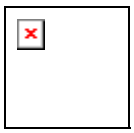
NITRATE AND PESTICIDE JOINT WORKING PARTY: REPORT TO 31ST DECEMBER 1998

Presented to the States on 27th April 1999
by the Agriculture and Fisheries Committee



STATES OF JERSEY

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REPORT

1. Background

The Working Party was established in 1994, following the concerns of the Chairman of the Jersey New Waterworks Company Ltd. (JNW Co. Ltd.).

The Working Party consisted of an independent Chairman and representatives of the Agriculture and Fisheries Committee (AFC), JNW Co. Ltd., Health and Social Services Committee, and Public Services Committee.

JNW Co. Ltd. were finding it increasingly difficult not to exceed the European Union Directive maximum nitrate level in the public water supply. It was agreed that the Working Party would also consider levels of nitrate in wells and boreholes. In addition, the presence of pesticides in water resources would be considered.

The first Chairman (up until the end of 1996), was Mr. Norman le Brocq. Since that time, the constituent members have been pursuing their areas of responsibility. Extensive consultation between officers has taken place and the Working Party reconvened to formally consider progress under the chairmanship of Deputy Dorey (the President of the AFC) in December 1997.

2. Terms of reference of the Working Party

These were to include -

(a) the identification of the impact of the use of nitrogenous fertilisers and pesticides throughout the Island, and the other major contributors to the nitrate problem;

(b) the consideration of setting a nitrate sensitive area in a significant finite area, e.g. the Val de la Mare catchment area; and

(c) reporting its findings to its constituent Committees and Company.

The Working Party met regularly between October 1994 and December 1995.

The Report was issued in January and released in March 1996, from which time considerable progress has been made in addressing the issues and recommendations made. This document reports progress to date.

3. Nitrates

General recommendation of the Nitrate and Pesticide Working Party -

> *The principle of "the polluter pays" has been accepted almost universally in the developed world and has been incorporated into both International and European Law. It is our view that whilst it may not be practicable to implement this principle fully in Jersey at this stage, it should not be for consumers of either mains or of privately supplied water to foot the bill for pollution caused by others. This consideration, together with the environmental benefit and reputation that would accrue to the Island, presents an overwhelming case for the cost of both research and remedial measures to be funded by the States of Jersey.*

3.1. Action

This is a political matter which has not been addressed at this stage, but political support for limiting pollution by co-operative efforts is evident. The draft Water Law, while not as yet debated by the States, will go some way to address this issue.

3.2. Denitrification

Recommendation -

> *While the current level of nitrate in the public water supply is one of "image" and of complying with International standards, not of health, it is a level that is steadily worsening. For this reason, and the fact that our other recommendations will take time to achieve results, we are recommending denitrification.*
>
> *However, it must be understood that we see this as merely giving us a breathing space to allow our other*

recommendations to take effect. If for no other reason, the plant needed will have a short effective life of ten to fifteen years when it would need renewal.

We are informed that the Board of The Jersey New Waterworks Company Limited has instructed the Water Research Council to carry out investigations into the types of denitrification plants which are now being constructed elsewhere and to advise the Company on the most suitable plant bearing in mind the effluent disposal problem in Jersey. We are informed also that provision has been made in the 1996 Business Plan of the Company for the placing of an order of one such plant during that year and we commend the initiative taken by the Board.

In view of our comment on the principle of "the polluter pays" we recommend that the States should reimburse the Company for this cost, rather than it becoming a charge to the consumer.

3.2.1. Action -

The Jersey New Waterworks Ltd (JNWW) commissioned Anglian Water PLC to carry put pilot plant trials using a Reverse Osmosis process to reduce nitrate levels. The purpose of the trial was to prove that the process is effective in the removal of nitrate and is a suitable process for application with surface water.

The need for evaluation of the process was required, since very little knowledge or experience with nitrate removal of surface water exists within the water industry. The majority of nitrate removal facilities in the United Kingdom are at ground water source works, where the water is at a constant temperature and character throughout the year.

Unlike Jersey, the nitrate levels of surface water in the United Kingdom are generally within the European Union limit. This is primarily due to the much larger capacity reservoirs to allow natural degradation of nitrates to occur.

The Company's water resources are predominantly surface water (97 per cent) and with relatively small and shallow reservoirs, the temperature and character of the water varies throughout the year.

The pilot plant trials were carried out for a period of ten months and were completed in August 1998. The final report from the trials have shown that the process is effective at the removal of nitrates and is a suitable process for use with Jersey's surface waters.

Whilst these pilot trials were being carried out, environmental consultants Montgomery Watson Ltd, were commissioned to investigate the most suitable method of disposal of the waste stream from a full-scale nitrate removal plant. This has resulted in a comprehensive Environmental Impact Assessment (EIA) being carried out. The report has indicated that the most environmentally acceptable method of disposal of the waste stream is to the sea on the north coast of the Island.

The waste stream will be colourless and although it will contain nitrates removed from the drinking water, the overall quantity of nitrates entering the sea will be similar to levels occurring due to the natural streams already entering the sea along the north coast.

The EIA study document was submitted to the States Planning and Environment Department in December 1998 for approval to use this discharge method.

JNWW have commissioned Anglian Water PLC and their contracting subsidiary company Purac Ltd, to undertake the full design of a nitrate removal plant facility at its Handois WTW.

In the longer term, if nitrate levels in surface water courses do not fall, consideration will need to be given to the construction of a nitrate removal plant at JNWW's other treatment works at Augrés, using the experience and knowledge gained at Handois WTW. The provision of a further plant at Augrés WTW will require the disposal of an additional waste stream.

3.2.2. The completion of the new desalination plant will aid production of potable water which will meet acceptable treatments.

3.3. Modification of farming methods and nitrate sensitive area (NSA)

Recommendation (i) -

This appears to us to be the main change needed to bring the nitrate content of our ground and surface water down to an acceptable level. How drastic the alterations would have to be is something that needs a further study and we recommend that such a study be conducted as a matter of urgency.

Recommendation (ii) -

As the two streams that feed Val de la Mare Reservoir have a consistently high level of nitrate, we recommend a Nitrate Sensitive Area regime be set up in those catchments.

3.3.1. Action -

The University of Plymouth Department of Agriculture and Food Studies has been contracted to investigate nutrient losses from various agricultural cropping systems. The study is being led by Dr. R. Parkinson of the Seale-Hayne Faculty.

The soils, geology and physiography of Jersey combine to limit leachate dilution, which together with rapid shallow aquifer recharge results in significant difficulties in maintaining acceptable nitrate levels in drinking water. In addition, the JNWWC Eutrophication survey pointed to potential phosphorus enrichment of the Val de la Mare reservoir.

The objectives of the University of Plymouth study was designed to -

(a) assess nutrient losses under selected land uses and fertiliser treatments; and

(b) evaluate the impact of agricultural and other land uses on nutrient loading of Val de la Mare reservoir.

The project commenced in March 1997, and the first phases will be completed by February 1999. Two phases of work are underway -

(a) field trials; and

(b) catchment water quality modelling.

The field trials consist of two separate experiments.

Trial A - Cultivation systems -

Comparing nitrate and phosphate losses by leaching under a range of crops, including ungrazed and temporary grass, early potatoes (early and late plough), with either barley or cauliflowers as the intercrop. This trial will run from autumn 1997 - winter 99/00.

Trial B - Fertiliser rates -

Investigating leaching losses from fertiliser applied to early potatoes at a range of rates from 112 - 337 kg N/ha, and will run from autumn 1997 - winter 99/00.

In addition, intersite comparisons are being carried out on a range of land uses across Jersey, and the quality of water draining into the Val de la Mare reservoir is being monitored in terms of total and soluble nutrient content.

Export coefficient modelling of land use impacts in the Val de la Mare catchment area is being conducted, based on the construction and validation of a model, which will forecast impacts of a range of scenarios e.g. reduced fertiliser use, modified cover cropping, reversion to permanent grass, use of buffer zones.

Land use impacts on water quality -

Detailed land use surveys carried out in 1995 and 1996 indicated that early potatoes were grown on 54-56 per cent of the cropped land in the Val de la Mare catchment. Nitrate and phosphate losses by leaching from this crop were found to range from 80-180 mg/l, in comparison with losses from grazed and ungrazed grass, which averaged approximately 10 mg/l over the winter period.

Analysis of water quality for the twelve-month period August 1997 - July 1998 demonstrated that nitrate dominates

the total N input into the reservoir, accounting for in excess of 95 per cent of the total nitrogen loading on the reservoir. Peak concentrations of nitrogen enter the reservoir in spring each year, corresponding to the time of fertiliser application to early potato crops. Phosphorus enters the reservoir in both soluble and insoluble/organic forms, with soluble reactive phosphorus accounting for typically 50-70 per cent of the total phosphorus loading in the reservoir.

Export coefficient modelling was carried out for the years that a detailed land use inventory exits. In total, the observed nitrogen load on the reservoir for 1996 was 14.8t, equivalent to 44kg N/ha. Modelling estimates produce a value of 13.3t, which is in close agreement with the observed load. Cropped land accounts for 11.2t, livestock accounts for 1.3t and domestic sources account for only 0.3t. More work is on-going to refine the model and to investigate specific scenarios for change, notably the role of the cover crop in controlling nutrient losses.

3.4. Extension of public sewerage system and water supply

Recommendation -

We are dismayed by the recent announcement that the Public Services budget for foul sewerage extension work to be cut. We recommend a swift extension of both public water and sewerage provision.

3.4.1. Action -

The funds voted for sewer extensions in 1998 was £4.1 million and £4.0 million for 1999. The capital allocation for the years 2000 and 2001 is £3.5 million and for 2002 is £3.0 million.

3.5. Private water supply and sewerage systems

Recommendation -

While currently some 20% of people are dependant on their own provision of these services there is a significant number for whom the services are already available but who have not taken the opportunity to connect. We recommend that it should be made more financially attractive to connect the public water supply and the public sewers.

3.5.1. Action -

The Public Services Committee provides foul sewerage facilities prioritised depending upon the pollution risks. The charge for a connection to a public sewer is subsidised at a cost of £75, whereas the average actual connection cost is approximately £1,200. Additionally, there is no charge to individual property owners for the provision of a foul sewer which cost an average of approximately £16,000 per property for the most recent projects.

4. Pesticides

Compliance with European Union standards

Recommendation -

Compliance with EU standards on water quality to be regarded as a matter of urgency.

4.1. Action

The legal use, sale and storage of atrazine, simazine, and chlorthal-dimethyl has been withdrawn in Jersey following detection in the water. It should be pointed out that these chemicals remain approved for use within the United Kingdom and the rest of the European Union.

4.1.1. Any breaches over the European Union limit for pesticides which are detected by the JNW Co. Ltd. are reported to the Department of Agriculture and Fisheries (DAF). Chlorthal-dimethyl had been detected repeatedly over a two-year period prior to March 1997, when approval for sale and use was withdrawn pending further investigations into laboratory analytical procedures by the University of Plymouth. As a consequence, the JNW Co. Ltd. asked Southern Science to amend the analytical techniques from 31st July 1997, from which time there have been no further breaches of the EU limit with chlorthal-dimethyl in the water supply.

The metabolite, chlorthal continues to be detected. However, there are no set legal limits for metabolites in Europe to-date, although there are European Union proposals to introduce these.

The herbicide chlorthal-dimethyl is a relatively safe compound compared to alternatives available for use in brassica crops. None of the alternatives to chlorthal-dimethyl have been detected in the water supply. Consideration needs always to be given to ensuring that alternatives would not present a more serious pollution risk.

4.2. Resource allocation

Recommendation -

Resources to be allocated for effective policing of the pesticide legislation.

4.2.1. Action

An Environmental Fund has been introduced by the AFC and a researcher appointed. The researcher has taken on much of the research work related to the recommendations in the Nitrates and Pesticides Working Party Report.

Currently all farmers' pesticide stores are being upgraded and are certified annually by the Department's Inspectorate. In addition, supermarkets will not accept produce unless it complies with the supermarket protocols which embrace all relevant pesticide and environment legislation.

The DAF Inspectors' roles have been re-prioritised to take into account the recommendations. The researcher will now audit farm pesticide stores. The Marketing Groups' technologists also monitor their producers' pesticide use and storage. In addition, Jersey has joined an Assured Produce Scheme which will involve independent verification of all producers by a United Kingdom audit company.

4.3. Reporting levels of compliance

Recommendations -

Levels of compliance with the pesticide legislation to be reported to the States on an annual basis by the Agriculture and Fisheries Committee.

4.3.1. Action -

The Department of Agriculture and Fisheries at the moment produces an annual Pesticide Residue Report to the Agriculture and Fisheries Committee. Since 1990, over 100 samples per annum of exported Jersey produce are analysed throughout the season for a range of pesticides. This is an internationally recognised measure of

compliance with pesticide legislation. The analytical work is carried out by a United Kingdom nationally accredited laboratory. There have been no detectable residues above the statutory set Maximum Residue Limits (MRL) for relevant chemicals since 1994. Pesticide residues well below the MRL were detected in 4.1 per cent of analyses and 14 per cent of samples in 1997, comparing with 29 per cent of samples in the United Kingdom. Detectable residues do not imply a health risk, as approval for use adhering to Good Agricultural Practice (GAP) takes into account the Acceptable Daily Intake (ADI) - which is set at one-hundredth of the "no-effect" level to protect infants and children.

4.3.2. Farmers' pesticide stores are annually certified by the DAF Inspectorate.

The results of the independent United Kingdom verification audit carried out by Checkmate International are made available, and to date, no one who has been audited has failed to comply with United Kingdom and Jersey legislation.

4.3.3. A pilot study on pesticide usage using the Farm Secretarial Service has been undertaken involving 40 per cent of the farmers.

4.3.4. The Department of Agriculture and Fisheries, Public Services Department - Water Resources Section, Planning and Environment Department - Environmental Services Unit and the JNW Co. Ltd. receive a quarterly list of all pesticides imported into the Island.

4.3.5. An annual report is also available from JNW Co. Ltd. which states the breaches by pesticide in water supplies.

These actions will form a measure over the years from which to monitor compliance.

4.4. Pesticide application

Recommendation -

Public bodies to be instructed to set an example of ensuring that all spraying carried out on their behalf is carried out using the safest product available and avoiding application of pesticides whenever other methods are possible.

4.4.1. Action -

30 per cent of the people who have achieved the National Proficiency Testing Councils' (NPTC) Certificate for Spray Operators belonged to public bodies.

NPTC Training incorporates safe use of pesticides and use of alternative measures where applicable.

NPTC courses are carried out regularly at the Philip Mourant Training Centre, fully funded by the Department of Agriculture and Fisheries. Courses cover the full range of pesticide application techniques, from tractor mounted, and knapsack sprayers to granule applicators.

4.4.2. The Department has produced a set of guidelines on the range of control measures available, and sent a letter recommending their adoption to the Comité des Connétables and other public bodies.

4.4.3. The Parks and Gardens Section and Highways Section of the Public Services Department (PSD) has been the subject of a "Water Quality Audit" by the PSD Water Resources Unit. Advice was given on the storage transportation and usage of pesticides in order to minimise the risk of water pollution.

The number of chemicals used by PSD has been reduced by approximately 50 per cent, and only the less toxic products (e.g. glyphosate) are used. All personnel are trained in compliance with the Pesticides Law.

In addition, all relevant DAF staff are fully trained, having achieved NPTC certification for all the necessary application techniques. (DAF staff also undertake routine health surveillance tests to monitor and/or detect levels of chemicals in blood.)

4.4.4. Other "Water Quality audits" have been carried out throughout Public Services, at the Jersey Electricity Company, sections of the JNW Co. Ltd, at Jersey Airport, trade premises at Rue des Prés Trading Estate, and on a farm in St. Peter, following a request by a farmer. The Water Resources Section is also asked to comment on the position of sprayer washings tanks in relation to watercourses.

4.5. Pesticide reduction

Recommendations -

The number of allowable pesticides to be reduced and a detailed investigation and regular review of so doing to be carried out.

4.5.1. Action -

Of the approved chemicals available in the United Kingdom and Jersey, only a very limited quantity are relevant to horticultural crops in Jersey. The majority of approved chemicals are for use on combinable arable crops, whereas most crops grown in Jersey are classed as 'minor crops', for which there are a very limited choice and number of chemicals. This considerably limits the Islands' chemical imports.

4.5.2. The Department has however, withdrawn the approval of three active ingredients where problems have been identified.

4.5.3. Biological control measures have been established in all protected salad crops in the Island since the early 1980s.

There is minimal use of pesticides. In addition, measures are taken in outdoor crops to enhance natural populations of beneficial insects which are now very evident in outdoor crops.

4.6. Monitoring

Recommendations -

Resources to be provided for more frequent monitoring of streams and watercourses, and for the safe disposal of surplus pesticides.

4.6.1. Action -

The establishment of an Environmental Fund and the appointment of a researcher has enabled an increase in the number of water courses which can be sampled.

4.6.2. One of the supermarket customers of Jersey Royal potatoes now require their suppliers to have their water courses analysed up and down stream of any farming operations. More than 20 growers, covering a considerable acreage, are involved in this protocol.

4.6.3. There was a Pesticide Amnesty in December 1996, which resulted in the collection of 18 tonnes of concentrated pesticides. This quantity has therefore been removed from being a potential risk to the environment. The concentrate has been removed by ReChem Environmental Services for high temperature incineration in the United Kingdom.

4.6.4. The DAF now has a Sentinel Treatment Plant which renders pesticide spray washings collected from growers holding tanks - harmless. The highly subsidised collecting tanks are supplied by DAF to the industry. The resulting water can be recycled for irrigation or washing, while the contaminated "cake" will go for high temperature incineration via the PSD.

4.6.5. The Water Resources Section at Public Services appointed an additional Water Resources Officer in November 1998. This will allow the Section to extend its investigation of pollution incidents, the monitoring of Island waters and to step up its pollution prevention programme. A further Water Resources Officer has recently been recruited and will take up post in 1999. This will allow the Section to further develop hazardous waste policy and control. The biological monitoring of streams for macro-invertebrates is continuing into 1999.

4.6.6. The Water Resources Section continues to test boreholes two to three times each year for pesticide pollution. The Section is continuing to build a comprehensive water quality database, and welcomes enquiries from other departments on water quality and related issues.

4.6.7. The Water Resources Unit continues to test 20 boreholes three times each year for pesticide pollution. The Unit is continuing to build a comprehensive database on water quality using its own data and data collected by other Departments.

4.6.8. The introduction of the new Water Pollution (Jersey) Law is likely to allow for resources for more frequent monitoring of streams and watercourses.

4.7. Water resources

Recommendations -

Particular regard to be paid by the Agriculture and Fisheries Committee to the safeguarding of water resources.

4.7.1. Action -

All the pesticides used in Jersey are approved by MAFF and the pesticide labels carry information on buffer zones, i.e. the distance (six metres) from a water course in which that chemical cannot be used. The Pesticide Safety Directorate in York are reviewing buffer zones, and some might extend to 12 metres, which will further prohibit the use of some chemicals in small Jersey fields.

The Pesticides Law does not allow the Department to licence chemicals, but the Law can be used to withdraw approval for the use of chemicals. The Department is not in a position, nor does it wish to act outside of the United Kingdom legislation. The provision of fresh produce to the United Kingdom and European Communities would be jeopardised by such a move.

4.8. Integrated crop management system

Recommendations -

Greater use of biological control systems and other alternatives to the use of pesticides.

4.8.1. Action -

An ICMS (Integrated Control Management System) has been available since the 1980s. This ensures that biological control and cultural control measures are always the first line of defence. More recently, the ICM systems have been fully endorsed by Retailer protocols.

4.8.2. Pest and disease monitoring/forecasting is also a major part of ICM systems and is carried out continually by the Department of Agriculture and Fisheries.

4.8.3. A computer programme which would enable a quick assessment of the field risk of potato blight infection to ensure effective and justified use of fungicides is being investigated. Field forecasting is carried out at present on several field pests, and potato blight, but not with the aid of modelling software. This will be fully operational in 1999.

4.8.4. More intensive mapping of field soil samples can lead to more specific treatment for potato cyst nematode. There is also the potential in the future for fertiliser to be applied to specific areas rather than to the whole field, and for "designer-type" fertilisers to meet specific needs.

4.8.5. Research work into biological fungal antagonists of potato cyst nematode is being undertaken in conjunction with Luton University and Rothamsted Research Station.

4.8.6. New parasites are being investigated all the time, and as soon as a relevant agent is identified and its introduction in to the Island accepted by Planning and Environment and Société Jersiaise - there is nothing stopping the Industry remaining in the forefront in usage of biological control measures.

4.9. Accreditation

Recommendation -

The States Analysts Department should seek recognised accreditation for pesticide analysis.

4.9.1. Action -

The States Analyst is now working towards accreditation. It will need to be supported by manpower resources but it is likely that the equipment required is already in place.

4.10. Pesticide waste disposal

Recommendation -

An investigation should be carried out into the practicalities of introducing a scheme for storage, transportation application and disposal of commercial quantities of pesticides only by licensed specialists.

4.10.1. Action -

The present Pesticide Law requires competence in all areas of handling pesticides.

Commercial pesticide storekeepers are all BASIS qualified, while the commercial stores will all be BASIS registered by January 1999, and are then due for an annual audit. This will be carried out by the recently BASIS trained researcher in conjunction with officers from the Water Resources Section at Public Services and the Fire Service.

5. Summary

Biannual meetings of the Joint Working Party will continue to be called to review progress being made on the recommendations. In addition, the Environmental Monitoring Working Group monitors many of the aspects of this

report.

The whole Island is an intensive area of horticultural growing and thus there is not the ability to blend waters from these areas with water collected from tracts of uncropped land. This, coupled with limited water storage in surface water reservoirs, and a geology that gives no potential for natural subterranean storage, could present a water quality problem. The combined resources of States Departments and the JNWW Co. Ltd. coupled with active participation by farmers has resulted in excellent progress being made which is documented in this report.