



**ENVIRONMENT
AGENCY**

**WATER QUALITY SECTION
CORNWALL AREA**

FINAL DRAFT REPORT

**A DESK STUDY TO ASSESS THE
COMPLIANCE OF THE RIVER FOWEY
WITH THE EC SURFACE WATER
ABSTRACTION DIRECTIVE
(75/440/EEC) FROM 1993 TO 1995**

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Author: Katherine Ivall
Biologist**

**Geoff Boyd
Area Manager**

1. INTRODUCTION

Colliford Reservoir (R15B050/51/52), the River Fowey at Trekeivesteps (R15B053) and the River Fowey at Restormel (R15B054) are regularly monitored by the Environment Agency in order to assess compliance with standards laid down in the EC Surface Water Abstraction Directive (75/440/EEC).

Rosanne Broome (Senior Scientist, Regional Pollution Prevention and Control) reports non-compliant sites to the Department of the Environment (DoE) and to the Environment Agency Head Office each year. A publication is written annually by the Regional Pollution Prevention and Control Department listing all EC Directive failures for the South West Region. Raw data and EC Directive returns are available from 1993.

A desk study was undertaken to highlight any instances of non-compliance with the EC Surface Water Abstraction Directive standards.

2. METHOD

The River Fowey catchment has three sites which are assessed annually for compliance with the EC Surface Water Abstraction Directive standards. This report lists and explains any failures recorded since 1993. A site cannot fail a standard if less than twenty water samples have been taken in any one year.

3. RESULTS

See Table 1, Appendix 1 for River Fowey failures since 1993. A site has not failed as far as the DoE/EC are concerned if a 'waiver' is applied. Article 8 of the Surface Water Abstraction Directive allows the requirements of the Directive to be waived if exceedences occur under the following circumstances:

- a) in the case of floods or other natural disasters;
- b) in the case of certain parameters marked (o) in Annex II (colour, temperature, nitrates, copper (A1 waters only), sulphates (A2/A3 waters only) and ammonia (A3 waters only) because of exceptional meteorological or geographical conditions.
- c) where surface water undergoes natural enrichment in certain substances as a result of which it would exceed the limits.
- d) in the case of surface water in shallow lakes or virtually stagnant surface water.

In no cases may the exceptions provided for disregard the requirements of public health protection. Applying a waiver means that Europe/DoE will not expect the Environment Agency to take action to achieve future compliance with standards where failures are due to circumstances beyond our control.

The River Fowey and Colliford Reservoir are A1 raw water sources. Explanations of apparent failures are listed in the Discussion.



4. DISCUSSION

4.1 Failures attributed to Poly Aromatic Hydrocarbons (PAHs) and Dissolved and Emulsified Hydrocarbons

PAHs and Dissolved and Emulsified Hydrocarbons are both derivatives of oil.

PAHs are almost entirely of man-made origin and formed as a result of incomplete combustion. PAH presence can also result from exhaust fumes, rubber materials and air pollution. PAHs are often detected in water samples where there has been a history of oil contamination. Run-off from tarmac can contain high levels of PAHs.

Dissolved and Emulsified Hydrocarbons and PAHs are ubiquitous in the environment in many forms. The possibility of a water sample becoming contaminated by sampling procedures is extremely high even though specialised bottles are used and the National Sampling Procedures Manual is followed. The sampling jug, the samplers' hands and the samplers' vehicle itself are all potentially contaminating sources.

Although positive results for PAHs or Dissolved and Emulsified Hydrocarbons are valid; it cannot be determined whether the results are genuine or a sampling procedure contamination problem. If there was no odour or any physical signs of oil at the time of sampling, it would be highly unlikely that the water concerned contained oil.

The problems associated with the limit of detection for PAHs and Dissolved and Emulsified Hydrocarbons has been raised as a national problem.

THE CURRENT LIMIT OF DETECTION FOR DISSOLVED AND EMULSIFIED HYDROCARBONS HAS MEANT THAT NO AI WATER IN THE SOUTH WEST REGION COULD HAVE MET THE SURFACE WATER ABSTRACTION DIRECTIVE STANDARD.

Detection limits have recently improved for Dissolved and Emulsified Hydrocarbons although the results obtained must continue to be viewed with some scepticism. A report investigating the PAH failure at Restormel in 1994 was written by Chris Leach (Survey Officer) Cornwall Area. This report is included in Appendix II.

4.2 **FAILURES ATTRIBUTED TO TOTAL PHENOLS**

These failures are attributed to problems related to the limit of detection available, the method used to calculate total phenols and the isomers used in the calculations. Head Office have been trying to resolve the laboratory issues at a national level. There are no failures relating to Total Phenols in 1995.

4.3 FAILURES ATTRIBUTED TO COLOUR

Waivers have been applied on the basis of the sites having an upland moorland source, with naturally occurring high colouration derived from humic acids in peaty soils. Rainfall events appear to exacerbate the situation.

4.4 FAILURES ATTRIBUTED TO DISSOLVED IRON

A waiver has been applied when the source of dissolved iron was considered to be of natural origin.

Colliford Reservoir failed the dissolved iron EQS of 0.3 mg/l in 1994 and 1995. A waiver was applied due to the source being considered of natural origin.

THE RIVER FOWEY AT TREKEIVESTEPS WAS THE ONLY SITE OUT OF THE THREE IN THE FOWEY CATCHMENT TO FAIL TO COMPLY WITH THE EC SURFACE WATER ABSTRACTION DIRECTIVE IN THE LAST THREE YEARS. This failure was in 1995 and was attributed to dissolved iron. A waiver was not suggested to Rosanne Broome until after the 1995 return was made. Waivers could not be requested in retrospect. If Trekeivesteps fails again in 1996 a waiver will be requested in 1997.

5. CONCLUSION

Since 1993, water samples analysed from Colliford Reservoir, the River Fowey at Trekeivesteps and the River Fowey at Restormel have complied with the EC Surface Water Abstraction Directive (75/440/EEC). Failures that are listed within the Result Table can be explained either by the presence of natural contaminants or by problems associated with low detection limits in the water analysis methodology. A waiver for the failure attributed to dissolved iron at Trekeivesteps in 1995 was suggested after the EC Directive Returns were made. The presence of iron was considered to be of natural origin and no action has been taken. There were no failures attributed to 'Total Pesticides'.

This desk study suggests that the land usage within the catchment has not derogated water quality with regard to the EC Surface Water Abstraction Directive Standards.

6. REFERENCES

- Oliver, Anna; July 1996 - Water Quality Technical Series (QA96/01): 1995 EC Directive Returns.
- Oliver, Anna; June 1995 - Technical Department: 1994 Directive Returns South West Region.

**RESULT TABLE 1. EC SURFACE WATER ABSTRACTION DIRECTIVE
NON-COMPLIANCE 1993-1995**

FAILURES²

River Fowey Sites	1993	1994	1995
R15B053 - Trekeivesteps (River Abstraction Point)	Colour (Waiver) Dissolved + Emulsified Hydrocarbons	Dissolved + Emulsified Hydrocarbons Total Phenols Colour (Waived)	Dissolved + Emulsified Hydrocarbons Dissolved Iron
R15B054 - Restormel (Abstraction Point)	Colour (Waiver) Dissolved + Emulsified Hydrocarbons	Poly Aromatic Hydrocarbons (PAHs) Total Phenols Colour (Waiver)	Dissolved + Emulsified Hydrocarbons
R15B050/51/52 - Colliford Reservoir	Colour (Waiver) Dissolved + Emulsified Hydrocarbons Dissolved Iron (Waiver)	Dissolved + Emulsified Hydrocarbons Total Phenols Colour (Waiver)	Dissolved + Emulsified Hydrocarbons Dissolved Iron (Waiver) Colour (Waiver)

FOR COLLIFORD RESERVOIR THE DATA FROM THE 3 DRAW-OFF LEVELS ARE COMBINED FOR THE PURPOSES OF COMPLIANCE ASSESSMENT.

'WAIVERS' ARE EXPLAINED IN THE DISCUSSION (4.1 - 4.4)

INVESTIGATION NOTECORNWALL AREA 1996R. FOWEY EC SURFACE WATER ABSTRACTION DIRECTIVE FAILURE

The River Fowey at Restormel failed for polyaromatic hydrocarbons (PAH) in 1994. The standard that applies is 200 ng l⁻¹ PAH measured as a sum of the following six polyaromatic hydrocarbons:

- Benzo (a) pyrene
- Benzo (b) fluoranthene
- Benzo (ghi) perylene
- Benzo (k) fluoranthene
- Fluoranthene
- Indeno (1, 2, 3, cd) pyrene

The standard is the maximum allowable total concentration and 95% of samples must pass.

Four samples were taken during 1994 and on such a low number all must pass. Failure occurred on 3 February when the total concentration for the six PAHs was 299.4 ng l⁻¹. There are no problems with the analytical method itself but any oil film on the water being sampled that gets into the sample bottle could give positive results. There had been heavy rain in the previous twenty four hours producing spate conditions.

PAHs are ubiquitous in the environment e.g. from the incomplete combustion of gases present in exhaust fumes, rubber materials and tarmac on road surfaces

A possible source is road run off from the A38 along the Fowey Valley.

In view of the lack of data it was agreed through Cornwall Investigations Coordination Group (CICG) to increase the frequency of sampling for PAHs.

Eleven samples were taken from March 95 to March 96. On no occasion was a PAH failure recorded.

However, it should be noted that in December 95 the highest total PAH value of 92.9 ng l⁻¹ for this set of samples was recorded. There had been heavy overnight rain prior to sampling causing run off. It would appear that the higher PAH levels are associated with run off following rain and should further failure occur, any investigation should be directed towards wet weather conditions. Levels of hydrocarbon oils should also be determined to ascertain if these are responsible for elevated PAH values.

Monitoring for PAHs should revert to the requirements of the Regional Programme for the Abstraction Directive.

CHRIS LEACH
Survey Officer