure a safe product. Only parameters relating to product safety were discussed. Quality issues were not addressed in this model.

6. Critical Limits. Critical limits selected must be based on the best information available to provide a safe product and yet be realistic and attainable. Processors must keep in mind that any product which does not meet a critical limit must have a Corrective Action taken on the product before being released from the plant.

7. Process Authority. Reference may have been made about a "Process Authority" in this model. A Process Authority may be an in-plant employee who has had specialized training, an outside consultant, or other professional.

8. Record-keeping. Record-keeping is an important part of the HACCP plan. Lack of accurate, current records may be cause for withholding or suspending inspection from a plant.

9. Chain of Custody. Chain of custody refers to the point at which a plant gains control of the mea' This is particularly important to know the history of incoming meat products. Requiring a HACCP plan from the supplier will in effect, extend the chain of custody to the supplier.

10. Sampling Procedures. Each plant must establish a sampling plan to verify critical control points (biological, chemical and physical) in the operation. The procedures will be based on prior knowledge about the problem areas and not necessarily on random testing. A Process Authority may help establish these sampling procedures which are most likely to identify a problem if it exists.

USING THIS GENERIC MODEL TO DEVELOP AND IMPLEMENT A HACCP PROGRAM

Getting Started: The plant should establish a HACCP team which includes at least one HACCP trained individual, and then develop a flow chart for each product (or process category). In addition, a training program should be completed for all employees. It is important for all employees to have ownership in the HACCP plan and to participate in its development as appropriate. It also is important that the employees be given the authority to stop production if the process becomes out of control. This empowerment is critical to make the HACCP program a successful one. Once HACCP is established, it must be continually evaluated, upgraded, and modified. Experience in working a HACCP plan will be helpful in continual improvement in the plan. In effect, the HACCP program is a long-term commitment to improving the safety of the product by controlling the process.

The NACMCF has 12 steps (five preliminary steps listed below and the seven principles previously listed) in developing a HACCP plan.

PRELIMINARY STEPS:

1) Assemble the HACCP team.
2) Describe the food and its method of distribution.
3) Identify the intended use and consumers of the food.
4) Develop a flow diagram which describes the process.
5) Verify the flow diagram.

Then apply the seven principles beginning with conducting a hazard analysis.

The following steps should be considered when developing an effective HACCP system.

Before developing the HACCP system it is important to ensure that an adequate sanitation system (sanitation standard operating procedures - SSOPs) is in place for compliance with FSIS regulation. GMPs and SOPs are also important because they establish basic operational parameters for the production of safe food.

Assembling the HACCP Team: An important step in developing a plan is to gain management commitment and assemble a HACCP team. Top management must be fully committed to product safety through HACCP to make the program effective. After commitment is obtained, the HACCP team should be assembled. The team should consist of individual(s) from all aspects of production and should include at least one HACCP trained individual.

Product Description. The description should include the products within the process, their distribution, intended use, and potential consumers. This step will help ensure that all areas of concern are addressed. If a particular area on the example form is not applicable to your process, then eliminate it from your description. The description for the Pork Slaughter is included in this model.

Flow Diagram. The HACCP team should develop and verify a flow diagram for production of the product(s). A simple flow diagram which includes every step of production is necessary. The flow diagram should be verified for accuracy and completeness by physically walking through each step in the diagram on the plant floor. The purpose of the flow diagram is to provide a clear, simple description of the steps in the process which are directly under the control of the facility. This model contains a generic flow diagram for Pork Slaughter.

Hazard Analysis. A hazard has been defined as any biological (B), chemical (C) or physical (P) property that may cause a food to be unsafe for human consumption. The hazard analysis is one of the most critical steps in the development of a HACCP plan. The HACCP team must conduct a hazard

analysis and identify steps in the process where significant hazards can occur. The significant hazards must be "of such a nature that their prevention, elimination, reduction or control to acceptable levels is essential to the production of safe food." (NACMCF, 1992) The team should focus on risk and severity as criteria for determining whether a hazard is significant or not. Risk, as defined by the National Advisory Committee, is "likelihood of occurrence." "The estimate of risk is usually based on a combination of experience, epidemiological data, and information in the technical literature." (NACMCF, 1992). Severity is the potential magnitude of the consequences to the consumer if the hazard is not adequately controlled. Hazards that are not significant or not likely to occur will not require further consideration in the HACCP plan.

Appendix 3 provides a list of example food safety hazards as identified in the Pathogen Reduction; Hazard Analysis Critical Control Point (HACCP) Systems regulation (USDA, 1996).

The hazard analysis and identification of associated preventive measures accomplishes the following:

Identifies hazards of significance and associated preventive measures.
The analysis can be used to modify a process or product to further assure or improve food safety.
The analysis provides a basis for determining CCPs, principle 2.

Critical Control Point (CCP): A CCP is any point, step, or procedure at which control can be applied so that a food safety hazard can be prevented, eliminated, reduced, or controlled to acceptable levels. Information developed during the hazard analysis should enable the HACCP team to identify which steps in the process are CCPs. A decision tree, such as the NACMCF Decision Tree (Appendix 4) may be useful in determining if a particular step is a CCP for an identified hazard.

The CCPs discussed in this generic model should be considered as examples. Different facilities preparing the same product can differ in the risk of hazards and the points, steps, or procedures which are considered CCPs. This can be due to differences in each facility layout, equipment, selection of ingredients, or the production process that is being used. Plant-specific HACCP plans may include additional or fewer CCPs than this model based on their individual process.

Critical Limit: A critical limit is a criterion that must be met for each preventive measure associated with a CCP. Therefore, there is a direct relationship between the CCP and its critical limits that serve as boundaries of safety. Critical limits may be derived from sources such as regulatory standards and guidelines, scientific literature, experimental studies, and advice from experts. The HACCP worksheet provided in this model summarizes the critical limits for each CCP. Critical limits must b based on the best information available at the time to provide a safe product and yet must be realistic and attainable. Establishments must keep in mind that any product which does not meet the critical limit must have a Corrective Action taken. Corrective actions may be as simple as re-processing or re-packaging or may require destroying the product.

Monitoring: Monitoring is a planned sequence of observations or measurements to assess whether a CCP is under control and produces an accurate record for future use in verification. Monitoring serves three purposes:

1) Monitoring is essential to food safety management in that it tracks the systems operation.
2) Monitoring is used to determine when there is a loss of control and a deviation occurs at a CCP, exceeding the critical limit. Corrective action must then be taken.
3) Monitoring provides written documentation for use in verifying the HACCP plan.

Because of the potential serious consequences of a critical defect, monitoring procedures must be effective. Continuous monitoring is possible with many types of equipment, and it should be used when possible.

Individuals monitoring CCPs must:

1) Be trained in the technique used to monitor each preventive measure;
2) Fully understand the purpose and importance of monitoring;
3) Have ready access to the monitoring activity;
4) Be unbiased in monitoring and reporting; and
5) Accurately report the monitoring activity.

All records associated with monitoring must be signed or initialed, dated, and the time recorded by the person conducting the monitoring activity.

Corrective Actions: Corrective actions are procedures to be followed when a deviation occurs. Because of variations in CCPs for different products and the diversity of possible deviations, specific corrective action plans must be developed for each CCP. The actions must demonstrate that the CCP has been brought under control and that the product is handled appropriately.

Record-Keeping: Record keeping is a critical aspect of the HACCP system. Records must be accurate and reflect the process, the deviations, the corrective actions, etc. Lack of accurate, current records may be cause for withholding or suspension of inspection from the plant.

It is also important that all HACCP records dealing with CCPs and corrective actions taken, be reviewed on a daily basis by an individual who did not produce the records and who has completed a course in HACCP, or the responsible establishment official who must sign or initial, date and record the time all records are reviewed. The HACCP plan and associated records must be on file at the meat and/or poultry establishment.

Example forms have been included in this model. It may be beneficial to combine forms as possible to reduce the amount of paperwork.

Verification: Verification consists of the use of methods, procedures or tests in addition to those used in monitoring to determine that the HACCP system is in compliance with the HACCP plan and whether the HACCP plan needs modification. There are three processes involved.

1) The scientific or technical process to verify that critical limits at CCPs are satisfactory — review of critical limits to verify that the limits are adequate to control hazards that are likely to occur.
2) Process verification to ensure that the facility's HACCP plan is functioning effectively.
3) Documented periodic reassessment, independent of quality audits or other verification procedures, that must be performed to ensure the accuracy of the HACCP plan.

Sanitation SOPs: According to USDA's Pathogen Reduction/HACCP regulation (USDA, 1996), effective establishment sanitation is essential for food safety and to successfully implement HACCP. There are direct and substantial links between inadequate sanitation and the contamination of meat and poultry products by pathogenic bacteria. Sanitation SOPs are necessary because they clearly define each establishment's responsibility to consistently follow effective sanitation procedures and substantially minimize the risk of direct product contamination and adulteration.

Microbial testing for indicator organisms can be used to validate CCP effectiveness, and to establish in-plant trend analysis. Microbial testing should be part of a sanitation program in order to validate effectiveness. Microbial testing does not indicate that the product is safe, but it is used to verify that the process was in control.

PROCESS CATEGORY DESCRIPTION

PORK SLAUGHTER

WORKSHOP LOCATION: Kansas City, MO

COMMON NAME:

(1) Pork Carcass (Skin-on)
(2) Pork (Skinned) Hot Boned Meat
(3) Heads (snout, tongue, cheek meat, ears, pate/forehead, brains, and lips)
(4) Pluck (heart, liver, and kidneys)
(5) Viscera (stomach, large intestine, small intestine, uteri, and rectum)

HOW IS IT TO BE USED: Whole carcass for fabrication (including hot boned meat)

TYPE OF PACKAGE:

Pork carcass and Pork Hot Boned Meat — No package
Head, Pluck, and Viscera — Boxed

LENGTH OF SHELF-LIFE, AT WHAT TEMPERATURE?

The shelf-life should be 14-21 days depending on the temperature (<40°F) and storage conditions. The head, pluck and viscera should be frozen at -20° as soon as possible. Products should be distributed within 90 days of slaughter.

LABELING INSTRUCTIONS:

Not applicable for carcass or hot boned meat; mark of inspection.
"Keep Frozen" on frozen head, pluck and viscera.

IS SPECIAL DISTRIBUTION CONTROL NEEDED?

Maintain refrigerated or frozen storage conditions.

PRODUCT CATEGORIES AND INGREDIENTS

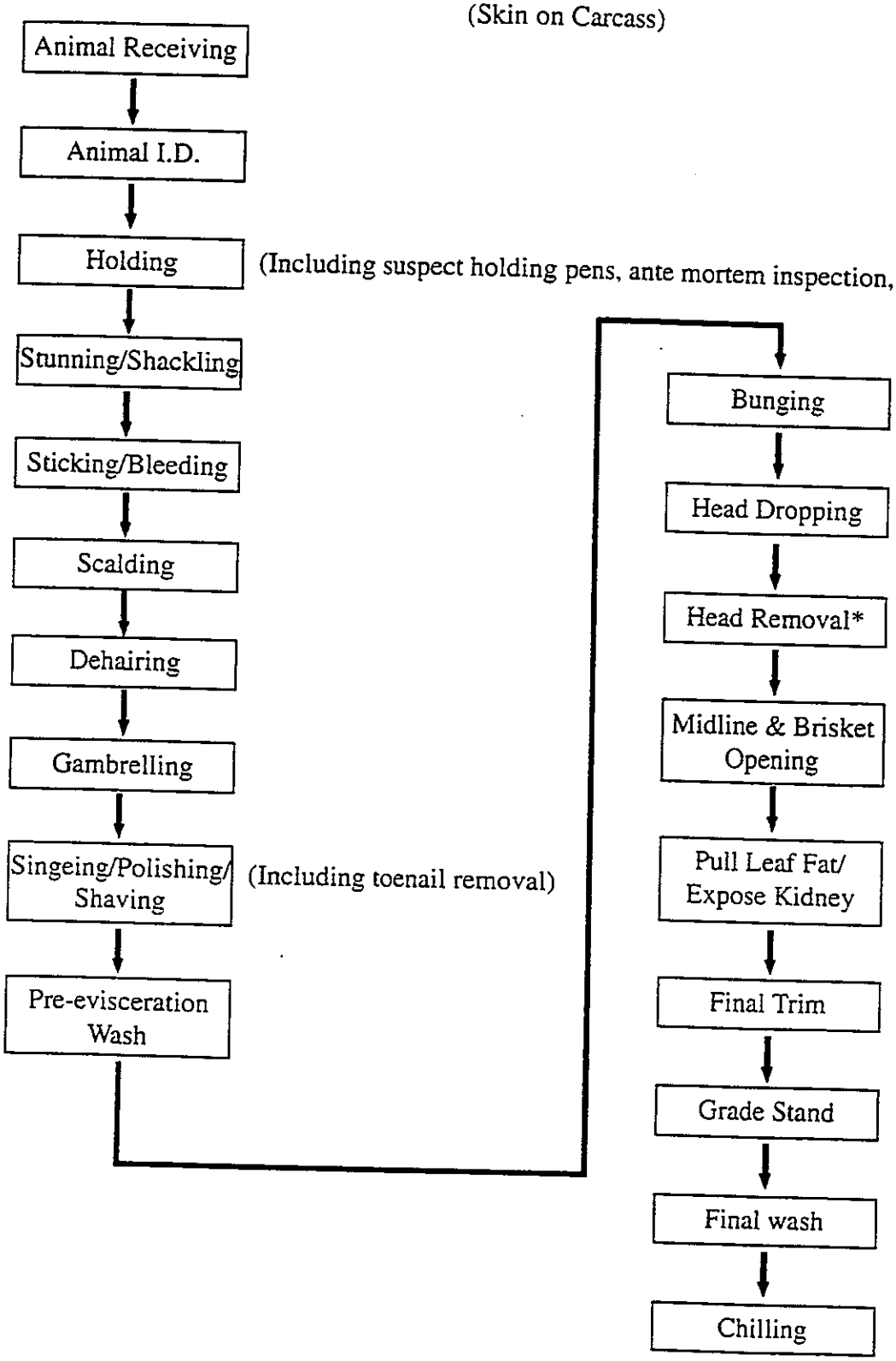
PRODUCT CATEGORY: Pork Slaughter

WORKSHOP LOCATION: Kansas City, MO

MEAT AND MEAT BYPRODUCTS	NON-MEAT INGREDIENTS	BINDERS/EXTENDERS
Live Hogs	N/A	N/A
SPICES/FLAVORINGS	**RESTRICTED INGREDIENTS**	**PRESERVATIVES/ ACIDIFIERS**
N/A	N/A	N/A
OTHER		
Packaging material for boxed products.		

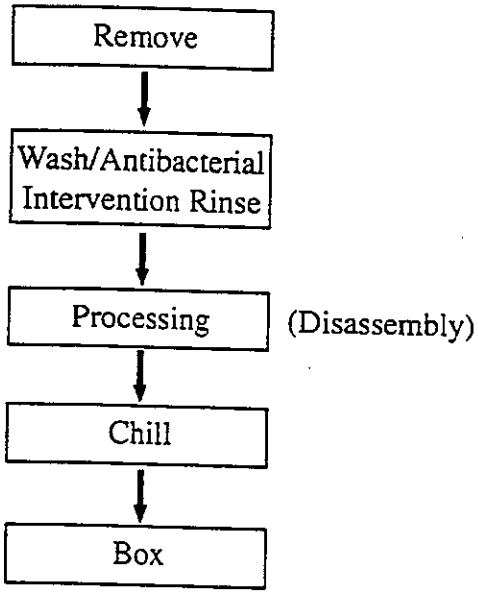
Pork Slaughter Flow Chart

(Skin on Carcass)

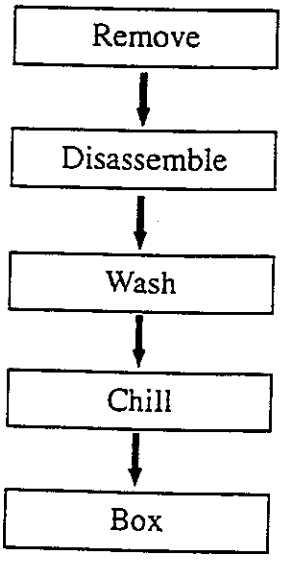


*The majority of industry operations remove the head following evisceration or splitting. In these situations the head removal step should be followed by an antibacterial intervention and the step be designated as a CCP.

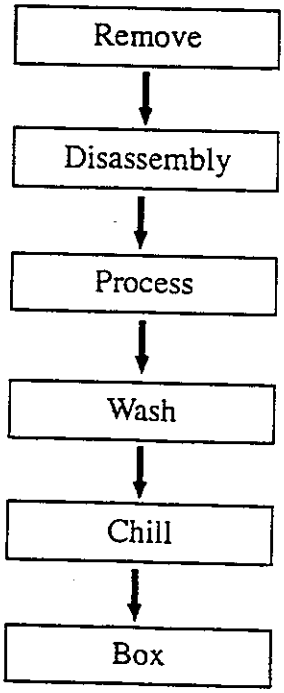
Flow Chart for Heads



Flow Chart for Pluck

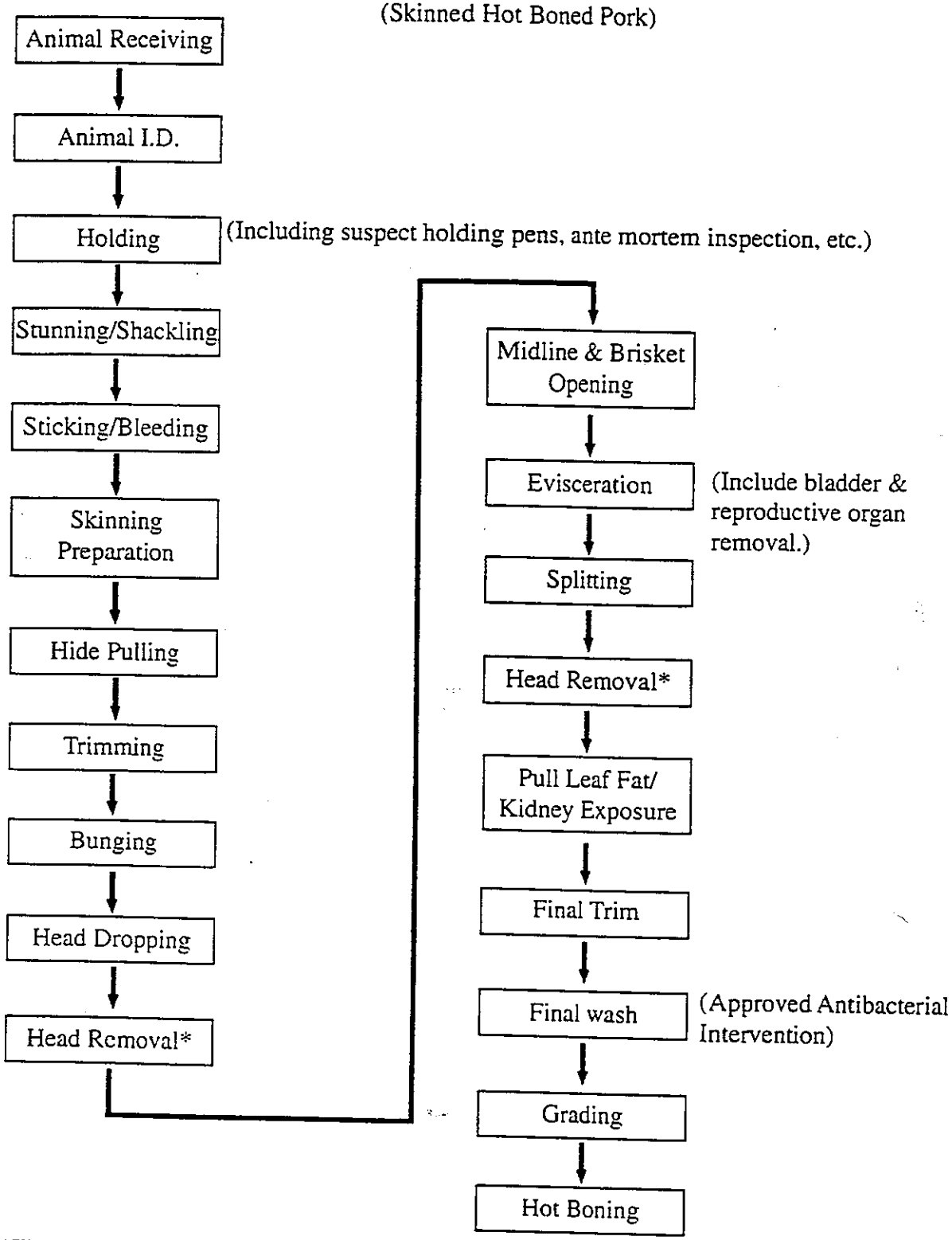


Flow Chart for Viscera



Pork Slaughter Flow Chart

(Skinned Hot Boned Pork)



*The majority of industry operations remove the head following evisceration or splitting. In these situations the head removal step should be followed by an antibacterial intervention and the step be designated as a CCP.

Hazard Analysis Worksheet:

The Hazard Analysis Worksheet format used in this model is an example format. Alternative forms can be used for the hazard analysis.

This worksheet should be used in two steps.

The first step, is to review each process step listed in the Process Flow Diagram and identify all potential hazards that can be introduced or enhanced at this step. Chemical, physical, and biological hazards should all be addressed. It is recommended that you list all potential hazards for each process step before moving to column two.

The second step, is to determine if the potential hazard is significant. The significant hazards must be "of such a nature that their prevention, elimination, reduction, or control to acceptable levels is essential to the production of safe food." (NACMCF, 1992) The team should focus on risk and severity as criteria for determining whether a hazard is significant or not. Risk, as defined by the National Advisory Committee, is "likelihood of occurrence." "The estimate of risk is usually based on a combination of experience, epidemiological data, and information in the technical literature." (NACMCF, 1992). Severity is the potential magnitude of the consequences to the consumer if the hazard is not adequately controlled. Hazards that are not significant or not likely to occur will not require further consideration in the HACCP plan.

It is important that you justify your decision for determining if a hazard is or is not significant. This will help you document your rationale for making decisions and is a useful tool when you re-validate or revise your HACCP plan.

The fifth column, addresses preventive measures. For each significant hazard, identify preventive measures, if they exist. A preventive measure is a physical, chemical, or other means which can be used to control an identified food safety hazard.

It is recommended that you complete columns 1 through 5, before starting on column 6. Column six asks, "Is this step a critical control point (CCP)?" A CCP is any point, step, or procedure at which control can be applied so that a food safety hazard can be prevented, eliminated, reduced, or controlled to acceptable levels. Information developed during the hazard analysis should enable the HACCP team to identify which steps in the process are CCPs. A decision tree, such as the NACMCF Decision Tree (Appendix 4) may be useful in determining if a particular step is a CCP for an identified hazard. The hazards identified during the development of this model were subjected to a decision tree by the team members. CCPs must be carefully developed and documented and must be for product safety only. Different facilities preparing the same product can differ in the risk of hazards and the points, steps, or procedures which are CCPs.

The CCPs identified in this model are for illustrative purposes only. Individual plant process will determine the CCPs identified for plant-specific plans. Remember that Sanitation Standard Operating Procedures are essential prerequisites to HACCP.

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Animal Receiving	C: Antibiotics, residues P: Foreign materials (needles, buckshot, etc.) B: Pathogens, parasites (*Salmonella*, etc.)	C: No P: No B: Yes	C: The potential food safety hazard from chemical residues (antimicrobial, pesticides, herbicides, and heavy metals) is not considered to be significant as there have been "no reports of residue-related human illness in the United States associated with consumption of commercially available meat or poultry" (Kindred and Hubbert, 1993). Monitoring for the presence of violative chemical residues is done by USDA and the slaughter establishments. Industry educational programs such as the Pork Quality Assurance (PQA) Program (National Pork Producers Council, 1994) have promoted residue prevention on the farm. In addition to the and producer efforts to address residues, slaughter establishments can request letters of guarantee and copies of relevant animal treatment records. The above listed combination of no identified food safety illnesses from pork residues, industry and government preventive and monitoring programs, and the extremely low level of residues provides the justification for chemical residues to not be considered a significant food safety hazard for this product.	No controls at this point. Programs being developed by animal producer groups may address some of these issues in the future.	No

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Animal receiving continued...			P: Physical hazards that may be of concern are related to foreign materials such as broken hypodermic needles that could be present in muscle tissue. Industry quality assurance programs include educational materials on proper injection techniques to minimize the potential for this to happen and how to address them if they do occur. At the present time, there are not devices available that are capable of detecting needles or other objects in the live animal. Detection devices may be used later in the processing stage to address this potential hazard. B: Hogs are potential carries of human pathogens/parasites. Most animals are asymptomatic so there is no practical detection method in live animals. Control is better accomplished throughout the process through sanitation, trimming when necessary and implementation and monitoring of designated CCPs.		
Animal I.D.	N/A				No
Holding	C: Residues P: None identified B: Pathogens	C: No B: Yes	C: Monitored by plant prerequisite program. Use only preapproved cleaning chemicals, etc. for holding pens. Low risk/exposure. B: Concern over animal shedding (salmonellae) which may occur within 3 hours of co-mingling (Cray, 1995). The holding period of animals prior to slaughter allows for rest and feed which have been shown to reduce the incidence of broken viscera and cross-contamination (Miller, et. al, 1996).	No specific controls exist at this step; however, holding should be geared to obtain optimal benefits at slaughter (i.e., clean pens, etc.)	No
Stunning/ Shackling	N/A				No

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Sticking/ Bleeding	C: None identified P: None identified B: Pathogens	No	B: Low risk. Potential for cross contamination of stick wound from animals that might be condemned or that have abscesses. All stick wounds are trimmed out and condemned during the processing operation.	Recommend sanitizing knife (180°F water) between animals as part of the Sanitation SOPs.	No
Scalding	C: Scalding agents P: None identified B: Pathogens	C: No B: No	C: Limited potential for contamination from improperly used chemicals in the scald water. B: Low risk. There is some indication that there is a potential for an increase in internal contamination via the stick wound during scalding (Woltersdorf, 1996). However, the risk to consumers is very low. All stick wounds are trimmed out and condemned in a subsequent process.	Recommend plant operational procedures to assure proper chemical and concentrations as approved.	No
Dehairing	C: None identified P: None identified B: Pathogens	Yes	There is significant cross contamination during conventional dehairing operations (Gill & Bryant, 1993; and Knudtson, 1995). *Note: There is a need for improved equipment design and investigation of alternative dehairing methods.*	Controlled at a later step in the process (i.e., trimming, washing, etc.)	No
Gambrelling	N/A				No
Singeing/ Polishing/ Shaving (scraping)	C: None identified P: None identified B: Pathogens	Yes	There is a lack of scientific evidence to show that singeing is a control for pathogens. Singing may reduce but not eliminate contaminants (Gill, 1994). Significant increases in cross contamination may occur during polishing (Knudtson & Hartman, and Gill et. al). Polishing will evenly distribute and may even add to the microbial burden (Merbrink & Borch, 1989; Gill and Bryant, 1992). Therefore, the singing, polishing and shaving process has not been sufficiently studied to justify it as a CCP. There are other interventions further in the process that better control contamination. However, the process needs to be explored to see if the technology can be improved to do the job without increasing the contamination.	Controlled at a later step in the process.	No

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Pre-evisceration Wash and antibacterial intervention	C: None identified P: None identified B: Pathogens	Yes	High bacterial loads on the surface due to dehairing & polishing. Note: Washing at this time is important as it removes organisms prior to attachment.	Hot water &/or organic acid rinse, steam or other USDA approved antibacterial intervention. (Organic rinse is recommended.)	Yes CCP 1-B
Bunging	C: None identified P: None identified B: Pathogens	Yes	Possible fecal contamination from procedure. Even though rupture may occur on some animals it is impossible to take corrective action at this step. It is recommended that improved dressing procedures (bags, tying, plug, etc.) be investigated.	Operational procedures - sanitize implements in 180°F water. Ruptured bungs should be tagged for railout. Trimming worker should identify carcasses needing trimming or cleaning. Do this as soon as possible after noting contamination as part of the plant's Sanitation SOP.	No
Head dropping	C: None identified P: None identified B: Pathogens	No	Cervical abscesses are more of an aesthetic problem than a human health threat. The major bacterial species associated with macroscopic lesions in pigs are considered non-pathogenic to humans or constitute no risk for foodborne illness (Berends et al., 1993).	Operational procedures - sanitize implements in 180°F water between carcasses as part of the plant's Sanitation SOP.	No
Head removal (see analysis for Head)	C: None identified P: None identified B: Pathogens	No	Same as above.	Same as above.	No
Open Midline & Brisket	C: None identified P: None identified B: Pathogens	No	Potential for contamination of internal cavities by accidentally cutting into the viscera, particularly the gastro-intestinal tract. Low incidence of occurrence; properly trained employees will reduce the incidence.	Operational procedures for worker identification of carcasses needing trimming or cleaning. Do this as soon as possible as part of the plant's Sanitation SOP. Also subsequent wash/anti-microbial treatment to reduce risk.	No

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Evisceration	C: None identified P: None identified B: Pathogens	Yes	Same as above.	Same as above.	No
Splitting	C: None identified P: Bone B: Pathogens	P: No B: No	P: Small bone fragments are deposited on the outer surfaces; however, these are easily removed at the final wash. Low risks. B: On contaminated carcasses there is some potential for spreading the contamination via the splitting saw. This is controlled via the operational procedures and Sanitation SOPs designed to prevent contamination.	Sanitize saw between carcasses; known contaminated carcasses split on throw-out rail.	No
Head Removal (alternate site for Heads given below)					
Pull Leaf Fat & Expose Kidney	N/A				No
Final Trim	C: None identified P: Deadlocks B: Pathogens	P: No B: Yes	P: Removed prior to fabrication. Metal detectors may be used on trimmings. Low risk to cause health problems. B: As contamination occurs during processing, it should be removed as soon as possible by using physical trimming. The final trim rail is the final point in the slaughter process to remove visible contamination prior to the antimicrobial intervention.	Trim and visual evaluation.	Yes CCP 2
Grading	N/A				No
Final Wash & Antibacterial Rinse	C: None identified P: Bone dust, chips B: Pathogens	P: No B: Yes	P: Small particles will wash off easily. Low risk B: Appropriate step to reduce bacterial load from previous slaughter steps. (Alsmeyer, RH, Dickson, et al, 1991 & 1992; van Netten et al, 1994; USDA, FSIS Backgrounder, 1992)	Hot water, organic acids, steam or other USDA approved intervention.	Yes CCP 3

HACCP Worksheet:

The HACCP Worksheet format used in this model is an example format. Alternative forms can be used for the HACCP plan.

The first three columns of the form, identify the process step associated with the CCP, allows for CCP identification (number and type of hazard), and provides a description of the CCP. Columns four through eight are used to indicate the establishment's critical limits, monitoring procedures, corrective actions, recordkeeping methods, and verification procedures for each CCP.

A critical limit is a criterion that must be met for each preventive measure associated with a CCP. Critical limits may be derived from sources such as regulatory standards and guidelines, scientific literature, experimental studies, and advice from experts. Critical limits must be based on the best information available at the time to provide a safe product and yet must be realistic and attainable. Establishments must keep in mind that any product which does not meet the critical limit must have a Corrective Action taken. Corrective actions may be as simple as re-processing or re-packaging or may require destroying the product.

Monitoring procedures should include a planned sequence of observations or measurements to assess whether a CCP is under control and produce an accurate record for future use in verification. Monitoring serves three purposes:

1) Monitoring is essential to food safety management by tracking the systems operation.
2) Monitoring is used to determine when there is a loss of control and a deviation occurs at a CCP, exceeding the critical limit. Corrective action must then be taken.
3) Monitoring provides written documentation for use in verifying the HACCP plan.

All records associated with monitoring must be signed or initialed, dated, and the time recorded by the person conducting the monitoring activity.

Corrective actions are procedures to be followed when a deviation occurs. Because of variations in CCPs for different products and the diversity of possible deviations, specific corrective action plans must be developed for each CCP. The actions must demonstrate that the CCP has been brought under control and that the product is handled appropriately. Corrective action records must be signed, dated, and the time of action recorded by the individual responsible for taking the action.

Record keeping is a critical aspect of the HACCP system. Records must be accurate and reflect the process, the deviations, the corrective actions, etc. Lack of accurate, current records may be cause for withholding or suspension of inspection from the plant. It is also important that all HACCP records dealing with CCPs and corrective actions taken, be reviewed on a daily basis by an individual, who did not produce the records and who has completed a course in HACCP, or the responsible establishment official who must sign or initial, date, and record the time all records are reviewed. The HACCP plan and associated records must be on file at the meat and/or poultry establishment.

Example recordkeeping forms have been included in this model. It may be beneficial to combine forms as practical to reduce the amount of paperwork.

Verification consists of the use of methods, procedures, or tests in addition to those used in monitoring to determine that the HACCP system is in compliance with the HACCP plan and whether the HACCP plan needs modification. Verification involves:

1) The scientific or technical process to verify that critical limits at CCPs are satisfactory — review of critical limits to verify that the limits are adequate to control the hazards and that are likely to occur.
2) Process verification to ensure that the facility's HACCP plan is functioning effectively.
3) Documented periodic revalidation, independent of quality audits or other verification procedures, that must be performed to ensure the accuracy of the HACCP plan.

PROCESS STEP	CCP NUMBER	CCP DESCRIPTION	CRITICAL LIMITS	ESTABLISHMENT MONITORING	CORRECTIVE ACTION	HACCP RECORDS	HACCP VERIFICATION
Final Wash & Antibacterial Intervention	CCP 3-B	Wash complete carcass with water at sufficient force (water as it contacts carcass), volume and pressure (psi supplied to the hose) to remove visible contamination. Use a pathogen intervention process approved by USDA and/or scientifically validated such as use of organic acids (acetic or lactic acid) or hot water. See FSIS Directive 6340.1; December 1993.	Psi of water $\geq$35 and $\leq$500 ml for each carcass (Not enough data for pork carcasses so the standard for beef carcasses is used as an example.) Lactic acid applied at 500 ml per carcass and 250 ml for each side of a 2% solution at 130°F. Acid and water must remain on the carcass for 30 seconds.	Continuous monitoring by designated plant employee (record every 30 minutes that wash (individual or cabinet) is operating properly. Carcass evaluation by designated plant employee to assure removal of visible contaminants. Equipment checked for psi, at least once per shift; assure application is not hindered by equipment malfunction.	Stop production, first/and/or adjust was unit. Monitoring individual empowered to stop production as soon as cabinet fails to operate. Unwashed product will be reconditioned by hand washing, skinning or recycling through wash cabinet.	Continuous monitoring results are recorded on appropriate form. Record results of each evaluation of carcasses on production form, recorded at least once per shift. *All records should be signed, dated and the specific results recorded.*	Random micro testing to compare with baseline and measure progress. Daily review of records for this CCP prior to shipping product. Check random sampling of carcasses every 1/2 hour to determine visual contaminants have been removed. (Size of sample will vary depending on the size of the operation and each days' total sampling should be between 1-2% of the daily kill.)

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
HEADS					
Removal	N/A				
Wash/ Antibacterial intervention	C: None identified P: None identified B: Pathogens	Yes	Potential for cross contamination from dressing operation.	Wash followed by antibacterial intervention.	Yes CCP #3
Disassembly	N/A				No
Chill	N/A				No
Box	N/A				No
PLUCK					
Receive pluck from evisceration	N/A				No
Disassembly	N/A				No
Wash	N/A				No
Chill	N/A				No
Box	N/A				No
VISCERA					
Receive from evisceration	N/A				No
Disassembly	C: None identified P: None identified B: Pathogens	Yes	Cross contamination from broken guts.	Broken guts are removed and condemned. Sanitation SOPs should prevent additional product contamination.	No
Processing	N/A				No
Wash	N/A				No
Chill	N/A				No
Box	N/A				No

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Hide Pulling	C: None identified P: None identified B: Pathogens	Yes	B: Contamination, carcass to carcass, equipment, airborne pathogens, hide left on carcass. Most of the contaminating organisms originate from the hide. A previously 'sterile' surface is now exposed and may be contaminated either through direct or indirect contact with hide, hair, fecal matter equipment and worker handling. Any visible contamination will also be trimmed further during the processing where it may be more effective in pathogen removal. (Johanson, 1983; Roberts, 1984)	Subsequent wash/ antibacterial intervention step applied. Properly train workers, proper equipment adjustment. Contamination should be identified and removed as soon as possible. *recommend hide puller be sanitized — should be continuous for product contact surfaces. Any foreign material will be identified and removed as soon as possible.	No

PROCESS STEP	CCP NUMBER	CCP DESCRIPTION	CRITICAL LIMITS	ESTABLISHMENT MONITORING	CORRECTIVE ACTION	HACCP RECORDS	HACCP VERIFICATION
Final trim	CCP 2-B	Removal of all visual contamination by trimming.	No visual fecal or ingesta contamination on carcass. Greater than 20% of the carcasses (3 of 10 sequential carcasses) having visible contaminants. (Horne, 1993)	Visual inspection in 2 steps. 1. Continuous monitor 100% or carcasses. 2. Designated monitor examines X number of carcasses every X time period. (1-2% of production).	Reduce line speed by 10% for each carcass that deviates on designated monitor's examination and increase frequency of monitor examinations. Increase speed - (up to the original speed) in the same 10% increments on the basis of "clean tests." Rail out for individual attention and evaluation those carcasses that have excess contamination. Should be identified by operator at the station where the contamination occurs. Stop line.	Use carcass mapping to indicate location of defects. *All records should be signed, dated and the specific results recorded.*	Random micro testing to compare with baseline and measure progress. Daily review of records for this CCP prior to shipping product. Check random sampling of carcasses every 1/2 hour to determine visual contaminants have been removed. (Size of sample will vary depending on the size of the operation and each days' total sampling should be between 1-2% of the daily kill.)

HACCP WORKSHEET — GENERIC HACCP MODEL — PORK SLAUGHTER							
PROCESS STEP	**CCP NUMBER**	**CCP DESCRIPTION**	**CRITICAL LIMITS**	**ESTABLISHMENT MONITORING**	**CORRECTIVE ACTION**	**HACCP RECORDS**	**HACCP VERIFICATION**
Pre-evisceration Wash	CCP 1-B	Wash complete carcass with water at sufficient force (water as it contacts carcass), volume and pressure (psi supplied to the hose) to remove visible contamination. Force, volume and hose psi are intimately interrelated and vary from plant to plant and factors can be adjusted for maximum effectiveness. Force of the water contacting the carcass is also a function of distance from the nozzle.	Psi of water $\geq$35 and $\leq$500 ml for each carcass	Continuos monitoring by responsible plant employee (recorded every 30 minutes) by designated plant employee that washer (individual or cabinet) is operating properly. Carcass evaluation by trained designated individual to assure removal of visible contaminants (1-2% of carcasses, selected randomly). Equipment checked for psi, at least once per shift; assure application is not hindered by equipment malfunction.	Stop production, first/and/or adjust wash unit. Monitoring individual empowered to stop production as soon as cabinet fails to operate. Unwashed product will be reconditioned by hand washing, skinning or recycling through wash cabinet.	Continuous monitoring results are recorded on appropriate form. Record results of each evaluation of carcasses on production form, recorded at least once per shift. Hold summary Deviation/ Corrective Action log Verification log *All records should be signed, dated and the specific results recorded.*	Equipment (thermometer, pressure gage, etc.) calibration at the beginning of every shift and at lunch break (two checks per shift). Random microbial testing to compare with baseline and measure progress. Daily review of records for this CCP prior to shipping product. Check random sampling of carcasses every 1/2 hour to determine visual contaminants have been removed. (Size of sample will vary depending on the size of the operation and each days' total sampling should be between 1-2% of the daily kill.)

HACCP WORKSHEET — GENERIC HACCP MODEL — PORK SLAUGHTER							
PROCESS STEP	**CCP NUMBER**	**CCP DESCRIPTION**	**CRITICAL LIMITS**	**ESTABLISHMENT MONITORING**	**CORRECTIVE ACTION**	**HACCP RECORDS**	**HACCP VERIFICATION**
Pre-evisceration Wash	CCP 1-B	Wash complete carcass with water at sufficient force (water as it contacts carcass), volume and pressure (psi supplied to the hose) to remove visible contamination. Force, volume and hose psi are intimately interrelated and vary from plant to plant and factors can be adjusted for maximum effectiveness. Force of the water contacting the carcass is also a function of distance from the nozzle.	Psi of water $\geq$35 and $\leq$500 ml for each carcass	Continuos monitoring by responsible plant employee (recorded every 30 minutes) by designated plant employee that washer (individual or cabinet) is operating properly. Carcass evaluation by trained designated individual to assure removal of visible contaminants (1-2% of carcasses, selected randomly). Equipment checked for psi, at least once per shift; assure application is not hindered by equipment malfunction.	Stop production, first/and/or adjust wash unit. Monitoring individual empowered to stop production as soon as cabinet fails to operate. Unwashed product will be reconditioned by hand washing, skinning or recycling through wash cabinet.	Continuous monitoring results are recorded on appropriate form. Record results of each evaluation of carcasses on production form, recorded at least once per shift. Hold summary Deviation/ Corrective Action log Verification log *All records should be signed, dated and the specific results recorded.*	Equipment (thermometer, pressure gage, etc.) calibration at the beginning of every shift and at lunch break (two checks per shift). Random microbial testing to compare with baseline and measure progress. Daily review of records for this CCP prior to shipping product. Check random sampling of carcasses every 1/2 hour to determine visual contaminants have been removed. (Size of sample will vary depending on the size of the operation and each days' total sampling should be between 1-2% of the daily kill.)

PROCESS STEP	CCP NUMBER	CCP DESCRIPTION	CRITICAL LIMITS	ESTABLISHMENT MONITORING	CORRECTIVE ACTION	HACCP RECORDS	HACCP VERIFICATION
Final trim	CCP 2-B	Removal of all visual contamination by trimming.	No visual fecal or ingesta contamination on carcass. Greater than 20% of the carcasses (3 of 10 sequential carcasses) having visible contaminants. (Horne, 1993)	Visual inspection in 2 steps. 1. Continuous monitor 100% or carcasses. 2. Designated monitor examines X number of carcasses every X time period. (1-2% of production).	Reduce line speed by 10% for each carcass that deviates on designated monitor's examination and increase frequency of monitor examinations. Increase speed - (up to the original speed) in the same 10% increments on the basis of "clean tests." Rail out for individual attention and evaluation those carcasses that have excess contamination. Should be identified by operator at the station where the contamination occurs. Stop line.	Use carcass mapping to indicate location of defects. *All records should be signed, dated and the specific results recorded.*	Random micro testing to compare with baseline and measure progress. Daily review of records for this CCP prior to shipping product. Check random sampling of carcasses every 1/2 hour to determine visual contaminants have been removed. (Size of sample will vary depending on the size of the operation and each days' total sampling should be between 1-2% of the daily kill.)

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
Hide Pulling	C: None identified P: None identified B: Pathogens	Yes	B: Contamination, carcass to carcass, equipment, airborne pathogens, hide left on carcass. Most of the contaminating organisms originate from the hide. A previously 'sterile' surface is now exposed and may be contaminated either through direct or indirect contact with hide, hair, fecal matter equipment and worker handling. Any visible contamination will also be trimmed further during the processing where it may be more effective in pathogen removal. (Johanson, 1983; Roberts, 1984)	Subsequent wash/ antibacterial intervention step applied. Properly train workers, proper equipment adjustment. Contamination should be identified and removed as soon as possible. *recommend hide puller be sanitized — should be continuous for product contact surfaces. Any foreign material will be identified and removed as soon as possible.	No

Ingredient/ Process Step	Potential hazard introduced, controlled or enhanced at this step	Is the potential food safety hazard significant?	Justification for decision	What control measures can be applied to prevent the significant hazards?	Is this step a critical control point (CCP)?
HEADS					
Removal	N/A				
Wash/ Antibacterial intervention	C: None identified P: None identified B: Pathogens	Yes	Potential for cross contamination from dressing operation.	Wash followed by antibacterial intervention.	Yes CCP #3
Disassembly	N/A				No
Chill	N/A				No
Box	N/A				No
PLUCK					
Receive pluck from evisceration	N/A				No
Disassembly	N/A				No
Wash	N/A				No
Chill	N/A				No
Box	N/A				No
VISCERA					
Receive from evisceration	N/A				No
Disassembly	C: None identified P: None identified B: Pathogens	Yes	Cross contamination from broken guts.	Broken guts are removed and condemned. Sanitation SOPs should prevent additional product contamination.	No
Processing	N/A				No
Wash	N/A				No
Chill	N/A				No
Box	N/A				No

Attachment G: Case studies from participating plants

Meat Industry Council

Project 1

CASE STUDIES FROM PARTICIPATING PLANTS

These case studies were presented by participating plants at industry seminars held in July and August 1997. Presentation style has been edited to provide a consistent format but the content is that presented by the participants.

In their presentations, participants were asked to address a number of implementation issues:

- Process followed
  - Easy bits
  - Problems
- Results achieved
  - Documentation
  - Links with suppliers
  - Links with customers
  - Improvements in the plant
- Advice/help from regulators during the project
- Use of consultants and the value of this
- Lessons from your experience
- Advice to others who might be starting out.

Supported by the Department of Industry, Science and Tourism Food Quality Program and the Meat Research Corporation Food Safety Key Program.

TEYS BROS, BILOELA, QLD

Process followed

- we set out to achieve MSQA certification from AQIS
- we followed the AQIS MSQA implementation guide
- conducted early training for HACCP teams
- commenced system development with the HACCP steps and in developing work instructions
- followed with support programs
- difficulties with:
  - getting consistent advice from AQIS
  - understanding how all the system pieces operated together
  - understanding the full system requirements
  - understanding the level of detail required
  - finding out what was a critical control point and what was not
- some easy parts of the process were
  - startup
  - can't think of any others
- Project 1 group workshops were very valuable in identifying implementation issues and obtaining assistance

Results achieved

Documentation

- serious re-writing following the group workshops and the initial MSQA audit
- the MSQA structure means we now have the framework for an ISO 9000 system if we wish to take it further
- Work Instructions are well accepted by the plant personnel and are now displayed at each work station
- system now certified by AQIS

Links with suppliers

- we used the introduction of the vendor declaration system to start to educate suppliers to our needs
- bringing livestock buying into the management system is a slow process because of the large number of suppliers
- progress is being made with groups of suppliers to ensure they understand our requirements particularly for clean cattle to be delivered to us

Links with customers

- we get numerous audits of our production systems and products, by foreign as well as domestic customers
- customers now put a lot of effort into telling us what their requirements are and we put the necessary effort into understanding them

Improvements in the plant

- our meat hygiene results consistently run below the threshold limits
- microbiological results have not shown any positives for pathogens
- our plant had the highest score of the Project 1 group for several of the audit criteria in the second project audit
- we have had customers from North America comment that our HACCP system is the best they have seen anywhere

Advice/help from regulators during the project

- AQIS local advice was inconsistent and at times wrong
- audits by Canberra based personnel were valuable and provided guidance for system development and refining
- local plant staff did not want to get involved in the ssytem development, preferring to reserve a "judgement" position on the documentation as it developed
- the MSQA guide led towards us having too many critical control points

Use of consultants and the value of this

- consultants were used to provide HACCP training and internal audit training
- consultants vary a lot in capability – get references before you engage them
- make sure their experience covers your needs – check satisfaction of their previous clients
- professional consultants are always happy to supply references

Lessons from our experience

- we underestimated the time and trouble required to fully understand customers' businesses so we could ensure that our system was able to deliver what they wanted
- we also underestimated the training requirement to get the system and the operations to the level we wanted them
- we initially underestimated the contribution which could be made by the internal audit and management review activities – these have turned out to be very valuable in improving our systems

Advice to others who might be starting out

- expect the development of your plan to take longer than you think
- invest in training – you can't do too much
- adopt a systematic development approach – set your development timetable and milestones and stick to them
- try to recognise when you need outside assistance – you may not realise that you don't know something

NOLAN MEATS, GYMPIE, QLD

Process followed

- we set out to achieve Q-safe certification from QLMA and third party ISO certification
- we also set out to include all our requirements in our system: e.g. OH&S and environmental requirements
- appointed our training manager to lead the implementation (had to repeat this when the first one left)
- conducted training for all personnel
- commenced system development with the HACCP steps and in developing work instructions, involving all the teams
- set up a structures series of system development meetings which involved all workers in the development of the system as it affected them
- bought some software which assisted the development and organisation of the system
- Project 1 group workshops were very valuable in identifying implementation issues and obtaining assistance

Results achieved

Documentation

- Our documentation complies with all Q-Safe and ISO requirements

Links with suppliers

- we are integrated livestock producers ourselves and we have set up producer groups to learn our requirements
- we run regular field days and we assist with carcass competitions to get the message across
- we supply genetics to suppliers where it helps them meet our needs

Links with customers

- our business has expanded in what are difficult times particularly for beef
- we provide a full service, we deliver meat and place it store for them
- our customers regularly comment on the cleanliness of our trucks, the hygiene our drivers observe and the quality of our meat

Improvements in the plant

- we believe our wastage has fallen and this contributes to our business result
- we have made some significant efficiencies which have helped us during the recent beef market problems
- we were the first abattoir to gain Q-Safe certification at the first audit (others had required follow up audits)
- we also gained our ISO 9002 certification at first audit

Advice/help from regulators during the project

- QLMA were initially directive about their requirements but once they understood our plan to have a system to cover all operations they were helpful
- they provided advice as required but other than that they let us get on with it
- they were prompt with service once we were ready for audit

Use of consultants and the value of this

- consultants were used to provide quality system training and internal audit training
- some were good and others not so good, we got best value from people who really understood our business

Lessons from our experience

- it is quite practical and in fact not difficult to include all your management requirements within one management system

Advice to others who might be starting out

- don't shy away from including all the things you want to include in your system
- involve all your workers – they will have to make it work
- do enough training
- find others who are trying the same thing and get support – you are not alone!

QUEENSLAND ABATTOIR CORPORATION, IPSWICH, QLD

Process followed

- we set out to achieve Q-safe certification but to incorporate the AQIS MSQA requirements since that would provide a plantform to move to ISO certification if we wanted to
- because we have a group operation (three plants in south east Qld) we had a group quality manager who had responsibility for HACCP implementation
- we set up and conducted training for HACCP teams
- we started HACCP by following the twelve steps and the seven principles and also developed work instructions
- we attended Project 1 group workshops and got help from other participants and from the regulatory authorities who came along

Results achieved

Documentation

- our documentation complies with all Q-Safe requirements
- it also meets MSQA requirements which assisted us in implementation at our export plant
- there is a lot of it!

Links with suppliers

- we are a service works, we don't own the meat which goes through our plant
- we have established very close links with our major customers, they have in turn established systems with their suppliers to ensure the proper presentation of livestock at our plant

Links with customers

- we have established systems with our customers so that our service results in correct processing of their stock, and the final product meets their specifications

Improvements in the plant

- we have got better hygiene of our product and plant as a result of people following the work instructions which they helped develop
- we gained Q-Safe certification during the course of the project
- we also moved to company based meat inspection as a result of gaining Q-Safe certification

Advice/help from regulators during the project

- we did not get too much help early in the project because QLMA did not seem to know too much about HACCP implementation themselves, but attendance at the Project 1 workshops helped us reach a common understanding of requirements

Use of consultants and the value of this

- consultants were used to provide quality system training and internal audit training
- our consultants were good and very helpful
- they were meat industry specialists and this helped them understand our business

Lessons from our experience

- HACCP is a great deal of work
- Good consultants can help a lot when you are struggling to understand, or when you are not sure what to do next

Advice to others who might be starting out

- get good help – you will need it
- go to workshops and seminars to help you understand requirements
- do plenty of training

R J GILBERTSON (QLD) PTY LTD, GRAFTON, NSW

Process followed

- nothing was in place when we started this project – everything was developed from scratch during the project
- we set out to achieve the AQIS MSQA requirements
- we adopted a strictly focussed approach that AQIS were the customer for the first phase of our system development, other customer requirements would follow once the system was up and running – this provided management focus on the outcome
- we followed the twelve steps and the seven principles of HACCP as outlined in the AQIS MSQA guide
- workers were set up in teams and given training to develop their own work instructions
- Project 1 group meetings were helpful
- We started with too many critical control points but we reduced these as we revised the system

Results achieved

Documentation

- we followed the MSQA guide
- we also followed sample documentation provided by the project
- our consultants were very helpful in structuring the documentation and helping with content requirements
- all levels of management were involved in the development and revision of documentation

Links with suppliers

- this is not yet well developed because of our focus on AQIS as the customer in the first phase
- the vendor declaration forms have provided an opportunity to educate suppliers that we will have more formal systems in the future
- supplies generally are happy about this, they are usually keen to know our requirements

Links with customers

- because of the AQIS focus, this is also not yet well developed
- we are getting more visits from customers and in some cases they are auditing our systems

Improvements in the plant

- we were the first Project 1 plant to achieve MSQA certification
- the plant is achieving better hygiene because workers developed their own work instructions and they police it themselves within their teams

Advice/help from regulators during the project

- we did not find AQIS very helpful initially mainly because they did not have their internal requirements sorted out, so consequently the local staff were not sure about what they should be doing in regard to MSQA
- they were also confused about definitions such as critical control points
- the audits carried out later were helpful because of the guidance we got, but also because it clearly helped local staff to understand their role in the MSQA system

Use of consultants and the value of this

- our consultants were good and very helpful
- they were meat industry consultants and this was helpful
- the carried out training, assisted in the drafting and revision of documentation, and provided internal audit training

Lessons from our experience

- you will sometimes be ahead of the regulators
- sometimes they don't know what they want, and this can cause delays
- involvement of the workers is essential
- training is paramount
- senior management support is crucial

Advice to others who might be starting out

- good consulting advice is very valuable
- involve your regulatory authority – they also need to learn
- focus on what you are intent on achieving and work towards it – don't try to do too much too soon

THE MID-COAST MEAT COMPANY, MACKSVILLE, NSW

Process followed

- we set out to achieve MSQA certification, but at the same time provide a basis for ISO certification if we wanted it, and include all our management requirements within the one system
- we had some extensive systems in place but we had not brought these together within the one overall system
- we decided to develop the key process control parts of the system as a matter of priority and to allow the documentation of other areas to follow as required, this meant that in many areas the documentation lagged behind the systems development itself
- we followed the five initial steps and the seven principles of HACCP as required by Codex
- teams of workers developed their own work instructions after training
- Project 1 group meetings let us see how others were progressing

Results achieved

Documentation

- documentation complies with ISO requirements
- the structure of the documentation allows us to provide any auditor with the relevant documentation for any audit, as all audits are for part of the system only
- we get lots of audits from AQIS, from customers, from OH&S officials, from Department of Environment officials etc. etc., we average over 2 per month
- revision of documentation is a never ending task

Links with suppliers

- this is well developed with our feedlot suppliers because of the importance of this to our business
- for other suppliers, the vendor declaration forms have been useful to get suppliers used to providing documentation

Links with customers

- we have strong links with our Japanese customers in particular, we have a well developed system for developing product specification to suit any particular requirements
- we are getting more auditing of our systems by customers
- our quality records are available for customers to audit if they wish

Improvements in the plant

- we have sustained a downward trend in product defects since the project started
- the plant is achieving better hygiene because workers developed their own work instructions and our measurement systems are easily understood

- we plan to pass the measurement task to the production workers which will move them towards being self managed teams

Advice/help from regulators during the project

- AQIS staff generally did not know much about MSQA or its implementation when the project started
- AQIS have also changed some of their views on HACCP since the MSQA guide was first issued and this now needs updating
- the audits carried out later were helpful because of the guidance we got, but also because it clearly helped local staff to understand their role in the MSQA system
- we are still awaiting closeout of the final MSQA requirements to gain approval of the MSQA part of the system

Use of consultants and the value of this

- we used consultants for initial HACCP training and for internal audit training
- we did the rest of the development ourselves and did not use consultants
- we did get value from the consultants we used but they did know the meat business

Lessons from our experience

- the whole process is not yet complete since our overall scope was very broad
- just doing MSQA alone is a big job, made bigger by confusion within AQIS about requirements
- keep the number of critical control points to a minimum, it will help your control programs

Advice to others who might be starting out

- take your time
- including all management requirements within the scope of the system has benefits in bringing together a broad view of progress and performance
- talk to others so you can make some judgements on your progress, and also find out where to get help if you need it

LACHLEY MEATS, FORBES, NSW

Process followed

- we started with very little in the way of management systems, so this was all new to us
- we set out to achieve MSQA certification
- we followed the MSQA guide with the steps and the principles of HACCP
- supervisor/QA teams developed work instructions after training by consultants
- we went to Project 1 group meetings to get help on our documentation
- we started with a lot of critical control points but after the workshops we were able to reduce these to a more manageable level

Results achieved

Documentation

- documentation is approved for MSQA
- we had a lot of trouble getting acceptance from AQIS because of inconsistent requirements by different AQIS officers
- our documentation is structured with the prerequisite programs and work instructions to provide the basis of the HACCP plan
- there is always a lot of revision of documentation as things change

Links with suppliers

- our feedlot suppliers have strong links because of the importance of the specification of the finished cattle
- we don't yet have strong links with other suppliers, since we only buy on an as required basis

Links with customers

- we don't yet have strong links with customers except for our export customers in Japan, because of the marketing links through our head office these customers know us well
- many of our supervisory and QA staff have visited customers in Japan
- some of our systems (microbiological testing etc.) are set up specifically to suit these customers

Improvements in the plant

- carcass defects have reduced
- the plant is achieving better hygiene because workers understand the process requirements and can comply with these

Advice/help from regulators during the project

- local AQIS staff did not know much about MSQA or HACCP when the project started
- we had to cope with some pedantic demands which caused a lot of friction for some time
- involvement of senior AQIS staff in the workshops and in the audits helped this
- we are still awaiting closeout of the final MSQA requirements

Use of consultants and the value of this

- we used consultants for initial HACCP training and for internal audit training
- the consultants we used know the meat industry and we found them to be very helpful
- we have heard of other companies who did not feel they got value from their consultants so obviously you have to be careful

Lessons from our experience

- very difficult!
- we somehow have to get better commitment from key staff
- we also need better support from AQIS

Advice to others who might be starting out

- next time around, we would try to sort out the AQIS problems first
- training is important, you need to get commitment from staff and workers
- use good consultants

BEAK AND JOHNSON PTY LTD, GREENACRE, NSW

Process followed

- we are different from all the other participants in Project 1: we do not slaughter, we do only a little boning but we are largely further processors, producing fresh chilled, cooked chill and some frozen product
- we supply largely the food service sector and some retail product, some product goes export so we are export registered
- we have a development kitchen and as a result we are continually introducing new products
- we are a small company of approximately 50 people - it is not easy to release staff to do the developmental work
- we have over 150 different raw materials, many with multiple suppliers
- we have had a factory move at the same time as getting our MSQA prepared
- we set out to develop the system in product groups, because to tackle individual product lines one at a time would have taken us a very long time, and we would not have met the deadlines

Results achieved

Documentation

- our documentation is approved by AQIS for export
- we have to continually revise documentation as new products are added

Links with suppliers

- we have strict specifications for all our raw materials
- all our suppliers are familiar with our requirements, and we stay with those who can meet these requirements best
- we use a variety of suppliers for each commodity group so that we can source supplies all year

Links with customers

- our largest customers have regular meetings with us
- we are the largest suppliers of prepared ribs in NSW, and are also exclusive suppliers to more than one restaurant chain
- we are establishing links with retailers as we are able to supply cook chill products especially soups and sauces

Improvements in the plant

- we had a sophisticated test procedure previously so product safety has not changed much
- our internal controls and test/release procedures have improved

- our workers have a closer involvement in process controls and we think the quality has improved overall
- inspection of incoming materials has improved

Advice/help from regulators during the project

- we do not have a full time AQIS presence, so we relied on periodic visits from inspectors and technical staff
- the initial audits were valuable since they showed us where we could improve
- we are still awaiting closeout of the final MSQA requirements

Use of consultants and the value of this

- we only used consultants for the internal audit training
- we did get value from this since we had not really understood this part of the process
- the rest we were able to do ourselves

Lessons from our experience

- it is very big effort, especially with the range of product we handle
- it will be some time before we really start to get value from this exercise

Advice to others who might be starting out

- expect it to be a long and constant effort
- allocate enough people to get the job done, or it will drag on for ever

PROM MEATS, FOSTER, VIC

Process followed

- quality is particularly important to us because of our place in the "Tableright" supply arrangements - we offer a double mony back guarantee with our product
- we involved all workers in the development of our system, particularly the work instructions which they use day to day
- under the Victorian arrangements we have employed our own inspectors for some time and these inspectors provided the backbone of our development team
- we went through the development process twice, while the first effort was OK and passed the VMA certification requirements, we found we needed more to be able to get better value from the system
- we are now re-developing the system to ISO formats, so that we can get ISO certification if we want it
- we did a lot of training of our workers

Results achieved

Documentation

- our documentation was approved by the VMA'a auditors
- documentation is important so that we can show that we are doing what we are meant to, but it is more important that the plant staff know what to do - training goes along with the documentation
- we don't think there is anything particularly different or better about our documentation

Links with suppliers

- we have close links with suppliers because we have very tight specifications - it is the only way to be able to guarantee the quality we need
- suppliers visit the plant and we run sessions to ensure they know their effect on our product
- suppliers of both beef and lamb are all very keen to come to these sessions because if they can meet our requirements exactly then we can pay them more
- we regard this as training - an essential part of our business

Links with customers

- we supply into a supermarket chain to distribute the "Tableright" meat
- this initiative was done in conjunction with the customer, so they know our business well, and we know how to meet their requirements for delivery, storage and display
- any complaints which come back to them come straight through to us so we can fix any problems as quickly as possible

Improvements in the plant

- we are much better at keeping records

- process improvement has assisted our customers with improved product and delivery, and has also improved the safety of our product

Advice/help from regulators during the project

- little involvement from the VMA itself
- the audits from the VMA's auditors were helpful because they were able to give us some guidance in technical matters

Use of consultants and the value of this

- we only used consultants for internal audit training
- we did attend some industry training sessions in the early days

Lessons from our experience

- our management system is really aimed at achieving quality, but once the system was understood we found it easy to incorporate food safety matters and meet the regulatory requirements
- knowing what we know now, we would have got some help earlier to understand the ISO requirements, since this would have saved us some redevelopment later

Advice to others who might be starting out

- it is actually not difficult provided you have someone with some understanding of HACCP and ISO
- it might be useful to get some independent person to have a look at your system during the development stages, to make sure you are on the right track
- the VMA is only interested in safety of meat, so they cannot advise you on quality issues

FREWSTAL, STAWELL, VIC

Process followed

- we have had four tries at getting our system right
- first time, we got a consultant to write us a HACCP manual - this passed the documentation audit but we did not know how to use it
- second try, we got our inspectors to do it for us - this was better but the supervisors and workers did not understand it and did not use it
- third try, we got the supervisors involved, but the workers were not interested in using the results
- fourth try, we involved the workers as well in the HACCP team and this time we seem to have got something which everyone understands and uses

Results achieved

Documentation

- there is nothing unusual about our documentation
- it follows the standard layouts and covers our processes
- we did try to keep it brief as we have seen some systems which are just huge - you would spend all day reading it and never get any work done

Links with suppliers

- we are a specialist lamb processor and the majority of our stock comes from saleyards, so we don't have many links direct to suppliers
- this does not seem to matter much at present because the farmers are all familiar with the specification for domestic lamb
- this may change in the future and we are talking to some suppliers about developments which may change the supply patterns

Links with customers

- we have one major customer who takes the great majority of our product
- we are also their major supplier
- we have very close links with them - obviously, our mutual well being depends on each other
- they are also involved in discussions with suppliers since this will affect them as well
- we will end up with a supply chain direct from paddock to consumer

Improvements in the plant

- HACCP has helped us rectify a couple of long standing dressing problems, particularly on hindquarters
- dressing remains pretty good - we have not gone to inverted dressing

Advice/help from regulators during the project

- we had no help from the VMA at all, in fact, we found that they were unable to answer questions we had about meeting their requirements

Use of consultants and the value of this

- we used a consultant for our first effort, but all we got was the documentation, we did not know how to use it
- we used a consultant for internal audit training, and this was good

Lessons from our experience

- get a consultant to help you find out what HACCP is about, but you will still have to do all the work
- there are no short cuts
- we did not do any good until we involved all the staff

Advice to others who might be starting out

- involve all the people who actually do the work
- follow the steps in the HACCP guides - there is no easy way
- if you don't follow the steps and do the work properly, you will have to do it again

BLUE RIBBON MEATS, LAUNCESTON, TAS

Process followed

- we are a domestic multi-species plant in Launceston, we also have a smallgoods factory
- we had been involved some years ago in some early QA work sponsored by the MRC, and so we had developed some QA systems but theses were not complete enough to meet the new Australian Standards
- we went back to the teams which we had used before and trained them to do the HACCP work
- we had a lot of staff turnover and this caused many delays and meant we were constantly training new people, and re-training old ones
- we followed the standard HACCP implementation steps and the seven principles
- we also put a lot of effort into developing training materials specifically for our processes

Results achieved

Documentation

- it is now complete, but changes every day
- we are trying to develop it so that it covers ancillary areas as well as meat production itself, since the quality of co-products is so important

Links with suppliers

- the majority of our stock comes from saleyards, so we don't have many links direct to suppliers
- with lambs and pigs, this is not too important since they are pretty standard and Tasmanian quality is very good
- with beef, although local supplies are generally good quality we are trying to establish links with suppliers who we know can provide superior quality livestock

Links with customers

- we are establishing long term relationships with a number of key customers
- our interstate business has grown with our ability to supply quality product reliably
- this is an area where we expect to put a lot of effort in the future

Improvements in the plant

- quality of workmanship has improved a lot with the extra training we have done
- documentation is a good guide to both supervisors and workers when they are unsure of any particular process
- product hygiene has improved steadily over the past couple of years
- we are also happy with the trends in product quality

Advice/help from regulators during the project

- we have close relations with the Tasmanian DPI, and found them to be very helpful at a number of stages in our development process
- we know from talking to others that other people in Tasmania have also had good assistance from the DPI

Use of consultants and the value of this

- we used a consultant for initial technical advice and for internal audit training
- we felt we had really good value from our consultants, but they are expensive and this stopped us from using them more

Lessons from our experience

- getting some early consulting advice was very beneficial to us
- we kept getting behind because we did not do enough training, and we kept having to wait while we trained more people
- staff turnover can be a real hindrance to the development process

Advice to others who might be starting out

- for the first time - you can never do enough training
- a small amount of good technical advice up front can save you a lot of trouble
- for the second time - you can never do enough training
- scrape up all the money you can afford and spend it on training

TATIARA MEAT COMPANY, BORDERTOWN, SA

Process followed

- we set out to follow the MSQA guide published by AQIS
- we found this was a bit difficult for inexperienced people to follow, and so we had some trouble getting the right things into the HACCP system and also getting the right level of detail
- our HACCP team was formed from workers on the plant, and these people were keen to contribute
- we did not have an overall steering group involving management, preferring to rely on the regular meetings we have with the AQIS staff, but this meant we were constantly distracted by day to day issues
- we had also had a management restructure, which meant we were short of management people to carry the HACCP program forward
- attending the Project 1 group meetings and workshops was very good for us since we were able to see that others had exactly the same problems, and also we were able to get advice on how to proceed
- we eventually made one person responsible for all documentation changes and this helped us keep track of changes
- audits by AQIS were good in helping us identify the shortcomings in our system and doing something about improvements

Results achieved

Documentation

- our early efforts were not good, we did not understand the detail of HACCP or the MSQA, and had few examples to go on
- the documentation has been re-written four or five times now, and is in the standard format we got from Project 1
- this makes it easy to add new procedures when we need them

Links with suppliers

- almost all of our stock comes from saleyards, so we don't have many links direct to suppliers
- we are trying to improve this but many farmers are not interested, they just want to put their lambs to market and take what they can get, and the markets are very competitive
- this makes it difficult to get close to many suppliers

Links with customers

- we have good links with our customers, mainly export
- we produce a standard range of product and so we know these very well
- we do work with customers to develop new products for their specific requirements

Improvements in the plant

- our refrigeration has improved a lot since HACCP helped us identify some problems in product transfer and in cold store operation
- we still have work to do with our slaughter floor layout to correct some dressing problems

Advice/help from regulators during the project

- our on-plant vets were the only real technical resource we had
- some good technical advice would have helped both us and them since neither of us understood some of the finer technical details of HACCP
- the audits by the AQIS Canberra staff were very helpful since they were able to show us where we needed to do more work

Use of consultants and the value of this

- we used a consultant for documentation advice and another one for internal audit training
- we had good advice and help from our consultants and would have used them more if we could afford it

Lessons from our experience

- we found the whole process hard going because we simply did not know some of the things we needed to know
- we also were missing some key management staff at times and this made it difficult to get good commitment
- although we had a lot of data around the plant, we did not know how to turn it into good information to manage with
- there were also some gaps in the data we were collecting - simple things like dataloggers helped us collect facts about our product

Advice to others who might be starting out

- get good advice
- do proper training
- work from facts, not opinions
- use the audits to help you make improvements
- learn from others who have already done it

HILLSIDE MEATS, NARROGIN, WA

Process followed

- because we are only a small plant (about 20 people) we only have one team which involves everybody
- we attended some industry training provided in Western Australia and this helped us get started with HACCP
- we realised early that training was going to be the key to getting good results, and so we started a training program where workers can attend the plant after regular work or on weekends to get additional training
- this has worked very well and means that our workers are all multi skilled
- we developed our work instructions so that the process steps provide for adjacent workers to provide assistance to adjacent workers, evening the workload and providing on the job training
- we also helped as many of our people as possible to get Aus-Meat accreditation so that they have good product knowledge

Results achieved

Documentation

- our documentation has been developed according to the training we received, it is suitable to our purposes and has been accepted by the WA Health authorities
- we only change the documentation when we see a need, mostly this relates to work instructions, not the overall system

Links with suppliers

- we have set out to produce a superior lamb product, so we have established groups of suppliers who we rely on to give us the specifications and quantities we need
- our suppliers know our requirements and why we need the right numbers of clean lambs
- if our lambs arrive too dirty or the numbers are not right, we send them back
- we have very few problems with numbers of stock or with cleanliness of animals presented for slaughter

Links with customers

- we supply quality lambs into a supermarket program "Q-lamb"
- this has a tight specification and requires us to process and grade the product very carefully
- the program has been a success with other suppliers and some processors looking to join the program
- the customers are obviously very happy with this program and volumes are growing

Improvements in the plant

- we have been able to reduce the incidence of dressing errors, largely due to our training programs
- product hygiene is greatly improved, due in part to suppliers giving us cleaner lambs and partly due to better worker skills

Advice/help from regulators during the project

- we did not get a lot of help from regulators, they supported the industry training programs which gave us much of our early help

Use of consultants and the value of this

- we did not use consultants directly
- we attended industry training in HACCP and in audit which were provided by consultants on an industry wide basis

Lessons from our experience

- training of workers is the best thing we have done
- HACCP is just application of some common sense
- customers are the most important people in the business, followed by suppliers

Advice to others who might be starting out

- do plenty of training - without skilled workers you will not get anywhere
- involve everyone in your HACCP team