HACCP FOR WATER OPERATIONS AN OPERATORS EXPERIENCE

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ABSTRACT

Toowoomba City Council began the implementation of HACCP for Water Operations on the 20th of March 2001 and on the 23rd March 2004 obtained 3rd party certification from NCSI. This paper presents an Operator's view of the process of implementation of HACCP in a water treatment plant. It will also discuss the implementation of HACCP for Catchment & Dams and Pumping and Distribution.

The following are the major areas that will be covered;

- Quality Systems;
- Risk assessments;
- HACCP implementation; and
- Benefits to the Plant, Operators and the Organisation

This paper should provide operators that are introducing HACCP to their treatment plant an insight on what to expect and the benefits that are available from establishing a HACCP System at their plant.

KEY WORDS

HACCP, CCP's, QCP's, Risk Assessment, Quality Management, Water Treatment

INTRODUCTION

Australian water authorities have traditionally measured the quality of their drinking water supply by comparing monitoring results with values contained in the Australian Drinking Water Guidelines (ADWG). There is, however, increasing recognition that, while it provides valuable performance data, simply monitoring drinking water for compliance with numerical limits is not sufficient to guarantee the quality and safety of our water supplies. This implies a need for more effective drinking water quality control practices that provide ongoing assurance of reliable and safe drinking water supplies.

The threat to Sydney's water supply in 1998 highlighted the need for a more systematic means of managing drinking water quality for the protection of public health. The most effective way to do this is through the adoption of an approach that encompasses all steps in water production from catchment to tap with emphasis on the identification of hazards and associated risks to water quality in advance and proactive management of the risks to an acceptable level, rather than reaction after problems arise. This approach is one of risk management.

Many water supply authorities have moved to adopt risk management systems. Options for basing these systems include the Australian Standard AS/NZS 4630 – Risk Management, and

the Hazard Analysis and Critical Control Point (HACCP) system. Of these, HACCP has emerged as the system of choice for water quality management.

HAZARD ANALYSIS and CRITICAL CONTROL POINT (HACCP) SYSTEM

HACCP is a process control tool that:

- Provides a systematic approach to identify and assess hazards and risks that are significant to the product produced;
- Plans the controls and limits of identified significant hazards; and
- Develops process control systems structured within a quality management system.

The Pillsbury Company developed the HACCP system for the supply of food to the National Aeronautics and Space Administration (NASA) in the mid 1960's. Many organisations have harmonised their approach, terminology and application of HACCP as a universal scientifically based framework to ensure safe food production. Further enhancement has led to adaptation of HACCP in the water industry.

HACCP is used to analyse a water supply system from Catchments to Tap and identify points where failure of control systems may lead to a reduction in water quality or supply. It is best defined as "a tool for the systematic analysis of a process to identify potential hazards and plan for the control of those hazards".

A **Critical Control Point (CCP)** is a point, step or procedure where control can be applied and a hazard can be prevented, eliminated or reduced to an acceptable level. For Water Treatment it is a point in the process where the operator can change the quality of the water to bring it back within established critical limits.

A **Quality Control Point (QCP)** is a point, step or procedure that is not classified as a Critical Control Point because:

a) It is a Management process step rather than an operational control; or
b) It is an Operational process step, which has a limited capacity to be monitored and/or corrective action taken in a timely manner.

HACCP PRINCIPLES

The HACCP system consists of seven (7) basic principles that outline the methodology to establish, implement and maintain a HACCP plan.

Principle 1 – Conduct a hazard analysis to identify and list all significant hazards that may occur at each step in the process and describe preventive measures for their control.
Principle 2 – Identify Critical Control Points (CCPs) in the process.
Principle 3 – Establish critical limits for preventive measures for each identified CCP.
Principle 4 – Establish critical control point monitoring requirements.
Principle 5 – Establish corrective actions for deviations from established critical limits.
Principle 6 – Establish effective documentation and record keeping procedures.
Principle 7 – Establish procedures to verify that the HACCP systems working correctly.

BENEFITS OF HACCP

The major benefits of implementing a HACCP system are:

· **Progressive Analysis of Performance** – HACCP identifies Critical Control Points (CCPs) to provide signals for action ensuring a proactive approach to deal with potential problems before they are able to affect the quality or supply of water.

· **Comparisons with the Food Industry** – Use of HACCP in the food industry is highly recommended. As a result, established standards used in the food industry can be applied directly to the water industry. Water can be regarded as an equivalent to food, and the demonstration of timely control of quality is important for protection of public health.

· **Internationally Recognised** - HACCP is recognised internationally by the World Health Authority (WHO). Both the WHO and United Nations have sanctioned HACCP as "an acceptable scientific baseline for consumer protection".

· **The Utilisation of Existing Material** – HACCP is able to combine existing Quality assurance systems with Hazard and Operability (HAZOP) analysis and risk assessment. It therefore builds on current practice rather than requiring a totally new approach.

· **Demonstrates Due Diligence** – The current 3rd party certified quality assured HACCP management system provides Toowoomba City Council with evidence of due diligence in meeting its responsibility to provide a safe drinking water supply from existing catchment to the consumer tap. The implementation of a new system for reuse of wastewater will further enhance Council's demonstration of due diligence.

COUNCIL AREAS INVOLVED

The water storage, treatment and delivery process involves many Council Branches, each with different areas of responsibility and expertise. These include:

Water & Waste Operations	Laboratory Services
Asset Management	Project Services
Construction and Maintenance	Parks and Recreation
Technical Services	Design & Survey

Each of these areas must develop a Quality Management System and provide links through documentation and communication to the Quality Assured HACCP Management Manual.

IMPLEMENTATION OF THE HACCP PLAN

To ensure that the HACCP system adequately addresses all facets of water treatment and supply, a HACCP implementation team, with representatives from all these areas, will need to be established.

Implementation of a HACCP Plan requires:

- Commitment from Management
- Commitment from Operational Staff
- Determination of key risks
- Identification of steps
- Development of these steps using good management practice as a foundation
- To be successful adopt realistic expectations of time and commitment needed

TRAINING

Training in HACCP must be provided for this team, as well as for operational staff who will be required to implement the final plan. Training is essential to ensure a full understanding of HACCP and that CCP monitoring is performed effectively.

MAINTAINING THE HACCP PLAN

Once the HACCP Management System has been implemented then the next task is to maintain the HACCP Management Manual and associated HACCP Plans. Improvements will result from making adjustments to the system by verifying and validating the system and using this information, together with other internal and external audits, corrective actions, complaint's feedback and management reviews.

HACCP AT TOOWOMBA CITY COUNCIL'S WATER TREATMENT PLANT.

Having dealt with what is HACCP and implementation of HACCP into a Water or Wastewater treatment plant we examine Toowoomba City Council's experience with HACCP from an Operators view.

In the Beginning… There was chaos and confusion. This was due to three issues.

1. The initial risk assessments were undertaken by council staff that had since departed or changed positions within council
2. New staff had started work at the Water Treatment Plant and had changed the operation of the plant. This made a lot of the risk assessments in the original HACCP plan invalid.
3. There was no training in HACCP until we were well into the implementation of the HACCP program.

There were early lessons learnt by Toowoomba City Council. The first of these is that training of the team should occur before doing any workshops. Training in HACCP is not to be confused with Implementation of HACCP or as part of monitoring – these are part of the support programs. Allowing staff to understand the process of HACCP from the risk assessment stage right through to the end is vital in gaining their support in the project.

The next lesson learnt was the importance of a good Quality System. This should be in place before you start, however, you can develop the Quality System in conjunction with HACCP. The Kynoch Quality System was developed as HACCP was being introduced. It was developed specifically to support the HACCP system. Whilst this is possible it does cause a lot of stress to the people trying to develop it. The main point to remember is that you cannot have a HACCP program without a Quality System to support it.

At the same time as we were trying to implement HACCP and develop the Quality System we were also finalising an upgrade that occurred at the treatment plant two years previously. The work we were doing involved final commissioning work, calibration, optimisation of plant equipment and changing plant operations. This involved changing the plant from Conventional Treatment to run in Contact Filtration as well as changing the chemicals used at the plant.

This work highlighted problems that were occurring around the plant and at the same time resolved most of them. This work had a significant impact on risk assessments and HACCP plans that had been done, as HACCP plans all needed review to reflect the changes.

CCP and QCP ISSUES

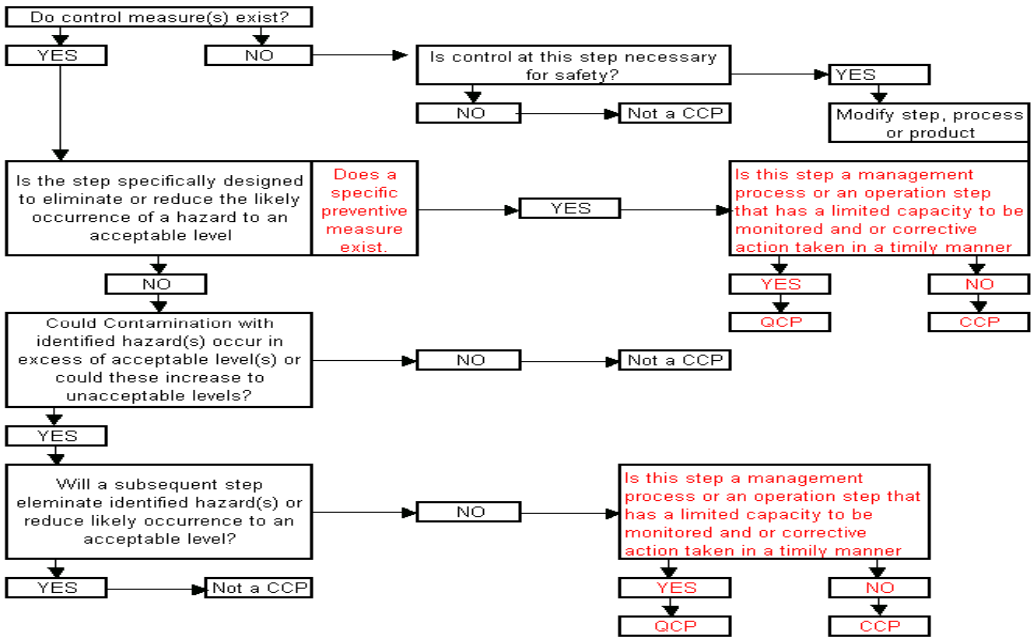
CCP and QCP issues can arise within HACCP plans with regards to the defining the difference between a CCP and QCP. When Toowoomba City Council started to put HACCP in place we defined all control points as CCP's. After the first year in use the HACCP Teams reviewed the plans and found that there was a reduction in the amount of CCP's.

Was this due to a change in process or a more developed understanding of HACCP?

The latter was the case.

The answer lies in that we had to change the way we analysed the control measures. The decision tree that we used was misleading. This is mainly because there is nowhere on the decision tree to include QCP's, as the answer it produces is that it must be either a CCP or nothing.

The diagram below is possibly a better way of assigning a control point either as a CCP or QCP.



BENEFITS FOR OPERATIONS/ WHERE ARE WE NOW

The plant now has gone from reactive to proactive operations. Staff have a greater degree of confidence in the online monitoring equipment as well as the lab testing equipment. This is due to the setting up of a calibration schedule for equipment and the recording of data. This has also enabled the operators to find problems or potentional problems before it can adversely affect the treatment plant.

Training and passing on knowledge to new operators and trainees. The fact that there is an excellent Quality System supporting the HACCP Management plan at the Water treatment plant has resulted in knowledge being maintained rather than lost in cases of staff turnover. Much of the daily operation now exists as documents. The down side is that not everything can be written and you can lose some history of the plant operations

CONCLUSIONS

The development of HACCP for water operations in Toowoomba City Council has enabled council to focus on the production of potable water and improve the way it is stored, pumped, treated and delivered to the customer. This has allowed the operators to produce a quality product that meets or is better quality than recommended in the Australian Drinking Water Guidelines.

HACCP has enabled treatment staff to find problems in the plant before they are able to affect the final product. HACCP has allowed council staff to identify problems within the system and this has enabled council as a whole to focus time, effort and money into critical areas and resolve them.

RECOMMENDATIONS

The following points need to be considered by organisations seeking to implement a certified HACCP plan:
A well developed Quality Management System needs to be developed and referred to in the HACCP Management Plan

- All affected staff need to be involved in the risk assessment and development of the CCPs and QCPs, monitoring and corrective actions for the HACCP Management Plan.
- Recording of information, particularly lab results and calibration data needs to occur. This aids in auditing, the recording of non-conformances and for the verification of limits at a later stage.
- Training for staff needs to occur before the start of the HACCP implementation process.
- When developing the risk assessment record all details of the process
- All limits must be developed, based on facts using well-documented scientific data.
- There needs to be clear commitment from all areas of the organisation before starting to implementing HACCP
- Develop an internal auditing schedule that meets the systems requirements. This is a requirement that needs to be recognised and resourced form the outset.

Finally, obtaining HACCP certification is only the beginning. Once you have certification then there is continuous improvement, verification and validation of the plan, meetings of the best practice team and internal auditing. Toowoomba City Council undergoes six monthly external surveillance auditing to ensure that the implemented HACCP system continues to function, maintain and better the standard.

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