

Ram Dyke (Brook Drain)

The pre-treatment plant at a paper mill, from which a discharge of effluent is made at the head of the Ram Dyke, was operating throughout the year. Occasionally a very unsatisfactory effluent was produced, but as a result of closer attention to procedures within the mill the peak polluting discharges have been eliminated. The effluent discharged almost invariably fails to meet the prescribed conditions, and it is apparent that a second stage of treatment is required to reduce the pollution load to an acceptable level. Although the effluent remained unsatisfactory, the load on the stream was drastically reduced such that self-purification with dilution from subsidiary drains resulted in the Brook Drain having suspended solids and B.O.D. values corresponding to a well purified sewage effluent at the confluence with the Maxey Cut. The respective figures have been reduced to 25 milligrams per litre and 16.5 milligrams per litre as compared with 86 milligrams per litre and 74 milligrams per litre the previous year.

As in the case of other streams to which effluents from paper mills are discharged, an improvement in the condition of the dyke from time to time produces a profuse growth of sewage fungus. Previously even that was inhibited by the massive blanketing of paper pulp and the low dissolved oxygen !

Bourne Eau

Only one chemical survey was made, and it indicated that the drain was in a fairly satisfactory condition. As had been anticipated, extensions to the Bourne sewage treatment works completed towards the end of 1966 resulted in an improvement in the effluent, beneficial to the watercourse.

River Glen

A survey indicated that the river was in a clean condition.

Blue Gowt Drain

A farmer complained that water from the Blue Gowt Drain which he had sprayed on his Cox's Orange Pippins as a frost preventative had killed the blossom, and he attributed the cause to the Internal Drainage Board having used copper sulphate as an algicide. Some rhubarb had also been affected, but no apple trees other than Cox's Orange Pippins had been damaged.

The highest concentration of copper found in samples of water taken from the drain was 0.02 milligrams per litre, which the National Agricultural Advisory Service considered to be well below the level harmful to plant life. Further investigation showed that the salinity of the Blue Gowt Drain in proximity to the orchard varied between 600 and 1,200 milligrams per litre. The threshold toxicity value of salt for apple blossom expressed in terms of chloride ion is considered to be about 300 milligrams per litre. It appeared that the cause of the damage was not the algicide but the salinity of the water, and an analysis was made to ascertain the salt content of the leaves and blossom affected as compared with that of the leaves and blossom unaffected.

The result was as follows:

	Percentage chloride			
Affected apple leaves and blossom	1.65
Unaffected apple leaves and blossom	0.37
Affected rhubarb leaves	1.95
Unaffected rhubarb leaves	0.08

This analysis appeared to be conclusive evidence that the salt had been the cause of the damage.

It was subsequently discovered that de-watering equipment had been used extensively during the construction of sewage pumping stations and a sewerage scheme, and that at three sites saline water could have been discharged to the Blue Gowt Drain in proximity to the orchard.

Unfortunately it has not been possible to establish with certainty whether the salinity of the Blue Gowt Drain had been increased by these civil engineering works.

As a result of this incident local authorities and others likely to employ contractors who might use de-watering equipment have been requested to inform the Authority when such equipment is to be used. When licences to abstract water are now issued the licence holders are advised that no assurance is given that the water is suitable for the purpose for which it is to be used.

Gretton Brook

Another unusual pollution was discovered as a result of an anonymous complaint concerning the Gretton Brook between Rockingham and Deene. Investigation showed it to be caused by a discharge of contaminated ground water from a pumping station used to drain ironstone workings. Waste vegetable matter from a potato crisp factory had been tipped into a disused ironstone quarry and the resulting foul drainage had polluted the surrounding ground water which apparently flowed towards the pumping station. Tipping was discontinued, and the drainage from the disused ironstone quarry was pumped over grassland. The Company also agreed to suspend pumping from the ironstone workings so long as there was any danger of the ground water there being still contaminated.

Oil and Other Pollutions

As in previous years there were a number of oil pollutions generally caused by accident or ignorance and not too far reaching in effect, but some were perhaps unavoidable.

On the 10th February a tanker travelling down the south-bound carriageway of the M.1 Motorway near Rothersthorpe ran out of control across the central reservation and overturned on the embankment of the north-bound carriageway. The insulated tanker carried liquid beef fat, approximately 3,000 gallons of which spilled on to the road and congealed making the surface like an ice rink. Roadmen were employed to clear the road and the fat was carted away. After the fat had been removed the road remained slippery, and a detergent was used. Slurry was brushed and hosed down surface water drains, and eventually reached a tributary of the Wootton Brook. Fortunately the dilution was very great, and the stream appeared to have suffered little harm. As the Wootton Brook joins the River Nene above the Mid-Northamptonshire Water Board's Duston Mill intake the Water Board were kept informed, and the intake was shut down as a temporary precaution. The highly dangerous road conditions resulting from the accident had to be remedied with the greatest urgency, and the discharge of polluting matter to the surface water sewers was inevitable. The risk had to be accepted, and no more could be done than watch for any adverse effects and prepare to initiate remedial measures.

North Drove, South Drove, Counter and Vernatts Drains

The four drains may be regarded as "clean" by pollution prevention requirements, but the North Drove Drain and the South Drove Drain are too saline to permit of the water being used for spray irrigation.

River Welland—Tidal

Grossly polluting discharges continued to be made at the head of the tidal section, and they cannot be removed until Spalding sewage works is reconstructed to provide adequate treatment for the sewage and various industrial effluents being discharged after only rudimentary treatment.

River Nene—Non-tidal

Six full chemical surveys of the non-tidal River Nene were made at bi-monthly intervals. Twelve supplementary surveys were also made between Billing Bridge and Oundle, as that

length of river receives the heavy polluting load from the industrial towns of Northamptonshire.

The Billing Bridge sampling station provides an analysis of the river before it reaches the large volume of effluent from Northampton sewage works, and the Oundle sampling station indicates the improvement which has taken place as a result of self-purification and some dilution.

Comparison of the six full surveys with those of the previous two years was as follows:

	1964/65		1965/66		1966/67	
	No. of Samples	Per Cent	No. of Samples	Per Cent	No. of Samples	Per Cent
Satisfactory ..	59	44	63	58.5	67	59.5
Unsatisfactory ..	74	56	45	41.5	46	40.5

A sample is regarded as "satisfactory" if the 5-day Biochemical Oxygen Demand does not exceed 5.0 milligrams per litre.

Although the comparison shows a marginal improvement, it should be noted that (with one exception) river flows were higher on the days of the 1966/67 surveys than on the corresponding surveys in the previous years.

If the comparison is expressed in relation to the three phases of the river—unpolluted head waters from the source to Billing, the polluted middle reach from White Mills to Ringstead, and the recovered lower reach from Oundle to Dog-in-a-Doublet—then the statistics are as follows:

	Source to Billing		White Mills to Ringstead		Oundle to Dog-in-a Doublet Sluice	
	Samples	% Satisfactory	Samples	% Satisfactory	Samples	% Satisfactory
1964/65 ..	42	88	56	14.5	35	40
1965/66 ..	36	94.5	42	19	30	70
1966/67 ..	36	91.5	42	31	36	58.5

It suggests that the tendency is for an improvement in the middle reach, but that the effect of the pollution there has extended further into the lower reach as the river's natural recovery has been delayed. It is possible that this was due to the higher river flows in 1966/67 reducing retention time in the middle reaches so that polluting matter was carried downstream more quickly and further.

It is regretted that it is not possible to record any apparent progress towards a regional scheme for the Wellingborough area. The Nene River Board first suggested a regional scheme as the only solution to the difficult trade waste problems in the leather processing towns as long ago as 1956, but there was then local opposition and the Minister of Housing and Local Government was unwilling to use his powers under section 9 of the Rivers (Prevention of Pollution) Act, 1951. At a local inquiry into a sewerage and sewage disposal scheme in 1963 the Ministry's Inspector came to the conclusion that a regional scheme was to be preferred to the several county district councils proceeding independently, and as a matter of urgency the Ministry convened a conference of the councils to discuss the proposal. As requested, Consulting Engineers reported on the technical considerations with equal urgency, and the report was received in 1964. There is little evidence of any progress since then. In the meantime the polluting load on the river between Wellingborough and Irthlingborough continues to increase, and the preparation of improvement schemes which might otherwise have been then carried out independently by the councils have been suspended. The River Board, and more recently the Authority, were prepared to suffer the grossly polluting discharges from these obsolete and overloaded works as an adequate and well-managed regional sewage works, albeit in the bush, was to be preferred to several smaller sewage works in hand. As was said in the First Annual Report:

"It is becoming increasingly obvious that little or no improvement in the condition of the middle (industrial) section of the River Nene can be achieved without a scheme for dealing adequately with the difficult trade effluents produced by the leather industry. The fact that water may now have to be taken for public supply from the river down-

stream of the "black" industrial reach makes an improvement most essential and urgent".

This Authority are not concerned in the local political issues which arise, or with the administrative arrangements for operating a large works serving the industrial area, but they are concerned that there should be no further delay in improving the present conditions. The time may not be far away when the Authority will have to consider whether they can continue to show forbearance in respect of these unsatisfactory discharges, and tolerate a badly polluted river.

River Ise

Only two full chemical surveys were made, and although the analyses suggest that the river is generally satisfactory no worthwhile conclusions can be drawn.

Willow Brook

Three chemical surveys were made. The Northern tributary revealed a pronounced deterioration from the previous year, and while the Central and Southern tributaries remained unsatisfactory there was no evidence of further deterioration.

The middle and lower reaches were unsatisfactory, and a more detailed investigation of the cause is to be carried out in the coming year. The chloride and free and saline ammonia content of the water is influenced by the discharges of effluent from Corby Steel Works, and it is possible that they may have to be taken into account when deciding on the site of the proposed abstraction for the Rutland project.

Harpers Brook

This stream is generally of good quality. The high B.O.D. values found on the survey in May were probably due to the effect of algae during incubation. The presence of algal growth was indicated by the super-saturation which was appreciably higher than would normally be expected from a free-flowing stream. The low ammonia content indicated that there was no significant pollution from discharges of untreated sewage from septic tank overflows. The brook was well able to contain the discharge from Brigstock sewage works, notwithstanding that the effluent is not of a consistently satisfactory standard.

South Holland Main Drain

Data accumulated over the past few years shows that this water can be regarded as unpolluted, and only two surveys were considered necessary, but the results confirmed the remarkably high salinity. Summer B.O.D. values tend to be higher than might be expected due to a combination of the effect of algae and fragments of decaying vegetation after weed cutting.

River Nene—Tidal

Five full chemical surveys were carried out, and the results were in general slightly better than those of the preceding year. The better quality of the sewage effluent from the Peterborough sewage disposal works may well be the cause of the improvement.

2. STANDARDS APPLIED TO EFFLUENTS

The Royal Commission's recommendations are usually adopted for fully treated discharges of sewage and trade effluent, but more stringent standards are being increasingly applied where circumstances warrant. The proposal to make a major abstraction upstream of Peterborough for an impounding reservoir in Rutland emphasises the importance of raising the standards to improve the quality of the river.

One hundred applications under the Rivers (Prevention of Pollution) Acts and the Water Resources Act were dealt with. The various types of discharges were as follows:

Sewage Effluents (treated)	..	..	..	..	21
Storm sewage effluents	..	..	..	..	8
Emergency overflows	..	..	..	..	9
Surface water discharges	..	..	..	..	13
Trade effluents	..	..	..	..	5
Farm effluents	..	..	..	..	1
Discharges to underground strata	..	..	..	..	43

Volume and quality control conditions were prescribed in granting section 7 consents in respect of discharges of fully treated sewage and trade effluent. Discharges from storm sewage tanks were required to be of such a nature and composition as could be produced by the plant as approved, and when properly operated and adequately maintained.

Sewage effluents were normally required to comply with the Royal Commission recommendations in not containing more than 30 milligrams per litre of suspended solids dried at 105°C nor taking up more than 20 milligrams per litre of dissolved oxygen in 5 days at 20°C. Where circumstances warranted higher or lower standards, the conditions were varied accordingly.

Applications relating to discharges of trade effluents were treated similarly to those for sewage effluents, but conditions relating to temperature control and (where necessary) toxic constituents were included as appropriate.

Discharges of crude sewage from emergency overflows at sewage pumping stations were only to be made at times of mechanical or electrical breakdown or failure of the pumping plant. Surface water discharges were required to consist of surface water only, uncontaminated by either domestic sewage or trade effluent.

It is relatively easy to draw section 1 or section 7 conditions in respect of treated effluents discharged from sewage works in dry weather. It is only when there has been pollution arising from culpable mis-operation of the works or from persistent overloading to which the sewage authority have been indifferent that the conditions may have to be tested in court. It is much more difficult to draw precise and enforceable conditions to cover those exceptional discharges which have to be allowed for, but which cannot be precisely limited. Emergency discharges due to mechanical or electrical failure at a pumping station must be accepted, but how can the continuation of such discharges due to unreasonable delay in repairing or remedying the breakdown be prevented? In many cases storm sewage discharges are inevitable, and it is apparently impossible to specify in chemical terms the nature and composition of the discharge. But how can a river authority ensure that storm water tanks are properly operated and promptly emptied after a storm so as to be fully available to minimise the effect of the subsequent storm? The difficulty appears to be that the prescribed conditions are adequate for the contingencies which are unlikely to result in legal proceedings, but may prove inadequate and insufficiently precise for those contingencies for which the sanction of the court may most likely be required. It is suggested that in most cases the conscience and responsibility of the sewage authority and the conscientiousness of their employees are more effective in achieving the objects of the Act than the penalties it contains.

3. SAMPLES AND ANALYSES OF EFFLUENTS

During the year 1,016 samples of effluent were analysed, of which 921 were from sewerage and sewage disposal works and the remainder from trade premises. Miscellaneous analyses numbered 97, the majority being of sewage or industrial effluent at various stages of treatment. One Statutory Sample of a discharge of sewage sludge was analysed.

Classification of discharges of sewage and industrial effluents during the year is as follows:

			Number	Per cent
Sewage Works generally producing satisfactory effluents	..	..	109	43
Sewage Works generally producing unsatisfactory effluents	..	..	145	57
Trade premises generally discharging satisfactory effluents	..	..	13	48
Trade premises generally discharging unsatisfactory effluents	..	..	14	52

4. SEWAGE AND TRADE EFFLUENTS

Hitherto, particular sewage and trade waste problems have been considered as and when they arose or gave cause for concern, but the Pollution Prevention Committee have now adopted the practice of considering at each meeting and in rotation a Special Report on each local authority, the condition of their sewage plants, and particularly the extent to which the various discharges may be falling short of the prescribed conditions, the progress they have made in complying with their statutory obligations under the Public Health Act 1936 and the Rivers (Prevention of Pollution) Acts 1951-61, and their proposals for new or improved sewage schemes. When reports on all the 51 local authorities have been considered the review will be repeated, and in this way it is hoped that it will be easier to measure the progress "in restoring the wholesomeness of rivers". It has become apparent that, although many new sewage works have been built in the past fifteen years, they are not all producing as good an effluent as had been expected, and some of the prescribed conditions are consistently contravened. The two River Boards, and more recently the Authority, have adopted the policy of patience and persuasion in dealing with sewage authorities—particularly having regard to the difficulties and delays which have been beyond their control—but this stocktaking exercise may be salutary.

One result of these Special Reports has been to emphasize the importance of dealing with the section 1 applications if effective control is to be exercised over the pre-1952 discharge of trade and sewage effluent.

Advice given to farmers regarding the avoidance of pollution from silage drainage appears to have taken effect, as no silage pollutions were reported.

Barnack Rural District

A sewage disposal works is to be constructed for Wansford and Thornough.

The effluent from Wittering sewage disposal works was generally satisfactory, but the proposed development at Wittering is such that work has commenced on the construction of a new sewage works to take the substantially increased load.

Billesdon Rural District

Following the installation of an upward flow clarifier at the Tilton sewage disposal works satisfactory effluent was discharged to a tributary of the Eye Brook.

Boston Rural District

Some improvement in the effluent from Algakirk and Wigtoft (Church Road) sewage disposal plants was achieved following better filter distribution and ventilation.

Bourne Urban District

Two additional filters and humus tanks were constructed at Bourne sewage disposal works, and Bourne Urban District Council are proposing further extensions to provide for the treatment of a very unsatisfactory trade waste at present being discharged to the Bourne Eau.

Brixworth Rural District

Better maintenance and supervision has resulted in an improvement in the discharge from Church Brampton and Harlestone sewage disposal works.

A sewerage and sewage disposal scheme is being prepared for Great Brington, Little Brington and Nobottle. The Bringtons are at present served by inadequate land areas, and the Council have been asked to make better use of the existing land pending completion of the new scheme.

An additional humus tank and filter were constructed at the Hollowell sewage disposal works, and an additional primary settlement tank is to be constructed.

Corby Urban District

Effluent from Corby sewage disposal works continued to be satisfactory, although occasional high suspended solids may indicate that the works has little or no spare capacity.

Daventry Municipal Borough

The temporary additional sewage disposal plant constructed to meet the immediate needs of the Birmingham overspill expansion at Daventry was brought into operation in June, and produced a satisfactory discharge. Towards the end of the year there was a slight deterioration, and the Council were asked to provide more land treatment.

Daventry Rural District

Long Buckby sewage disposal works are to be extended to provide for future development there, and to take the sewage from the Watford Gap Service Station on the M.1. Motorway. The diversion of that sewage to Long Buckby will provide much needed relief at the Watford sewage disposal works.

Everdon sewage disposal works is almost completed. Work commenced on the extensions to Weedon sewage disposal works to take the sewage from Flore and Stowe IX Churches, and the unsatisfactory sewage works at Flore will then be abandoned.

A number of complaints have been received over the years of pollution of the Grand Union Canal caused by creosote from a sawmills at Welton. The creosote plant has now been dismantled.

Desborough Urban District

A section 7 consent was granted to Desborough Urban District Council in consequence of extensions to be carried out at the sewage disposal works.

East Elloe Rural District

East Elloe Rural District Council operate thirty-five small sewage disposal plants, and also undertake maintenance at a further eight. Maintenance by one mobile gang has not been nearly so good as is required, and most of the discharges are unsatisfactory and cause localised pollution.

A sewerage and sewage disposal scheme for Holbeach, one of the largest parishes in the district, was first prepared in 1939, and twenty-eight years later the scheme was started! It is expected to be completed in four years, when the six small sewage disposal plants there will be abandoned.

A sewerage scheme for Long Sutton and Sutton Bridge was first prepared in 1948, and is now being re-examined.

Following the Chief Pollution Prevention Officer's Special Report on sewage disposal in the rural district, it was pointed out to the Council that a survey of the forty-three small sewage disposal plants had shown that the majority were discharging unsatisfactory effluents. There were seven sewage disposal plants in Holbeach serving four housing estates, two hospitals and a school, and the remainder of the crude sewage was passed to a culverted dyke running through the centre of the town.

In 1958 the Nene River Board had asked the Council to regard as urgent a sewerage and

sewage disposal scheme for Long Sutton and Sutton Bridge, and they had replied that a scheme was to be submitted to the Ministry in the following year.

The general trend had been to build small site plants for new housing estates and schools, and no attempt had been made to provide adequate sewage treatment for the older parts of the villages.

The Authority felt that a multiplicity of small plants for new estates only tended to defer the time when adequate sewerage would be provided for the community as a whole. The Council was told that only in exceptional circumstances will any further consents be granted under section 7 of the 1951 Act in respect of discharges from small housing estates.

It is accepted that as the terrain is flat the pollution of the fenland drains is localised, and the discharges have no serious effect on principal watercourses. Even so, in the interest of the health of the community the Authority have responsibility to people in the locality to ensure that there are no polluting discharges in contravention of the Pollution Prevention Acts.

The Council had not made any applications under section 1 of the Rivers (Prevention of Pollution) Act, 1961 in respect of the pre-1952 discharges, and it appeared that the Council were not taking their statutory obligations under the two Acts very seriously.

Subsequently representatives of the Authority received the Council's Public Health Committee, who explained their difficulties and the steps which they were taking to deal with the position, and a mutual understanding was reached.

The Council were made aware of the Authority's concern in the matter, and it is believed that there will be more progress in complying with the statutory requirements.

Higham Ferrers Municipal Borough

Higham Ferrers sewage works was brought into operation in 1952, and until November, 1966 the effluent was consistently and extremely unsatisfactory. In the two years previous, seventy-six samples of final effluent were analysed and the average suspended solids were 235 milligrams per litre, five of the samples exceeding 500 milligrams, and only three being less than 100 milligrams. It must be recorded that the River Board, and more recently the Authority, had been satisfied that the Council was greatly concerned about the matter and had made continued but unavailing efforts to find a solution. The amount of trade waste from the leather processing factory in relation to the population of 4,400 was substantial, and it is believed that the crude sewage is one of the strongest throughout the country. When a Regional Sewage Scheme was first suggested by the River Board in 1956 the Council were the only local authority favourably disposed to the project as it would have given a better balanced and more tractable sewage liquor. Pending the implementation of such a Scheme the Council readily accepted the suggestion made by the Chief Pollution Prevention Officer that grassland or lagoon treatment might result in a substantial improvement, and although the Ministry of Housing and Local Government first rejected the proposal they subsequently were persuaded to approve a relatively small scheme for the construction of a lagoon providing about three days retention. The improvement was spectacular, as shown by the following results:

Date Sampled	Lagoon Feed		Lagoon Effluent	
	(as formerly discharged to river)			
	Solids	B.O.D.	Solids	B.O.D.
31st January 1967 ..	185	29	11.5	2.9
6th February 1967 ..	130	22	9.0	3.6
16th February 1967 ..	175	35	9.0	4.5
23rd February 1967 ..	220	47	14.0	3.6

The average suspended solids have been reduced to 10.9 milligrams per litre and the average Biochemical Oxygen Demand to 3.7 milligrams per litre.

It is extremely gratifying that at last a solution appears to have been found to this long-standing problem.

Irthlingborough Urban District

Infrequent cleaning of the primary settlement tanks at Irthlingborough sewage disposal works, no doubt due to inadequate facilities for sludge drying, resulted in a deterioration in the effluent. For several months during the winter some filters were out of commission due to difficulty in obtaining replacements for the distributor arms, and that also contributed to the unsatisfactory effluent.

At the end of the year work was in hand constructing additional sludge lagoons.

The plant is substantially overloaded. The Council prepared a scheme for extending the plant in 1960, but it was not proceeded with when the prospect of a Regional Sewerage Scheme presented a more satisfactory solution. In the meantime an unsatisfactory effluent has to be tolerated, but the Council have been advised that if there is any increase in the volume of the effluent due to further development in the town the Authority will have to consider their powers in relation to the prescribed conditions.

An inspection of the works on the 19th May revealed that sludge was spilling over one of the terraced drying beds and running directly to the river. It was considered that there was some culpability on the part of the Council's servants, and the Council was prosecuted at the Wellingborough Court for:

- (i) Allowing polluting matter to enter the River Nene,
- (ii) Making an unlawful discharge of sewage effluent into the River Nene.

The Council defended the proceedings, but were fined one hundred pounds and ordered to pay an advocates' fee of twenty-five guineas.

Kettering Municipal Borough

Investigation of a coloured discharge to a tributary of the River Isle in Kettering revealed that trade effluent from a leather finishing factory had been inadvertently connected to a surface water sewer. Remedial work was immediately carried out.

Throughout the year effluent from Kettering sewage disposal works was unsatisfactory as regards suspended solids. The Council made a thorough investigation of methods of reducing solids, and micro-straining, grassland irrigation and sand filtration were considered. Consultants have been instructed to report on work necessary to effect an immediate improvement, and to prepare a scheme of long-term extensions in anticipation of further development in the town.

Kettering Rural District

A *Banks* clarifier was installed on one of the humus tanks at the Broughton sewage disposal works, and resulted in a reduction in the Biochemical Oxygen Demand from 20 milligrams per litre to 14 milligrams per litre and of the suspended solids from 25 milligrams per litre to 15 milligrams per litre.

The new sewage disposal works for Weston-by-Welland came into operation at the end of the year.

Ketton Rural District

Analysis of effluent from the new Great Casterton sewage disposal works showed it to be satisfactory.

At a local investigation by the Ministry of Housing and Local Government's Inspector into a sewerage and sewage disposal scheme for Tinwell it was suggested that a better solution would be to pump the sewage to either Ketton or Stamford sewage disposal works.

Following drain cleaning at a cement factory, effluent discharged to the River Chater contained a large amount of suspended solids. When similar work is to be carried out in future the Company have agreed to block the final effluent pipe and empty the settlement tank by means of a cesspool emptier.

Market Harborough Urban District

An additional humus tank at Market Harborough sewage disposal works is under construction, and its completion should result in some improvement of the effluent. As only about half of the samples were satisfactory there appeared to be some deterioration in the quality of the land area effluent.

Norman Cross Rural District

The sewage disposal plant at Norman Cross Motel produced an unsatisfactory effluent, and arrangements were made for Norman Cross Rural District Council to service the plant regularly. By August the complaint had been remedied.

The Council have intimated that when the Elton sewage disposal plant is completed in the summer of 1967 they will no longer be able to accept farm drainage which has been discharged to the Council's ditches, and it presents three farms with a drainage disposal problem. The suggestion that the drainage from these farms could be combined, and given preliminary settlement prior to being disposed of over land by tanker is being considered.

Northampton County Borough

One sample of effluent taken in February from Northampton sewage disposal works failed to comply with prescribed conditions, and that was only four milligrams per litre in excess in suspended solids. Unfortunately free and saline ammonia content continued to be far too high throughout the year.

A 22 feet diameter experimental percolating filter was constructed to treat effluent from the high rate bio-filter, and during the nine months it was in operation the low figures for suspended solids, biochemical oxygen demand and free and saline ammonia of the settled effluent were very satisfactory.

Northampton Rural District

The inadequate sewage disposal facilities at Denton will be abandoned on completion of a scheme to drain the sewage to the Yardley Hastings sewage disposal works.

Oakham Rural District

The Minister of Housing and Local Government approved Oakham Rural District Council's sewage disposal scheme for Cottesmore and Greetham estimated to cost £76,000.

Oundle Urban District

The Council's attention was drawn to the unsatisfactory effluent discharged from Oundle sewage disposal works. A sample taken in January was satisfactory, but it would appear that the works has little or no spare capacity and unless extensions are carried out in the reasonably near future there will be overloading.

Oundle and Thrapston Rural District

Pending the implementation of a district sewerage and sewage disposal scheme for Thrapston, Islip, Denford and Ringstead, Ringstead sewage effluent was lagooned and sprayed over grassland as a temporary expedient. There was a considerable improvement, and an analysis made in late December showed suspended solids and biochemical oxygen demand to be 24 and 23 milligrams per litre respectively, which was the best result for ten years.

Land irrigation was also introduced as a temporary palliative at Thrapston sewage disposal works, and an effluent of Royal Commission standard resulted.

Following deterioration in the effluent from Easton-on-the-Hill sewage disposal works, the Council decided to construct a sand filter.

Peterborough Municipal Borough

An oil pollution of Werrington Brook was traced to an unauthorised connection of an effluent from an engineering works to a surface water sewer. The matter was remedied.

An oil pollution of Edgerley Drain was caused by spillages from an engineering works percolating through the sub-soil. Preventative measures were taken, the drain was cleaned out, and the oil-polluted sub-soil removed.

Peterborough Rural District

A survey of the Ram Dyke made in September showed that pollution by effluent from a paper mill at Helpston had been considerably reduced, and the large deposits which had been a serious problem had been eliminated. A second lagoon was constructed at the paper mill to provide settlement for the filtrate from the *Radcliffe* save-all used to treat the sludge from the *Krofta* plant.

The sewage plant at the residential caravan estate at Eye has never produced an effluent in accordance with the prescribed conditions since a section 7 consent was granted in June, 1964. The owners were informed in May that if no significant improvement was quickly achieved then statutory samples would be taken with a view to consideration of legal proceedings. An analysis made in March showed suspended solids of 120 milligrams per litre and a biochemical oxygen demand of 140 milligrams per litre, and it appeared that consideration will shortly have to be given to enforcing the prescribed conditions.

Raunds Urban District

Raunds Urban District Council had informal discussions with the Ministry of Housing and Local Government regarding the proposed extended aeration plants to be installed at Raunds and Stanwick.

Rothwell Urban District

Accumulation of humus in the Slade Brook largely due to deposition of solids from Rothwell sewage disposal works caused some concern to local farmers. The Council agreed to pay 90 per cent of the cost of dredging the affected length.

South Kesteven Rural District

A discharge from a septic tank at a bungalow at Bulby caused local ditch pollution resulting in several complaints. The owner removed the overflow from the ditch, and constructed a permanent soakaway.

Sewage from Uffington is to be drained to Stamford Borough sewage disposal works, which will eliminate an unsatisfactory discharge to a small watercourse.

Spalding Rural District

Effluent from Moulton sewage disposal works is to be irrigated over grassland to ensure a more satisfactory discharge to the Mere Drain.

Spalding Urban District

Gross pollution of Cemetery Drain in Spalding was caused by drainage from the disposal of waste fruit and vegetables. The Company have agreed to dam the drain and pump the polluted

water above the dam to the foul sewer. A mechanical press is being used experimentally to reduce the water content of the vegetable waste. If it proves successful it will have eliminated a serious source of pollution.

The Council's attention was drawn to the very unsatisfactory sewerage arrangements in Spalding, and they instructed Consultants to report on the existing and future requirements of the district. Opening the tidal sluice after the storm water sewers have been discharging should do much to avoid the objectionable conditions resulting from large volumes of crude sewage discharging to what would otherwise be a static watercourse.

Stamford Borough

Stamford Council have decided to construct a new sewage disposal works, and Consultants are preparing a report.

Towcester Rural District

On investigating pollution at Blisworth a sewer was found to be broken and sewage was overflowing to the stream.

Uppingham Rural District

The Council were advised not to use an emulsifying agent after an accidental discharge of oil to the Glaston sewage disposal works. The oil was retained in the primary settlement tank and easily skimmed off and burned. No traces of oil were found in the stream below the sewage works.

Wellingborough Urban District

Pollution of a tributary of the River Ise was caused by a very unsatisfactory discharge from Wellingborough sewage disposal works on the 23rd June, when much of the land normally available for treatment had been temporarily out of use while repairs were carried out. Overloading of the remainder of the land resulted in inadequate treatment. When the repair work was completed a very satisfactory effluent was again produced. On the previous night, 1.17 inches of rain fell in Wellingborough, and there is no doubt but that the abnormal flow aggravated the deterioration resulting from the temporary repair work.

In June sewage from Finedon was diverted to Wellingborough sewage disposal works, and the very unsatisfactory Finedon plant was closed.

Wellingborough sewage disposal works serves a population of about 40,000, and the Council's Consultants recommended that a sewage disposal works be built at Irthlingborough to serve in the first instance a population of about 90,000. If the Regional Sewerage Scheme is to be implemented, the Consultants recommend that Stage I of the new works should have capacity for a population of 120,000.

Wellingborough Rural District

Earls Barton sewage disposal works completed in 1966 failed to produce a satisfactory effluent, and the Council have requested some industrialists to provide pre-treatment for their trade wastes. If that does not prove to be sufficient it appears that additional units will have to be installed at the sewage works. A balancing tank was installed at a chrome tannery, and the waste is passed through an oxygenating tower before discharge to the sewer. By the end of the year there had been some improvement in the sewage effluent.

A marked improvement in the effluent from Wollaston sewage disposal works was achieved, and several samples complied with prescribed conditions, although the effluent is not consistently satisfactory. Work is proceeding on the installation of pre-treatment plant at the premises of one large industrialist, and when the effect on the trade waste has been assessed the Council's Consultants will report on the improvements required at the sewage disposal works.

West Kesteven Rural District

More stringent conditions than normal, namely that the discharge should not contain more than 20 milligrams per litre of suspended solids dried at 105 degrees Centigrade, nor take up more than 15 milligrams per litre of dissolved oxygen in five days at 20 degrees Centigrade, were prescribed for the sewage effluent from the new Burton Coggles sewage disposal works because of the low dilution in the stream and the fact that through swallow holes it feeds the Lincolnshire limestone aquifer from which public water supplies are drawn.

Wisbech Municipal Borough

A comprehensive regional sewerage and sewage disposal scheme with a proposed dry weather discharge of 8.67 million gallons per day to the tidal River Nene is under preparation for the Borough and parts of Wisbech Rural District and of Marshland Rural District.

Construction of the works will be phased, and it appears that it will not be necessary to provide for more than 3.5 million gallons per day within the next five years. It is suggested that the existing sewage farm be retained to take between 1 and 2 million gallons per day of that flow.

Wisbech Rural District

The extended aeration plants at Wisbech St. Mary and Guyhirne have not operated satisfactorily, and the Council have asked the manufacturers to recommend improvements necessary to rectify the very unsatisfactory position.

5. REMEDIAL ACTION

Northampton Oil Pollution

The difficulty of disposing of waste matter was illustrated in a case heard by the Northampton County Justices on 14th September, 1966.

The defendant company collect waste engine oil from garages and engineering works, and dispose of it as fuel oil after processing. They said that in the course of their work a quantity of water had accumulated in their tanks, and had to be disposed of. A quarry which the Company had previously used was no longer available, and they endeavoured to dispose of it at a number of refuse tips, but those responsible for the tips would not accept it because of the danger of combustion.

The defendant Managing Director then instructed a driver to take away the 'water' in a thousand gallon tanker wagon, and empty it into a ditch along an isolated and little used country road about six miles outside the town. He suggested that the driver must inadvertently have drawn off some oil with the water. From the consequences it appears that a considerable amount of oil or waste sludge must have been drawn off. He no doubt expected that that was the end of his difficulty, and that no-one would be sufficiently concerned to discover who was responsible for an act, which (irrespective of its legal consequences), could only be described as a "dirty" trick.

Two days later the oil had drained along the ditch, down a tributary stream, and then into the River Nene, past the Duston intake of the Mid-Northamptonshire Water Board, until it was caught up in the lock at Beckett's Park in the centre of Northampton. The oil then was 6 to 9 inches deep. The oil contamination was followed by the River Authority's officers until they reached the marks made by the tank waggon on the roadside verge. The police were asked to discover the waggon from which the oil had been discharged. Fortunately they were able to do so, and the driver of the waggon and the Managing Director accepted responsibility.

The Managing Director and the driver each pleaded guilty to the two summonses, firstly for causing polluting matter to enter a stream (contrary to section 2 of the Rivers (Prevention of Pollution) Act, 1951) and secondly for causing to flow into a river containing fish polluting

matter to such an extent as to cause the water to be injurious to fish (contrary to section 8 of the Salmon and Freshwater Fisheries Act, 1923).

The summonses against the Company were withdrawn.

The Court were told that the Public Cleansing Department of Northampton Corporation removed the oil contaminated water caught up in the lock and by a boom placed across the river, and thirty seven loads amounting to 33,900 gallons were taken away in a gully emptier. The work cost £114. Inspectors of the Royal Society for the Prevention of Cruelty to Animals had been engaged for six days on the humane destruction of the wild life contaminated by oil. They described it as the worst oil pollution they had ever seen. It was impossible to estimate the number of dead fish trapped in the oil, and hundreds of small wild birds which made their homes in the park were destroyed. Some 20 swans died, and a further 30 had to be humanely destroyed as the oil contamination was too thick to remove. It was estimated that the colony of swans in the park had been reduced from 80 to 7.

If the incident had occurred at a time when the Mid-Northamptonshire Water Board was abstracting water at the Duston intake the consequences could have been very far reaching.

The Managing Director was fined £40 for contravening section 2 of the Rivers (Prevention of Pollution) Act, 1951, and £10 for contravening section 8 of the Salmon and Freshwater Fisheries Act, 1923. The driver of the wagon was fined £2 and £1 respectively for the same offences.

The Chairman of the Court said that he accepted the defendants had acted unwittingly, and that they had been unable to find any facility for disposing of waste material, but the consequences of their action had been disastrous.

Irthlingborough Urban District Council

The proceedings against Irthlingborough Urban District Council are referred to on page 56

Higham Ferrers Municipal Borough Council

Section 4 of this Report refers to a number of matters which could be repeated again under this heading of Remedial Action, but special reference must be made to the remedial work at Higham Ferrers sewage disposal works referred to fully on page 55. The provision of a lagoon has resulted in a substantial improvement in an effluent which has been the cause of much concern for many years.

6. STATISTICS RELATING TO POLLUTION CONTROL

DISCHARGES INTO STREAMS REQUIRING CONSENT UNDER SECTION 7 OF THE 1951 ACT

	Consents and notices issued during year	Refusals during year
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	32	1
(b) Effluents from storm sewage overflows and storm sewage tanks	17	nil
(c) Effluents from trade premises	4	nil
(d) Farm effluents	1	nil
Totals	54	1

**DISCHARGES INTO TIDAL WATER REQUIRING CONSENT UNDER
SECTION 7 OF THE 1951 ACT AS EXTENDED BY
SECTION 1 OF THE 1960 ACT**

	<i>Consents and notices issued during year</i>	<i>Refusals during year</i>
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	nil	nil
(b) Effluents from storm sewage overflows and storm sewage tanks	nil	nil
(c) Effluents from trade premises	nil	nil
(d) Farm effluents	nil	nil
Totals	nil	nil

**REVIEWS OF CONDITIONS OF CONSENT UNDER
SECTION 5 OF THE 1961 ACT**

	<i>Consents reviewed during year</i>	<i>Consents varied during year</i>
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	nil	nil
(b) Effluents from storm sewage overflows and storm sewage tanks	nil	nil
(c) Effluents from trade premises	nil	nil
(d) Farm effluents	nil	nil
Totals	nil	nil

**DISCHARGES INTO UNDERGROUND STRATA REQUIRING CONSENT UNDER
SECTION 72 OF THE 1963 ACT**

	<i>Consents issued during year</i>	<i>Refusals during year</i>
(a) Effluents from local authority sewage disposal works and other domestic sewage effluents ..	40	nil
(b) Effluents from storm sewage overflows and storm sewage tanks	nil	nil
(c) Effluents from trade premises	1	1
(d) Farm effluents	2	nil
(e) Other miscellaneous discharges	nil	nil
Totals	43	1

7. RESEARCH

No research work was carried out.

RIVER NENE—ANALYTICAL RESULTS

<i>Sampling Point</i>	<i>Miles from Source</i>		<i>pH</i>	<i>Sus- pended Solids</i>	<i>Chloride (Cl.)</i>	<i>F & S Ammonia (N)</i>	<i>Nitrates (N)</i>	<i>4 hrs. P.V.</i>	<i>5 day B.O.D.</i>	<i>D.O. % Satura- tion</i>	<i>Water Temp. °C</i>	<i>Flow m.g.d.</i>
1. Non Tidal Sampling Points												
Dodford Road Bridge	5	Average Value	—	18	23	0.20	3.2	2.4	2.2	107.0	10.5	
		Maximum Value	8.55	33	24	0.50	5.1	4.4	3.4	120.5	14.5	
		Minimum Value	7.9	10	22	trace	1.1	1.4	0.7	97.0	6.0	
Weedon A.45 Road Bridge	—	Average Value	—	14	46	0.25	3.9	3.2	2.6	110.0	11.0	11.3
		Maximum Value	8.65	30	58	0.50	6.0	5.8	3.8	147.0	16.5	16.5
		Minimum Value	7.95	5	34	0.15	1.3	2.0	1.0	93.0	6.0	5.0
Kislingbury	12	Average Value	—	20	36	0.50	3.7	3.5	3.9	102.0	11.5	26.4
		Maximum Value	8.6	40	40	0.70	6.1	5.2	6.2	130.0	17.5	39.2
		Minimum Value	7.7	trace	32	0.25	1.5	2.4	2.7	88.5	6.0	11.6
Boughton Crossing	—	Average Value	—	26	37	0.35	6.5	2.8	3.4	96.5	11.0	19.9
		Maximum Value	8.35	80	43	0.80	9.3	6.0	5.2	111.0	16.0	32.2
		Minimum Value	7.3	10	32	0.20	2.1	1.2	1.5	88.0	6.0	8.7
Nunn Mills replacing South Bridge, Northampton	—	Average Value	—	10	42	0.35	4.9	2.9	3.6	95.5	12.0	
		Maximum Value	8.5	20	47	0.55	7.5	4.4	8.8	116.0	19.0	
		Minimum Value	7.7	5	36	0.15	0.5	1.6	1.5	83.5	6.0	
Billing Bridge	22	Average Value	—	13	44	0.35	4.7	3.3	2.7	95.0	13.5	80.5
		Maximum Value	8.4	75	56	0.70	8.4	5.2	4.0	109.5	21.5	457.
		Minimum Value	7.6	5	35	trace	0.9	1.6	1.0	83.5	6.5	16.6
White Mills	25	Average Value	—	12	57	3.25	5.4	4.6	6.0	71.0	13.5	
		Maximum Value	8.5	55	78	6.95	7.6	12.4	10.0	99.0	20.0	
		Minimum Value	7.5	trace	40	0.75	trace	2.4	3.0	25.5	7.0	
Hardwater Mill	27	Average Value	—	12	59	2.75	6.0	4.6	6.3	71.5	13.5	
		Maximum Value	8.4	60	96	7.35	8.1	6.2	12.0	98.0	20.0	
		Minimum Value	7.45	nil	39	0.50	trace	2.2	3.5	27.5	6.0	
Wollaston Mill	—	Average Value	—	12	54	2.05	6.1	4.6	6.1	78.5	12.5	100.
		Maximum Value	8.3	70	80	6.00	8.0	7.4	8.9	109.0	21.0	530.
		Minimum Value	7.5	nil	36	0.40	4.1	2.0	3.5	39.0	5.0	26.
Wellingborough Road Bridge	30	Average Value	—	12	57	1.90	5.5	4.6	6.8	83.0	13.0	
		Maximum Value	8.45	70	78	4.10	8.1	7.2	11.0	102.0	19.5	
		Minimum Value	7.5	trace	40	0.20	trace	2.8	2.8	60.0	5.0	
River Ise Wellingborough	—	Average Value	—	17	48	0.45	6.3	4.3	4.8	93.75	12.0	40.6
		Maximum Value	8.45	42	68	0.80	10.4	6.4	> 7.2	115.5	19.5	95.5
		Minimum Value	7.65	5	38	0.10	trace	3.2	2.3	80.5	5.0	9.2
Ditchford Mill	32	Average Value	—	9	49	2.20	5.9	4.5	7.7	86.0	14.0	
		Maximum Value	8.4	21	58	4.00	9.1	6.5	12.5	102.0	23.5	
		Minimum Value	7.7	5	44	0.65	trace	3.0	3.6	58.0	8.0	
Irthlingborough Old A.6 Bridge	34½	Average Value	—	14	55	1.25	6.2	4.6	6.2	92.0	13.5	
		Maximum Value	8.4	46	66	2.10	9.4	6.0	8.0	99.5	20.0	
		Minimum Value	7.6	5	48	0.30	trace	3.2	3.4	86.0	7.5	
Ringstead Lower Lock	38	Average Value	—	13	63	1.05	6.3	5.0	6.6	99.0	12.5	
		Maximum Value	8.4	60	92	3.60	9.5	8.6	12.0	106.5	20.0	
		Minimum Value	7.5	trace	41	0.05	4.4	3.4	3.2	69.0	5.0	
Thrapston	42	Average Value	—	11	56	1.00	6.2	4.7	5.8	90.0	13.0	
		Maximum Value	8.4	29	65	2.15	9.2	6.8	8.7	99.0	19.5	
		Minimum Value	7.65	trace	49	0.25	trace	3.2	2.3	80.0	7.0	
Oundle New Bridge	55	Average Value	—	15	59	0.65	5.9	4.5	5.0	97.5	12.5	
		Maximum Value	8.7	115	82	1.65	9.3	8.0	9.0	145.5	19.0	
		Minimum Value	7.6	trace	42	trace	trace	2.4	2.4	80.5	5.0	