	<h1>Drinking Water Audit Report</h1>
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<b>Local Authority:</b>	Kerry County Council	<b>Date of Audit:</b>	7 <sup>th</sup> November 2007
<b>Plant(s) visited:</b>	Lough Cummernamuck (referred to as Lough Caragh)	<b>Auditors:</b>	BW, MR (DWI), JF
		<b>Our File Ref:</b>	PAE2007/544
<b>Audit Criteria:</b>	<ul style="list-style-type: none"> <li>• The European Communities (Drinking Water)(No. 2) Regulations, 2007.</li> <li>• EPA Drinking Water Regulations Guidance Booklet No. 1 – Regulation 9 and 10.</li> <li>• The recommendations specified in the Handbooks on Implementation for Sanitary Authorities in relation to the E European Communities (Drinking Water) Regulations 2000.</li> <li>• The recommendations specified in The Quality of Drinking Water in Ireland reports.</li> </ul>		

## MAIN FINDINGS:

1. Due to the characterisation and quality of the raw water in Lough Cummernamuck and the treatment processes employed at this water treatment plant, the water from Lough Cummernamuck is considered very vulnerable to contamination and is not deemed an ideal raw water source.
2. Kerry County Council should take immediate steps to either improve the treatment on site or find a more suitable raw water source.

## 1. INTRODUCTION

Under the European Communities (Drinking Water)(No. 2) Regulations 2007 the Environmental Protection Agency is the supervisory authority in relation to the local authorities and their role in the provision of public water supplies. This audit was carried out to assess the performance of the local authority in providing clean and wholesome drinking water.

The opening meeting commenced at 2:00pm at Lough Cummernamuck (referred to as Lough Carragh). The scope and purpose of the audit were outlined at the opening meeting. The audit process consisted of interviews with staff, review of records and observations made during an inspection of the treatment plant. The following were in attendance during the audit. The audits observations and recommendations are listed in Section 3 and 4 of this report.

Lough Cummernamuck, which is referred to as Lough Caragh by Kerry County Council reportedly supplies approximately 1,700 customers in the Kilorglin and Cromane areas.

Representing Local Authority: (\*indicates that person was also present for the closing meeting)

Helen Welton, Area Technician; Kathleen McSweeney, Area Technician; Brian Sweeney, Senior Engineer; Colm Mangan, Senior Executive Engineer; David Lenihan, Senior Executive Chemist;

Representing the Environmental Protection Agency:

Brendan Wall, Marcus Rink (DWI, UK), John Feehan

## 2. AUDIT OBSERVATIONS

*The audit process is a random sample on a particular day of a facility's operation. Where an observation or recommendation against a particular issue has not been reported, this should not be construed to mean that there is this issue is fully addressed.*

a)	<b>Source Protection</b> <ul style="list-style-type: none"> <li>❑ The intake pipe is located some 18 meters out in the lake on a floating rose. This lake is located in an upland peaty area and is acidic in nature. The colour in the lake is in the range of 100-150 hazen units and turbidity of the lake water is also high. Livestock have direct access to its shoreline. The treatment plant was reported as having a throughput of 100,000 gallons per day and that the demand on this plant increases substantially during the summer months. Inlet screens were reportedly cleaned on a daily basis.</li> </ul>
b)	<b>Filtration</b> <ul style="list-style-type: none"> <li>❑ Raw water passes through one of four sand filters on site, is then chlorinated and flows to a 100,000 gallons reservoir. Sand is skimmed of the top of sand filters and new sand is added. The sand filter is reportedly refilled overnight and reopened to supply after approximately 2 days, depending on the demand at the plant.</li> <li>❑ Due to the fact that the raw water is high in colour (100-150 hazen units) the sand filters are under pressure and are constantly being challenged with raw water of a quality that they cannot cope with. It was unclear as to whether the maturation of sand filters was adequate and appropriate.</li> </ul>
c)	<b>Chlorination and Disinfection</b> <ul style="list-style-type: none"> <li>❑ Chlorine is injected into the pipeline some 5 meters underground from a shed located at the water treatment plant. The injection port is not visible. It was reported that there were occasional failures with the chlorine pumps. There is currently no residual chlorine alarm installed in the plant. There is no contact tank at the water works. The contact time after chlorine dosing at this plant was assessed. It was found not to meet the WHO Guidance value and is deemed inadequate to disinfect water from this plant.</li> </ul>
d)	<b>Chemical storage and bunds</b> <ul style="list-style-type: none"> <li>❑ Sodium Hypochlorite drums were found to be stored in an unbunded area in a shed on site.</li> </ul>
e)	<b>Management and Control</b> <ul style="list-style-type: none"> <li>❑ Midges were found floating on the water post filtration before entering the supply line.</li> </ul>

41 m<sup>3</sup>/hr

36 m<sup>3</sup>  
100,000  
gallons.

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### 3. AUDIT RECOMMENDATIONS

In view of the observations noted during the audit Kerry County Council is recommended to carry out the following:

1. The contact time for chlorine disinfection should be reviewed and Kerry County Council, should ensure that the correct dose and contact time is being used as recommended by the World Health Organisation and that the first connections are receiving appropriately disinfected drinking water. The calculation of contact time shall be submitted to the Agency. Contact time?
2. The local authority should install a continuous turbidity monitor on the final treated water at the water treatment plant. The monitor should be linked to a recording device and alarm in the event of a deviation from the acceptable operating range of the filters.
3. A turbidity meter should be installed to alert plant operators of any changes in raw water quality.
4. All water treatment plants should have a continuous chlorine residual monitor on the final water and such monitors should be alarmed and linked to a recording device to ensure that either a sudden increase in chlorine demand or a failure of the chlorine dosing system is immediately detected. The aim of such alarms is to ensure that corrective action is initiated as quickly as possible to prevent undisinfected water entering the distribution mains.
5. Kerry County Council shall ensure that a logbook is kept ("the filter logbook") for each sand filter containing the following:
  - a record of all maintenance work and inspections carried out on the filter;
  - details of the media depth and the condition of the filter when it is drained down;
  - details of any changes or required changes to filters, and
  - details of any trial work carried out on the filters.
6. Kerry County Council should follow the guidance on the operation and maintenance of slow sand filters as specified in the EPA Water Treatment Manual on Filtration and in particular the following action is required as a priority:
  - The local authority shall ensure that, following media replacement and skimming (i.e. removal of the schmutzdecke), the filters are run to waste for an appropriate period of time.
7. The chlorination injection port into the supply line should be visible and accessible for inspection.
8. Kerry County Council should ensure that the source protection and catchment risk assessment score for the *Cryptosporidium* risk assessment is examined in detail and measures implemented to reduce the risk where possible.
9. Raw water monitoring should be carried out routinely on all raw water sources and the monitoring should include *E.coli* monitoring.
10. Kerry County Council shall prepare a programme of monitoring for *Cryptosporidium* in the raw and treated water in consultation with the HSE. It should include a totaliser and flowmeter for the raw and treated water. If any *Cryptosporidium* oocysts are detected

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during the monitoring programme then the local authority should immediately contact the Health Service Executive.

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11. An assessment of the lake should be undertaken to ensure that the intake pipe is located at the most appropriate location. This assessment should include an evaluation of the thermal layers, dissolved oxygen results, settlement patterns within the lake (this is especially important as effectively primary treatment at this plant is settlement in the lake), retention time of lake and currents within the lake. This should include characterisation of the lake water quality including parameters such as: pH, temperature, turbidity, alkalinity, chlorophyll a and dissolved oxygen.
12. Action should be taken to ensure that the source is made secure and fenced off to prevent livestock (including cattle, sheep and deer) direct access to the lake. } *Identified*
13. A survey the shoreline of Lough Cummernamuck should be conducted to identify any potential high-risk agricultural or other sources. This should be extended to include all feeder streams into Lough Cummernamuck. The use of the SSRS methodology could be adopted to assess the risks from feeder streams into Lough Cummernamuck.
14. Kerry County Council should characterise the variability in raw water quality and compile a source water safety plan (reference WHO) in order to mitigate any risks to the abstracted water. Trends in raw water quality should be graphed and used to determine the optimum treatment conditions for the water at the plant and these trend graphs should be used to identify whether rapid variations in raw water quality have resulted in problems with the treatment process. Kerry County Council should calculate the retention time in the lake in an effort to understand the risk of *cryptosporidium* being abstracted.
15. Kerry County Council shall ensure that all chemicals used at the treatment plant are produced in accordance with an appropriate IS:EN or BS:EN standard or are on the List of Approved Products and Processes as published by the Drinking Water Inspectorate of England and Wales ([www.dwi.gov.uk](http://www.dwi.gov.uk)).
16. Kerry County Council should review chemical storage arrangements at treatment plants. Chemicals must be stored in bunded areas capable of containing at least 110% of the volume of chemicals stored therein. Fill points for storage tanks inside the bunds should be located within the bunded area. Refer to EPA guidance document on Storage and Transfer of Materials for Scheduled Activities available at [www.epa.ie](http://www.epa.ie)
17. Kerry County Council should ensure that all tanks storing treated water are so covered so as to prevent all insect life from entry into these tanks.
18. A Drinking Water Safety Plan approach to the operation of the treatment plant should be developed by the local authority and to provide safe and secure drinking water the water supplier must have in place a management system that has identified all potential risks and implemented reduction measures to manage these risks.
19. A documented system of regular internal auditing and supervision of the treatment plant by Senior experienced personnel in the local authority should be implemented and copies of quality assurance checks and audits records kept on site for inspection by the Agency.
20. Plans must be put in place by the local authority to improve plant management and performance, to upgrade or replace the water supply which currently has inadequate treatment. Furthermore, the local authority must review operations of all the other plant to ensure that the turbidity levels are below 1.0 NTU (and preferable below 0.25 NTU).

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#### 4. FOLLOW-UP ACTIONS REQUIRED BY THE LOCAL AUTHORITY

During the audit the local authority representatives were advised of the audit findings and that action must be taken as a priority by the local authority to address the issues raised.

The local authority should submit a report to the Agency within one month of the date of this audit report detailing how it has dealt with the issues of concern identified during this audit and implemented the various recommendations.

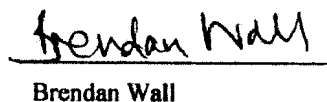
The actions taken will be verified by the Agency during any future audits.

Report prepared  
by:

  
John Feehan

Inspector

Reviewed by:

  
Brendan Wall

Senior Inspector

Date:

15/1/08

Date:

22/1/08