Bottled (Packaged) Drinking Water

HYGIENIC PRACTICE & HEALTH REQUIREMENTS

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The building and equipment should be designed and constructed so as not to contaminate water. Conditions that might lead to contamination include excessive dust, foul odors, smoke, pest infestation, airborne microbial and chemical contamination.
Unnecessary movement of water and personnel within the water packaging premises increase the likelihood of contamination and should be controlled. If unsanitary operations are conducted within close proximity, the likelihood of contamination increased. A properly constructed will reduce the chances of contamination.
Lighting

- Adequate lighting promotes cleanliness by facilitating identification of unclean places.
The air supplied to processing and packaging facility should be of sufficient quality so as not contaminate the equipment or the water. Unclean air, excessive dust, odors or build up of condensation or grease are all potential sources of water contamination.
VENTILATION ......

- Packaging water is a CCP where physical contamination can occur because it is not a closed system. Contamination can occur from splashing, insects, filth or dust.
STORAGE AREA

- Water, including package water can be susceptible to physical contamination or odor and taste transference from external sources.

- Packaging materials and finished products should not be stored in areas where volatile chemicals and high humidity.
INCREASING POTENTIAL FOR MOULD GROWTH.
PC, 7/23/2004
An adequate water supply, in quantities that encourage cleaning and rinsing, is necessary to ensure effective cleaning and safe processing operations. A safe water supply for cleaning and other sanitation is necessary to avoid contamination of the water handling equipment or the water product.
An assessment of the safety of the source. The collection process and the water quality will determine the treatment necessary to achieve final product safety. Water collection is a CCP in selecting and sustaining a safe water source.
SAFETY GOALS AND PRINCIPLES OF WATER COLLECTION

Routine testing of source water and the processed water for consistency of water quality.

- Choose a safe water source;
- Protect the recharge and contribution area;
- Construct a safe water facility;
- Monitor level of safety.
WATER SOURCE SAFETY LEVELS

There are three levels of safety –

- Maximum
- Minimum
- Unacceptable level
MAXIMUM LEVEL OF SAFETY

The water source is:

- Safe without treatment;
- Display no evidence of external foreign influence;
- Is at minimal risk to existing and future contamination from an external origin;
- Possesses natural barriers against risk of contamination (including those microorganisms generated by the external fauna and flora);
- Is regularly monitored;
THE WATER SOURCE MAY BE BOTTLED WITHOUT DISINFECTION, PROVIDED THE BOTTLING IS PERFORMED HYGIENICALLY AT THE SOURCE. CORRESPONDS TO THE SAFETY OBJECTIVE FOR "WATER DEFINED BY ORIGIN" SUCH AS "SPRING WATER" OR "GLACIER WATER"
MINIMUM LEVEL OF SAFETY

The water source:
- has had all existing contaminants and all microorganisms and present and future risks identified;
- has safe treatments available;
- has implemented measures to monitor and prevent any increase of identified risks or future risks of contamination;
- is regularly monitored to verify the safety of the water and consistency of the above criteria.
A WATER SOURCE WITH A MINIMUM LEVEL OF SAFETY SHOULD HAVE AN ANTI MICROBIAL TREATMENT AND ANY OTHER TREATMENT NECESSARY TO ITS SAFETY PRIOR TO BOTTLING OR DISPENSING.

PC, 7/24/2004
UNACCEPTABLE LEVEL OF SAFETY

Source water that is contaminated, adequate treatment is not available or the source water is not regularly monitored.
CRITICAL CONTROL POINTS

Should be established for the water source by:

a) Implementing protection measures such as protective perimeters to prevent future contamination in the higher risk zones.

b) A qualified hydro-geologist should carry out a comprehensive risk assessment;

c) Adhere to safe design and GMP construction for water collection installations;

d) Implementing a source water monitoring and water source surveillance program for human activities in the water recharge and contribution area.
The recharge and contribution area and contamination risk sub-zone may change in shape and increase in area from the original assessment. Reassessment of the safety of the water source and collection point may be necessary to evaluate new risk activities or larger risk area.
Re-assessment

Would be necessary when –

a) the maximum production flow rate of a collection point is increased beyond the initial risk assessment;

b) New collection points are added in the vicinity of the original collection points;

c) New water collection points on adjacent property have been established;

d) New or increased risk activities commence on adjacent property.
INTERMEDIATE PROTECTION PERIMETER

- Known as defense perimeter to ward off intruders, stray animals, restrict human activities and limit man-made objects to only those needed for the source water collection.
  - Be fenced;
  - Extend to distance beyond water collection shelter.
FAR PROTECTION PERIMETER

- Covers the rest of the recharge and contribution areas and extends beyond the “close protection perimeter.”
WATER COLLECTION POINT SHELTER

- Shelter should be properly constructed. Inside materials should be water resistant and the floor should be sloped to a screened drain far away (outside the "defense perimeter")
Commercial wells should be cased and grouted as deep as possible to prevent direct surface water intrusion;
Stainless steel casings should be applied.
A sampling valve should be placed in the main water line close to the well-head.
The casing should be designed so that all parts can be properly sanitized.
Safe Operation and Maintenance of Water Collection Facility

Start up disinfection after construction-

- Disinfectant should be sprayed on the upper inside casing walls above the static water table level;
- Sufficient chlorine solution (or other approved disinfectant) should be introduced to obtain an effective germicidal concentration throughout the entire system. Storage tanks and long aqueducts should be disinfected more frequently.
e.g: 500mg/L
PC, 7/24/2004

MAINTENANCE DISINFECTION SHOULD BE REPEATED USING THE SAME PROCESS, AS OFTEN AS NECESSARY, BASING UPON THE WATER QUALITY MONITORING RESULTS (MINIMUM ANNUALLY)
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Source Water Quality Monitoring

a) New water collection points should have increased sampling frequency for the first 2 to 3 years to determine the consistency of the water quality.

b) Following contamination incident, the frequency of sampling should be increased for sufficient time to ensure water safety and quality;

c) Routine monitoring frequency should be dependant on the level of vulnerability of the source and surroundings. Additional parameters necessary e.g. pesticides in agricultural area.

d) Results should be continuously monitored so as to adjust the frequency and the selection of parameters.
Permanent Surveillance in the Recharge & Contribution Area

- Regular surveillance of the risk areas in the watershed including human and wildlife activities.
PROCESS CONTROL

- All water filtration systems should be designed, operated and maintained to ensure safety of water.

**Carbon and Activated Charcoal Filters** (adsorption, absorption)
- to reduce or remove odor and/or taste producing substances or other undesirable substances that have bonding properties to a specific filtration media.
e.g. activated carbon.
PC, 7/24/2004
PROCESS CONTROL....

- Operating Considerations
  Filter size, bed life, regeneration and renewal program.

- Health and Safety Requirements
  Regular back-flushing and sanitization programs.

- Particulate filtration
  To reduce or remove particulate, water insoluble matter or other turbidity causing substances
e.g. suspended solids, colloids, oxidized iron and manganese compounds etc.
Membrane / cartridge filtration

Filter replacement may be required more frequently than indicated depending on the quantity of the particulate matter in the raw feed water.
PROCESS CONTROL....

- **Reverse osmosis**
  
  Used for removal and reduction of total dissolved solids contents,

  Regular back-washing and sanitization program necessary.
PROCESS CONTROL....

- **Deionization**
  
  To reduce / remove total dissolved solids.

- Regular back-flushing necessary.
PROCESS CONTROL....

- Validated disinfection process
  - Designed to continually and effectively disinfect the product.
  - Documented in writing;
DISINFECTION METHODS

- Ozonation
- Ultra-Violet Irradiation
- Microfiltration
TO DISINFECT - BACTERIA, VIRUSES AND PARASITES.
P8, 7/24/2004

TO REMOVE PARASITES
P9, 7/24/2004
HEALTH SURVEILLANCE OF FOOD HANDLERS

Strategies:

- Management commitment;
- Education and training;
- Health interviews;
- Reporting illness to management;
- Applying basic food handling practices; and
- Applying basic personal hygienic practices.
MANAGEMENT COMMITMENT

- A program of optimum hygiene covering all aspects of food handling.
- Open discussion and reporting hygiene problems by employees and quick response with corrective measures;
- Reassurance that food handlers will not suffer loss of pay or their jobs if they report symptoms such as diarrhea or infected skin lesions;
- Employment of technical experts to advise on hygiene;
MANAGEMENT COMMITMENT…

- Creating optimum hygiene conditions and practices and regular upgrading thereof;
- Implementation of quality control programs;
- Responding to consumer complaints regarding hygiene in a professional and responsible manner;
- Implementation of an occupational health program for improving working conditions and increasing product reliability.
EDUCATION AND TRAINING

- Education and training of food handlers are vital elements of food safety program;
- Practical and functional educational methods and aids should be used.
- All employees must know and understand the basic principles of food safety and their own responsibility in this respect;
- Managers must be aware that all employees who have gastroenteritis or open skin lesions must stay away from work or be prohibited from handling food while symptoms persist;
Education and Training…

- Food handlers should receive instruction in food safety and personal hygiene and should be required to undergo a test of their knowledge of the subject;
- Refresher course should be given periodically;
- Particular attention should be given to the need to report illness by food handlers as soon as it occurs;
Education programs must take literacy and educational standards of food handlers into consideration;

Education and training programs should be conducted by properly trained personnel;

Education and training programs must also be extended to management, cleaners and other personnel involved with food handling.
Health interviews involve the completion of a questionnaire by the employee and are aimed at general assessment of a person’s suitability for work as a food handler in terms of demeanor, appearance and cleanliness. All relevant aspects related to environmental health matters and practices of food handling would thus be included in the questionnaire,
Questions should be directed towards the identification of excreters, whether clinically well or symptomatic, of organisms of importance in food safety;

The interview should take place before employment;

The interview may be repeated under special circumstances, e.g. following a period of absence from work due to sickness or a holiday in a country or place in which an epidemic of gastroenteritis has been reported;
HEALTH INTERVIEW….

Recruits suspected of suffering from the following conditions will require a medical examination and if confirmed, be disqualified from being appointed as a food handler:

- Chronic suppurative conditions, e.g. otitis media with drum perforation;
- Chronic bronchitis with productive, purulent sputum, or
- Widespread chronic skin conditions, such as psoriasis or eczema which makes skin cleansing difficult and are often associated with secondary infection.
REPORTING ILLNESS TO MANAGEMENT

- Managers should encourage employees to report to their supervisors whenever they have diarrhea, sore throat, fever, a cold or open skin lesions, or are jaundiced.
The following conditions disqualify a person temporarily from food handling:

1. infection of the eyes or eyelids;
2. inflammation and/or discharge from ears;
3. oral sepsis;
4. staphylococcal conditions e.g. recurrent boils or open sores; or
5. recent history of gastrointestinal infections.
The following rule with regard to the length of exclusion from work after specific illness should be applied. Return to work in these cases should, however, only take place after consultation with and consent of a medical doctor:
REPORTING ILLNESS TO MANAGEMENT...

- **Hepatitis A**: six weeks from onset of jaundice;
- **Salmonella food poisoning, cholera, dysentery and typhoid and paratyphoid**: three consecutive negative stool specimens taken 48 hours apart;
- **Parasite worms and other parasitic conditions**: until successfully treated;
- **Staphylococcal and streptococcal**: until successfully treated;
- **All other gastrointestinal illnesses** (bacterial or viral): until symptoms free: and
With regard to basic food handling the following rule should always apply:

- basic foodstuffs (meat, milk etc;) must be obtained from a health approved source;
- cook food thoroughly;
- eat cooked food immediately or within one hour after preparation;
- store cooked foods carefully under specified temperature control;
- reheat cooked foods thoroughly and only once;
APPLYING BASIC FOOD HANDLING HYGIENE PRACTICES...

- cover and / or seal cooked foods during storing and when displayed.
- Avoid contact between raw and cooked foods;
- Keep all kitchen surfaces, utensils and equipment meticulously clean;
- Protect foods from dust, insects, rodents, animals and other sources of contamination,
- Clean tongs, gloves etc. should be used to handle prepared food where necessary;
- Use clean water, clean running water must continuously be available to ensure proper hygiene practices;
APPLYING BASIC FOOD HANDLING HYGIENE PRACTICES…

- Waste food must be properly disposed of;
- Do not inflate (blow into) food containers (plastic bags, paper bas etc.) by mouth;
- Do not thaw frozen foods in cold or warm water for more than 6 hours at room temperature.
APPLYING BASIC PERSONAL HYGIENE PRACTICES

Hands should be washed and fingernails scrubbed in warm soapy water

✓ Before food is handled;
✓ After visiting the toilet;
✓ After blowing the nose;
✓ After smoking, chewing or eating;
✓ Between handling raw and cooked food;
✓ Between handling unwashed vegetables and prepared food; and
✓ After handling any soiled objects, such as refuse bin etc.
APPLYING BASIC PERSONAL HYGIENE PRACTICES

- Hands should be dried with paper towels or a hot air drier and never a communal towel unless it is of the revolving type which is supervised properly;
- Fingernails should be kept short and clean;
- Keep hands away from the nose, mouth, eyes, ears or hair during the time food is handled;
- Fingers must no be licked when preparing food;
- Keep all cuts and sores covered with waterproof dressing. Do not prepare or work with food while there are unhealed cuts or sores on the hands, unless rubber gloves are worn;
- A clean washable overall or overcoat of pale colour, which will show the dirt, should be worn;
APPLYING BASIC PERSONAL HYGIENE PRACTICES....

- Hair should be kept covered to prevent dust and bacteria it contains from falling into the food;
- Never cough, sneeze or blow the nose over the food;
- Do not smoke, chew betel etc. while handling food;
- Do not wear rings and other jewellery which can come into contact with the food; and
- Food handlers should ensure that they are at all times clean of person. Soap and clean towels must be available.
APPLYING BASIC PERSONAL HYGIENE PRACTICES....

- The main emphasis should fall on:
  - Personal hygiene (suitable washing facilities etc ;)
  - Clean protective clothing;
  - Effective supervision of the health of employees and appropriate action timely taken when indicated; and maintaining hygienic food handling practices.
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