CENTRAL SCOTLAND WATER DEVELOPMENT BOARD
FOUNDATION FOR WATER RESEARCH
DEPARTMENT OF THE ENVIRONMENT

SURVEY OF CRYPTOSPORIDIUM IN LOCH LOMOND

Progress Report April to June 1991

REPORT NO UC 1235

AUGUST 1991
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Report No: UC 1235
August 1991
Authors: E G Carrington and D G Miller
Contract Manager: E G Carrington
Contract No: 2221

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Any enquiries relating to this report should be referred to the
Contract Manager at the following address:

WRC plc, PO Box 85, Frankland Road, Blagrove, Swindon, Wiltshire
SN5 8YR. Telephone: Swindon (0793) 51711
SUMMARY

One of the recommendations of the "Badenoch Committee" was that a survey of occurrence of Cryptosporidium oocysts in source waters should be undertaken and the survey should include an upland water. After discussions between various bodies a study in the Loch Lomond catchment was established. This is funded jointly by the Central Scotland Water Development Board and the Foundation for Water Research and the quality assurance of the analysis is funded by the Department of the Environment. The study will monitor the waters prior to introduction into the potable supply, outbreaks in the local human and farm animal communities, and the influence of their wastes upon the levels of oocysts in waters entering the Loch.

This report covers the initiation of the contract and the first three months of the study.
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SECTION 1 - INTRODUCTION

Following the outbreak of cryptosporidiosis in Swindon and Oxford in 1989, the Badenoch Committee was set up by the Secretaries of State to review the extent of the problem and offer advice to the water industry. Part of the deliberations of the Committee concerned gaps in knowledge and this led to the development of the national research programme. One element of this was a survey of the occurrence of cryptosporidium oocysts in water sources and it was the intention of the Committee that an upland water should be included in such a survey. Discussions between the Department of the Environment (DoE), Scottish Development Department (SDD) and WRc and between the Central Scotland Water Development Board (CSWDB), Foundation for Water Research (FWR), Scottish Parasite Diagnostic Laboratory (SPDL), Strathclyde Regional Council and WRc led to the formulation of a contract to carry out such a study. The study, which would complement that recently completed on lowland waters and boreholes, would examine the occurrence of cryptosporidium oocysts in Loch Lomond and its inputs in the vicinity of Ross Priory and the incidence of cryptosporidiosis in the local human and farm animal communities. It would be funded equally by CSWDB and FWR and would be administered by WRc. DoE agreed to fund a quality assurance programme for the analyses.

This report covers the initiation of the contract and the first three months of the study.

SECTION 2 - SCOPE OF THE STUDY

2.1 RAW WATER SAMPLING

A fixed sampling point would be established at the intake at Ross Priory Pumping Station. Raw water would be sampled continuously and the cartridges removed every second day and sent to SPDL for analysis.
2.2 **EPIDEMIOLOGY**

The reporting procedure adopted by the Communicable Disease (Scotland) Unit at the start of 1991, would be used to identify cryptosporidiosis cases in the population supplied with Loch Lomond water.

2.3 **SEWAGE INPUTS**

From the epidemiological reporting procedure it should be possible to identify cases of cryptosporidiosis in communities whose sewage effluent discharges into the Lomond catchment. At such times samples will be taken of both sewage effluents and adjacent waters courses to establish the levels of cryptosporidium oocysts present.

2.4 **FARM INPUTS**

The major beef and dairy herds within the catchment could be identified, and with the co-operation of the farmers it should be possible to identify the occurrence of cryptosporidiosis in the animals. It may then be possible also to enumerate the level of cryptosporidium oocysts present in the animals, on the land and in the surrounding water courses.

2.5 **FERAL ANIMALS, BIRDS AND FISH**

Extensive knowledge already exists on the ecology and biology of this body of water and it may be possible to identify and quantify the possible inputs from feral animals, birds and fish.

2.6 **VIABILITY OF OOCYSTS**

It would be possible to adopt the methods developed at SPDL for determining the viability of the oocysts found in the Loch Lomond samples.
SECTION 3 - CONTRACT ARRANGEMENTS

The work would be carried out at SPDL under the Direction of Professor H V Smith as a subcontract from WRC to the University of Strathclyde. Initially the University objected to the conditions in the contract referring to publication of results. This has now been resolved; any submission made for a higher degree would be held by the University on restricted access for 5 years. Other requests for publication would be referred to the funders via WRC.

SECTION 4 - RESULTS TO DATE

4.1 RAW WATERS

During the period under review some 40 samples from the raw water abstraction point at Ross Priory have been examined. These represent continuous filtration with the element being changed at two day intervals during the week and at a 3 day interval at weekends. On 2 occasions in early April oocysts were found at levels of 0.12 and 0.06 per litre. Using the staining techniques, on both occasions 81% of the oocysts were shown to be viable. Oocysts were also detected in the samples examined on 28 May and 10 June, both at 0.012 per litre. Viability test on these samples were unsuccessful.

4.2 SEWAGE EFFLUENTS

Eight sewage works discharging into rivers entering the southern loch or directly into the loch have been identified. The effluents have been examined at least once and no oocysts found. It is intended that they will be examined at least once a month and more frequently if infection in the community is indicated.

4.3 EPIDEMIOLOGY

During the review period only occasional isolated cases have been identified but data supplied by CD(S)U is still being examined.