

ISO 9001:2000, ISO 14001, and HACCP

**Implementing a Sustainable,
Integrated Risk Management
System for
Water Safety and Quality**

NSF/WHO Conference on HACCP for Water Utilities

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Manager of Plant Operations

- Regional Municipality of Durham, east of Toronto
- Responsible for Water and Wastewater Treatment

Regional Municipality of Durham

- 1000 square miles, east of Toronto
- Single tier water purveyor supplying over 130,000 industrial, commercial and residential customers
- Five surface water treatment plants on Lake Ontario
- One surface water treatment plant on Lake Simcoe
- Eight ground water systems utilizing 26 wells

Why Durham Implemented ISO 9001, ISO 14001 and HACCP

- Started in early 2001, registered early 2004
- Prior success with safety management and loss control program
- Promotes water quality excellence to the public
- Manage zero tolerance regulatory compliance
- Secure the Knowledge: early retirement “brain drain”
- Needed consistent application of best practices and continual improvement
- Needed a formal quality system to balance the cost factor
- Supplement end product failure testing with QA/QC system

Risk Management 101

- Competent, loyal and qualified employees sometimes take shortcuts and unknowingly take major risks
- Risks taken with intent of goodwill or saving money or time
- May not see the bigger picture and have a much higher tolerance of risk than the Corporation
- Cost of failure enormous: consumer confidence, liability, etc
- Systematic management review associated with the IRMS will help manage this risk

Best Practices Risk Management System

- Focus on Quality and Regulatory Compliance
- Division wide focus on customers and stakeholders
- Responsibilities clearly defined, understood and documented
- Division wide focus on Internal and External Communications
- Continual measured improvement in effectiveness
- Focus on employee training and development

What Durham Has Learned

- Select the right Consultant and approach
- The process is the KEY
- Demonstrate management support at all levels
- Involve all staff early and during the entire process
- Do not underestimate amount of work: time commitment huge
- Full time Coordinator who knows the industry
- Top management committed and participating
- Cooperation with other departments is vital

Province of Ontario Water Regulations

- Regulations based on end product testing
- HOWEVER, bacteriological testing is too late
- Shifting toward more oversight and stricter enforcement
- Zero tolerance approach to compliance
- Province wide initiative to implement Water Quality Management System based on ISO 9001, HACCP and ISO 14001

Bob White P.Eng., MBA, CMC
President, BRI International Inc.

1. Implementing ISO 9001, ISO 14001, HACCP, OHSAS 18001:
 - Municipalities of Durham, Waterloo and York and the Cities of Barrie and Toronto
 - Water Treatment, Waste Water Treatment, Solid Waste, Engineering facilities
2. Training trainers and consultants in Brazil, Canada, China Colombia, Egypt, Jamaica, Trinidad and Tobago and USA
3. Previous experience:
 - Standards and conformity assessment with Canadian Standards Association and the Quality Management Institute

The Walkerton Inquiry, Part 2

By The Honourable Dennis R. O'Connor, Commissioner, May 23, 2002

“...protect public health by:

- adoption of best practices and continuous improvement
- real time process control wherever feasible
- effective operation of robust multiple barriers
- preventive not reactive strategies to identify and manage risks to public health
- effective leadership
- ISO 9001, HACCP and ISO 14001”

Identify and Manage Risks to Public Health

ISO defines a Risk Management System (RMS) as:

- a continuous formal process
- involving the systematic application of documented management policies, procedures, and practices
- to the tasks of analyzing, evaluating, controlling and communicating risk and environmental impacts

ISO 9001, HACCP and ISO 14001 Integrated Risk Management System

An integrated ISO 9001, HACCP and ISO 14001 RMS:

- Identification of all sources or situations with a potential for harm:
 - in terms of injury or ill health, damage to property, damage to the workplace, the environment, the customer or a combination of these
- Determination of risk, based on a combination of the likelihood and consequence of a specified hazardous event occurring

ISO 9001 Focus

Quality Management System

Manage risk of internal and external failure:

1. Control processes and resources: who, what, where, when, why, how
2. Demonstrate ability to consistently meet requirements and expectations
3. Address failures: requirements and expectations
4. Identify opportunities for improvement
5. Continually improve

HACCP Focus

Hazard Analysis of Critical Control Points

Manage risk of supplying unsafe water by:

1. Systematic and preventative approach
2. On-line process controls to react to hazardous situations
3. Less reliance on end product testing
4. Biological, chemical and physical hazards and risks
5. Anticipating and preventing defects: source to tap

Hazard Identification

Facility: Ajax WSP
 Product Name Drinking Water

(FSEP Forms 5,6,7 & 8)

List of Biological, Chemical, and Physical hazards related to incoming material, processing, product flow, etc.

Ingredient/ Process Step	Hazard Identification					Controlled at (Is this hazard fully covered by a prerequisite program?) Yes/No	Program Details	HACCP Team Notes	Could a control measure(s) (CM) be used by the operator at any process step?	Is it likely that contamination with the identified hazard could occur in excess of the acceptable level or could increase to an unacceptable level?	Is this process step specifically designed to eliminate or reduce the likely occurrence of this identified hazard to an acceptable level?	Will a subsequent step eliminate the identified hazard or reduce its likely occurrence to an acceptable level?	CCP
	Situation	Hazard	B	C	P								
Pumping Distribution Storage	Mechanical Failure	Contaminated water	x	x	x	Yes	E	Preventive Maintenance					
	Fluoride addition	Overdose		x		No		WI-AAW-12	Yes	Yes	No	No	CCP3A
	Bisulfite addition	Overdose	x	x		No		WI-AAW-33	Yes	Yes	No	No	CCP1A
		Underdose		x		Yes	E	Preventive Maintenance					
	Area Spills	Contaminated water	x	x	x	Yes	Personnel	Training, SOP-15					
	No cleaning/post cleaning	Contaminated water	x	x		Yes	T&S	Preventive Maintenance					
	Open water, vandalism, surface water	Contaminated water	x	x	x	Yes	Premises	Security Cameras					

ISO 14001 Focus

Environmental Management System

Manage risk of negative environmental impacts

1. Identify impact of water, services and processes on the environment
2. Set objectives and targets to reduce impact
3. Prevent pollution
4. Comply with environmental laws and regulations

A Risk Management System for Water Safety and Quality
Integrated Risk Management System
Common Elements

HACCP		ISO 14001/ OHSAS 18001		ISO 9001:2000
Prerequisite requirements	4.1	General requirements	4.1	General Requirements
1. Conduct hazard analysis	4.4.2	Training, awareness and competence	6.2.2	Competence, awareness and training
2. Determine Critical Control Points	4.4.3	Communication	5.5.5 7.2.3	Internal communication Customer communication
3. Establish Critical limits	4.4.4	Documentation	4.2.1	General Documentation
	4.4.5	Document control	4.2.2	Quality Manual
	4.4.6	Operation Control	7.5	Service Provision
4. Establish system to monitor control of CCP	4.5.2	Non-conformance and corrective and preventive action (H&S- Accidents, Incidents)	8.3	Control of nonconforming product
5. Establish corrective action				8.5.2 8.5.3
	4.5.3	Records	4.2.4	Control of records
	4.5.4	Internal MS Audit	8.2.2	Internal Audit
	4.6	Management review	5.6	Management Review

Management System not Technical System

1. The technical dimension:

The nature of the management or business problem faced by the organization and the way in which this problem can be analyzed and resolved



2. The human dimension:

Interpersonal relationships in the organization, people's feelings about the problem at hand and their interest in improving the current condition

Actual Benefits to Water Utilities...

- Communication
- Comprehensive chemical inventory and cleanup
- Consistency: region wide procedures
- Resolved issues of maintenance of water plants and depots collection system and towers
- Electronic library of C. of A.'s, permits to take water, procedures and forms now accessible throughout

Actual Benefits to Water Utilities

- Consistent training format efficient and effective
- Awareness of legislation and regulations
- Nothing taken for granted: e.g: food grade oil
- Most of RMS already in place
- Due diligence

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