Guidance for Developing Good Operating Practice Procedures: Water: Ground Water

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Amendment 1

Background

A water supply can be made up of one or more water sources:

- council or network water supply
- surface water
- groundwater
- roof water

Groundwater is water that collects and flows beneath the land surface. The aquifers where water collects can be tapped into and the water abstracted by wells (or bores). Deep groundwater may also emerge as springs (when it would be dealt with under 'Surface Water' which is covered in separate guidance).

A groundwater source that is identified as 'secure[1]' will usually be free from microbiological contamination. This is because the microorganisms that are carried into it from the land surface are filtered out as the water moves between layers of soil and rock underground. Adequate protection at the bore head is an essential requirement in establishing that a groundwater source is 'secure'. If the bore head is not well constructed or maintained, contamination could be introduced to the water and groundwater in aquifers which the well intercepts. Bore head security can be established by a suitably qualified engineer.

Groundwater from shallow aquifers must be regarded as being microbiologically equivalent to surface water and likely to contain harmful bacteria (e.g. *E. coli)*, protozoa (e.g. *Cryptosporidium*, *Giardia)* and viruses which are carried into the aquifer from the land surface.

[1] As defined in the Drinking-water Standards for New Zealand 2005 (DWSNZ 2005). Ministry of Health.

Significant uses for groundwater in New Zealand include irrigation and the drinking water supply. The Ministry of Health administers the *Drinking-water Standards for New Zealand* which defines good quality drinking water and the maximum concentrations of chemical, microbiological and radiological contaminants that are acceptable for public health. The standards apply to all water intended for human consumption, food preparation, utensil washing and personal hygiene – whether it is a public or private water supply. The exception is bottled water which is subject to different standards set in regulation under the Food Act and requirements of the Food Standards Code.

This guidance aims to help food businesses that use a groundwater supply ensure that it is safe to use, and maintains the safety and suitability of the food.

For further guidance:

Off-the-peg Food Control Plan: Food Service and Catering. Section 2 – The Basics: Surface water or groundwater supply [232 KB PDF]

Off-the-peg Food Control Plan: Food Service and Catering. Section 2 – The Basics: Water supply [201 KB PDF]

Water Supply Assessment Checklist from Schedule 1 of the current version of the Animal Products (Specifications for Products Intended for Human Consumption) Notice

Draft Guidelines for Drinking-water Quality Management in New Zealand (2005)

Drinking-water Standards for New Zealand 2005 (DWSNZ 2005) [1 MB PDF]

Ministry of Health Household Water Supplies [1.54 MB PDF]

Ministry of Health Water Collection Tanks and Safe Household Water [337 KB PDF]

Ministry of Health Secure Ground Water Bores and Wells for Safe Household Water [414 KB PDF]

1 Purpose / Scope

Write up your purpose/scope for Water – Ground Water.

Example: To ensure the supply of groundwater is of a suitable quality to enable hygienic operations, minimise contamination and maintain the fitness for intended purpose of the final food. Water includes ice and steam.

See also (as applicable):

- Surface water

- Roof water
- Council / Network Supply

These topics have been covered individually in other guidance documents.

2 Authorities and Responsibilities

Write up who has specific authorities and responsibilities for Water – Groundwater supply. Think about managers, supervisors and other people as may be necessary.

Example: The business operator has overall responsibility for ensuring that ground water used in the business is fit for its intended use.

Water that a business draws from an underground supply needs to be treated to a level that ensures it is clean and safe for making food, cleaning food areas and for using for personal hygiene.

Other people or parties that have operational responsibility for this procedure are: [please identify who they are and specify their responsibilities].

3 Control Measures

Write up how you ensure your groundwater is safe to use.

Consider at least the following points:

3.1 Water Source

- how you determine if the water source is satisfactory, e.g.:
  - using the Water Supply Assessment Checklist from Schedule 1 of the current version of the Animal Products (Specifications for Products Intended for Human Consumption) Notice to determine whether or not the water source is secure. If the requirements in Part 3 of the Assessment are met, then the water source may be considered to be secure groundwater provided the bore is of an adequate depth and the soil types are not porous;
  - assessing any new water sources prior to use;
  - if you determine that the water source is unsecure, or you suspect the water source is unsecure, further checks will help to determine any possible contamination, e.g.

- checking with the local council if there are known water quality problems (including microbiological and chemical contamination, turbidity, corrosiveness, sediment, colour, smell and taste);
- carrying out a visual assessment of the immediate bore head area and checking for anything that could contaminate the supply;
- if necessary, testing for any chemicals that are likely to be present and that could pose a risk to food safety, in order to identify appropriate treatment methods; *and*
- if necessary, testing for the presence of *Escherichia coli (E.coli)*. *E.coli* is found in human and animal faeces, so its presence in the water can indicate the presence of other disease-causing microbes including *Campylobacter* and *Salmonella.*

- checking bore head security for all your groundwater supplies (refer to separate guidance available at Off-the-peg Food Control Plan: Food Service and Catering. Section 2 – The Basics: Surface water or groundwater supply [232 KB PDF]. Poor sealing of a bore head can lead to contamination seeping down the bore and into your groundwater supply; and
- regularly re-assessing the water status (e.g. at least every 3 years) and whenever:
  - monitoring indicates there could be a problem (e.g. you know or suspect there is a change in the water quality or bore head security);
  - extreme events such as heavy rain and flooding may have affected the water quality; or
  - there have been changes to the environment on or around the water source that may affect the quality of the water (e.g. events such as an earthquake which could alter that structure of the aquifer).

3.2 Water Treatment

- how you determine what, if any, treatment and/or other corrective action should be applied, e.g.:
  - ensuring your bore head is designed and correctly maintained so that it provides sanitary protection. While your groundwater source is classified as secure, you need do nothing further;
  - ensuring that, on an unsecure groundwater source, the system you select for water treatment (e.g. filtration and chlorination disinfection / UV disinfection) is appropriate for

the contaminants you identify need control. For further guidance refer to: Off-the-peg Food Control Plan: Food Service and Catering. Section 2 – The Basics: Surface water or groundwater supply [232 KB PDF].

A water treatment specialist can also assist you to select and design a water treatment system that best suits your particular water supply and your business needs;

- ensuring that following any unusual events (such as flooding) you re-assess your water supply and ensure that, before further use, your treatment system is capable of dealing with any additional issues posed by the event.

  Whenever you have concerns about the water quality, you should contact a Health Protection Officer at the local public health service or an Environmental Health Officer at the local council. They are also the people to speak to about any water testing, and where to get it done.

- how you can help ensure that your water treatment is effective and your water supply is safe to use includes, e.g.:
  - ensuring that the water filtration system takes into account:
    - the specific types of contaminants identified;
    - filter grade; and
    - water flow rate through the filter.
  - ensuring filters are installed between the water source and other treatment steps (e.g. chlorination);
  - improving filtration in water with high sediment loads by the use of coagulating chemicals;
  - controlling turbidity for effective disinfection;
  - installing a manual or automatic chlorination system to maintain a suitable level of chlorine in filtered water; or
  - installing an ultraviolet light disinfection system where filtration is effective in controlling high sediment loads and turbidity;
  - installing the treatment system appropriate for your water in accordance with the manufacturers' instructions; and

- maintaining the treatment system appropriate for your water in accordance with the manufacturers' instructions. (Take into account provision of a back-up system – e.g. manual chlorine dosing - in the event of a power-outage).

- if an alternative water quality has been determined suitable for certain operations, how you ensure you maintain the safety and suitability of the food, e.g.:

  - ensuring lesser quality water (e.g. for agricultural irrigation) does not come into contact with food produce (e.g. the edible portion of the plant);

  - ensuring that lesser quality water cannot be mistaken for clean/drinking water.

3.3 Water Reticulation

- how you ensure your water reticulation system is suitable for the purpose and maintains the quality of the water once it has been treated, e.g.:

  - ensuring the water reticulation system (e.g. pipe work, tanks, hoses and associated equipment) meets the requirements of relevant New Zealand legislation such as the Building Act and any local council regulations;

  - ensuring there are no cross connections between reticulations systems for potable water and non-potable water;

  - ensuring there are no dead ends or unused pipes in the system where water can stagnate;

  - ensuring pipes are flushed following periods of inactivity (such as seasonal shut-downs) and after repairs to the system (i.e. turn on taps and allow a significant flow of water through to remove stale water, rust, scale and other material from the system);

  - providing back flow prevention devices at critical points in the system to prevent contamination of clean water (e.g. treated tank supply);

  - maintaining water pipes, storage tanks and facilities, and other parts of the reticulation system in good condition and according to the manufacturers' instructions; and

  - protecting treated water from environmental contamination (e.g.: cover tanks and screen ends of open pipes – e.g. ventilation pipes - from animals, birds and debris).

- how you ensure all water lines are identifiable so that potable water and non-potable water lines can be distinguished, e.g. all water lines conveying non-potable water (e.g. for

cleaning down areas external to the premises, flushing toilets, fire-fighting equipment etc.) are clearly identified at:

- all outlets;
- junctions and valves;
- both sides of wall penetrations; and
- any other place where identification is necessary to distinguish the water type.

4 Monitoring

Write up how you check that your groundwater treatment and water reticulation systems are working effectively.

Consider the following:

- regularly check that bore head(s) maintain protection against surface contamination;
- check infrastructure (e.g. bore casings, pumps, water piping etc.) is fully operational and well maintained. Any specialised equipment is being operated and maintained in accordance with the manufacturers' instructions (e.g. schedule routine maintenance in advance and check that it is done);
- regularly check water tanks (e.g. inlet and outlet screens, access covers in place, strainer clear of debris, structural integrity, sludge level is below the water outlet level, tanks are internally clean);
- look for evidence of problems (e.g. lack of water pressure, evidence that there may be a leak) and deal with issues when they arise;
- monitor treatment systems (e.g. check residual chlorine levels of the water if you are using a chlorine dosing system, check UV light sources are operating correctly, check turbidity if this is known to be a problem);
- make regular visual, smell and taste checks of water at point of use to determine whether the system is operating as intended or something may be wrong;
- test as necessary for E. coli, chemical hazards, protozoa or viruses in treated water.

Seek advice from a water treatment professional if you have any problem with your water supply and treatment systems.

5 Corrective Action

If you have a problem with your treated water supply, do not use it until you have fixed the problem. Until the water quality has been restored you must stop any operations requiring clean potable water or use a safe, alternative supply (e.g. bottled water; or water from a registered water tanker; or water that has been boiled for one minute, or water that has been disinfected by adding chlorine).

Write up how you correct any problems that monitoring identifies.

Include how you cover the following:

1. Defining the extent of the problem (i.e. what has happened, how/why it happened, and if appropriate how much product is affected);

2. Notify your verifier of the problem and take immediate action to restore control (e.g. boil the water for 1 minute / disinfect with chlorine or use an alternative temporary supply of safe water until the problem has been rectified); arrange for repairs and maintenance to be carried out on the reticulation system or the treatment system as required; remove the source of the contamination; check that water quality/treatment system is working properly before using the water again;

3. Handling of affected things (e.g. put any product / water you suspect has been affected on hold and decide what to do with it); and

4. Preventing re-occurrence (e.g. review maintenance programme; review incident with verifier and/or water professional).

6 Documentation and Record Keeping

Determine what records you need to keep for this procedure. These will help you to introduce and maintain consistent good practices, and to demonstrate to your verifier (auditor) that you are sufficiently controlling those factors that can impact on the safety and suitability of the food.

Assess any records you already have, and introduce any additional records you need for the monitoring and corrective action activities you specify in your procedure. When monitoring, you may have an option to either:

- record every check; or

- indicate that checks have regularly been carried out (e.g. throughout a week) and only record the results of a specific check where something went wrong. In these instances, always make a record of what you did to put things right (the corrective action).

Keep blank record forms handy for staff to use and let people know where they are. Keep completed record forms together where they can be found easily for your regular internal verification checks.

For your general programme requirements refer to the guidance document on the appropriate risk-based programme or plan which can be found on the Food Safety website.