ENVIRONMENT AGENCY
Midlands Region

Report on Integrated Large Scale Audit

of

The Rugby Group plc, Southam Works

15 - 17 October 1996

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BACKGROUND TO THE AUDIT

This report describes an audit of Rugby Cement, Southam Works which took place between 15 and 17 October 1996. This process is authorised under Part 1 of the Environmental Protection Act 1990 and, as such, is subject to Integrated Pollution Control (IPC). The site also has a Waste Management Licence for operation of the landfill for process wastes.

Large Scale Audits have been developed as a supplement to routine regulation of particularly complex sites or those which have a high potential to pollute so that an assessment can be made of their overall environmental performance. By focusing on sites with high pollution potential, the Agency targets resource where the environmental risk is greatest.

Rugby Cement, Southam Works is a long established site for cement manufacture. The major potential environmental hazards are from dust, nitrogen oxide and sulphur dioxide.

The primary objective of the audit was to assess compliance with the IPC authorisation and to examine those underlying factors affecting compliance. In addition to detailed examination of the manufacturing process, consideration was given to factors which have an impact upon environmental performance, such as manning levels, training, supervision and maintenance programmes. The Company Environmental Policy and the Environmental Management System (EMS) underpinning the environmental performance of the Works were also critically examined. Evidence of the translation of the Policy into effective action at all levels was sought.

The audit was undertaken by a team of Environment Agency officers consisting of specialists in Integrated Pollution Control, Water Quality and Waste Regulation, thereby covering releases to all environmental media and allowing consideration of compliance with Duty of Care requirements for waste disposal.

The main body of this report is preceded by a summary of the findings of the audit, incorporating a number of recommendations. The main report first describes the Company Environmental Policy and management systems before looking in more detail at waste management, site water and effluent systems and the manufacturing process itself, looking for evidence of the management systems in operation and environmental awareness at all levels of the workforce. The process has been considered in terms of a series of steps from raw materials handling to packing and dispatch of the finished product.

Contained within the Appendices is a response by the company to the recommendations of this report. This has been included to demonstrate some of the actions undertaken by the company since the audit was done; these actions have not, as yet, been audited by the Agency.

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SECTION 1
REPORT SUMMARY

Introduction and General Overview

This summary outlines the main findings of the audit and has been set out under the same subject headings as would generally be considered for any process regulated under Integrated Pollution Control (IPC).

The process was found to be operating in compliance with the conditions set out in the authorisation.

The site is managed by a competent and committed management team who conduct their undertakings in such a way as to minimise the impact of the process on the local environment. Existing management practices with respect to environmental protection have recently been formalised and the Company are seeking accreditation to ISO14001 for their Environmental Management System. The promulgation of and adherence to good practices at all levels have relied upon the quite considerable experience of the workforce; some impassivity in the early stages of introducing the more formalised paper-based system was to be expected and was duly encountered.

A number of specific points relating to paper-based systems have been made throughout the report but, in particular, there is a need for the overall process equipment layout and general operating instructions to be documented to provide a framework which ties all other documentation together. For the purposes of the current operation, the systems in place are adequate but it is recognised that the Environmental Management System in its early stages and is being piloted for the Cement Division and for the new works at Rugby.

The audit findings are summarised below for the site as a whole.

1. Record keeping and use of information

There appears to be no overall documentation for the plant, except for that related to the maintenance planning system. In some production areas a large proportion of the process information kept is recorded manually and hence limited to basic spot measurements of continuous operations. In other areas continuous measurement of process parameters are recorded/linked to alarm systems.

Data retained for compliance with the authorisation was found to be complete.

Emissions monitoring and discharge sampling for compliance with the authorisation is carried out to the required frequency and results are submitted to the Agency as appropriate. Continuous instrumentation for emissions monitoring, where used, is maintained to a satisfactory standard. In some areas there seems to be confusion amongst the workforce with respect to units used and what the monitors are depicting. Of concern is the fact that SO_x and NO_x emissions data does not appear to be assessed by anyone on site in any way, certainly

not for the purpose of controlling the process; this data is, however, analysed at Divisional Headquarters in compiling company-wide process statistics but it seems as though this is not fed back to the site. The general impression was that there was little evidence of a formalised review of emissions, process or test data, except in the investigation of complaints and a few other exceptions where data are relevant to operation of the plant.

2. Knowledge and implementation of authorisation requirements

All staff have a personal copy of the authorisation and subsequent variations. There was some confusion expressed by those trying to integrate the requirements of the variations into the original authorisation, now more than 3 years old. It is appreciated, however, that the authorisation documentation supplied to Rugby Cement by the Agency is not easy to understand in some sections.

Whilst details of the authorisation were fairly well known and specific emission limits were known at shift supervisor level, the underlying principles of prevention and minimisation need reinforcing at all levels. The concept of residual BATNEEC is understood at Head Office and senior management level but the impression, particularly at workforce level, is that there tends to be a feeling that because the raw materials are naturally occurring they are not polluting.

3. Plant maintenance

Plant maintenance was found to be generally good with a well organised planned maintenance system; this could be expanded to some extent. It was unclear whether all plant was included within this system. Insufficient resource is allocated to housekeeping and too much reliance is placed upon reacting to problems caused by accumulation of dust.

4. Plant operation

Operation of the plant is very much operator dependent, relying heavily upon experience. Documentation (Procedures/Work Instruction) is in place but is not fully used by the workforce who are (i) unsure of the purpose of the various documents, and (ii) some of whom feel that they have sufficient experience to not need written instruction.

Shift handover between shift supervisors is commensurate with the need to communicate process detail and comprehensive written logs are maintained. The effectiveness of the handover between operators seems to vary and it appears that information relating to process problems may not, in some cases, be adequately communicated.

Reporting lines are a mixture of functional and supervisory e.g. the kiln operation is controlled by the Kiln Burner, and several staff, including the Lepol Grate Operator, have the technical aspects of their work controlled by the Kiln Burner and not the Shift Supervisor.

Procedures for modifications to plant and process are not sufficiently robust and a more formalised plant modification procedure may be of benefit. Communication of plant production/operating changes appears to be largely via internal memos. Some changes seem to be experimental in nature and it is not clear at what point, or how, these are either withdrawn or are otherwise incorporated into Work Instructions.

5. Management and training

The plant is adequately manned with skilled staff. An area where resource is obviously lacking is in housekeeping-related tasks. Training appears to be largely on-the-job and based on a written job description. There is evidence of assessments having been carried out against these job descriptions. Although the existence of the IPC authorisation is known to the workforce, the level of general environmental awareness needs to be raised; this is being addressed at present through the "toolbox talks" and environmental committee. Despite the above, the experience of long serving staff and the non-changing nature of the work minimises the problems.

The training matrix needs updating to better identify training needs; this is being addressed at present.

6. Non-compliance, incidents & complaints

Compliance with the authorisation was good.

The company would benefit from a more complete recording of episodes of abnormal operation-as this would allow for more complete investigation. There is evidence that such episodes are acted upon but tend not to be documented in sufficient detail to allow subsequent investigation and follow-up to determine the cause, or to detect any inconsistencies or trends.

The complaint procedure is appropriate and all complaints are investigated and the complainant contacted. The management make laudable attempts to maintain a good relationship with the local community and to inform and enter into discussion on various issues.

7. Auditable environmental management systems

The EMS in place appears to be comprehensive in area and depth of coverage. It is, however, very new and is untested but provides a good framework to work with. The management commitment to the system and to make it succeed is very apparent and the Company are seeking accreditation to ISO14001.

Cascading of information has not been as effective as perhaps hoped by management; the means of cascade needs improving and more feedback is required. Resolution of the uncertainties over documentation needs to be a priority; perhaps consolidation of documentation might be a positive early step. indeed, the documentation at times seems to duplicate similar requirements - a single system might produce easier familiarity by those involved.

Although there is an increasing awareness of environmental issues on the site, such considerations need to be incorporated with more transparency into all decision making, ie an auditable trail needs to be produced, documenting the considerations and reasons for decisions made.

SECTION 2
INTRODUCTION & BACKGROUND

2.1 THE ENVIRONMENT AGENCY

The Environment Agency has been formed by bringing together Her Majesty's Inspectorate of Pollution (HMIP), the Waste Regulation Authorities (WRA's), the National Rivers Authority (NRA) and some units of the Department of the Environment dealing with the technical aspects of waste and contaminated land.

The Agency's Functions most relevant to the regulation of industrial sites are as follows:

Integrated Pollution Control	Implement the requirements of Part I of the Environmental Protection Act 1990 for authorisation and regulation of the potentially most polluting industrial processes, covering releases to all environmental media.
Waste Regulation	License and regulate the transfer and disposal of waste under Part II of the Environmental Protection Act 1990.
Water Quality	Regulate release to Controlled Waters, including ground water, under the provisions of the Water Resources Act 1991.

2.2 LARGE SCALE AUDITS

Large scale audits have been developed as a supplementary tool to routine regulatory activities. These intensive audits are undertaken in order to assess the environmental performance of sites which have a high potential to pollute or which may be particularly complex. In selecting the sites for audit, the criteria include the scale of operations, the variety and complexity of the processes and the potential environmental impact.

Such audits consist of a series of pre-planned intensive inspections carried out by a team of experienced Agency officers over a period of several days. The aim is to ensure compliance with the release limits and process conditions set out in the IPC authorisation(s) and to ensure that the underlying systems controlling compliance are appropriate and that implied conditions such as residual BATNEEC (Best Available Techniques Not Entailing Excessive Cost) are also considered and taken into account. The formation of the Environment Agency enables wider environmental issues on the site concerning water usage and the quality of discharges as well as waste management to be addressed as an integral part of the audit. This allows a more complete picture of the impact of the process on the environment to be developed.

In addition to the scrutiny of process control, waste management and water quality issues, such audits focus upon the existence and effectiveness of the management system and training which underpin the environmental performance of the organisation.

2.3 REGULATORY FRAMEWORK

An IPC authorisation, AH8620, was issued in 1993 covering the cement making process. This process is described briefly below.

Cement is manufactured using the semi-wet process. Clay from the Works quarry and sand delivered to the site are slurried. Chalk slurry is received by pipeline from a remote quarry. The slurries are blended and then filtered to form a cake which is preheated and fed to two dissimilar kiln systems. The kilns are fired primarily on a mixture of coal and petroleum coke which is delivered to the Works by road.

The resultant cement clinker is ground finely in four cement mills with a small amount of gypsum to produce cement which is stored in silos.

Despatch is by road, either by bulk transport or in bags.

The majority of inert wastes are disposed of in the on-site licensed landfill site, others are sent to off-site locations via licensed disposal contractors.

Water for cooling and other manufacturing operations is taken from an on-site system which feeds by natural land drainage and via rock strata into the quarry, and which drains via evaporation from open ponds and natural drainage. This is almost a closed system but some discharge is made via two consented discharge points into the River Itchen or into Kaye's Arm of the Grand Union Canal.

A number of variations to this authorisation have subsequently been issued:

Description	Ref Number	Issued	Effective Date	Type of change made or comments
Application	AH8620.	Valid 10/09/92		
Sch 1		11/10/92	response 11/11/92	
Authorisation	**AH8620**	**24/8/93**	**24/8/93**	
First Variation Section 11	-	23/11/93	29/11/93	Changes to release conditions to water
Second Variation Section 11	-	23/5/94	23/5/94	Changes to due dates on Improvement Programme
Third variation Section 11	AP0445	22/11/94	22/11/94	Changes to release conditions to water

Fourth variation Section 11	AP2421	19/12/94	19/12/94	Conditions for trial of Dycal burning
Fifth variation Section 10	-	23/12/94	23/12/94	
Sixth variation Section 11	AP6591	19/1/95	19/1/95	Conditions for trial
Seventh variation Section 11	AT6018	9/10/95	9/10/95	Removes condition for both kilns to be operating before Dycal can be trial burned.
Eighth variation Section 10	AT6026	17/1/96	17/1/96	Reduction in the release limits for kiln 6. New improvement condition requiring action when continuous monitors read a high level.
Section 11(7) Notice	-	26/7/96	Response 31/7/96	

The authorisation covers the cement manufacturing process itself as well as associated activities - quarrying of stone and clay from the on-site quarry, storage and preparation of raw materials at the front end of the process, and milling, packaging and bulk loading of the finished product. The on-site water and effluent systems are included, as well as the discharge of water to the canal.

Compliance with this authorisation was investigated during the audit, together with the waste management license.

2.4 PUBLIC REGISTERS AND ACCESS TO INFORMATION

The Agency has a legal obligation to maintain Public Registers of information relating to the various functions which come under its control. The application made by the Rugby Group plc for authorisation under IPC and copies of the authorisation and subsequent variations, together with monitoring data, are available for public inspection.

More detail can be found in the Agency publication "A guide to information available to the public" which outlines the types of information available and gives the addresses of Public Registers within each Region.

2.5 AUDIT METHODOLOGY

2.5.1 Aims of the audit

The audit of Rugby Cement, Southam Works had the following general aims:

(i) To assess compliance with section 6(1) of EPA'90:

- to assess compliance with conditions set out in the IPC authorisation
- to look in detail at the effectiveness and coverage of the environmental management systems in place
- to evaluate the level of awareness of personnel at all levels on matters relating to environmental protection and to examine the scope and content of training given to personnel.

(ii) to assess compliance with the Waste Management Licence for the landfill site and for the disposal of wastes from the site.

(iii) to review authorisation, licences and consents, if required, to allow continued effective regulation of the site as an integrated regulatory body.

2.5.2 Audit preparation

Agency personnel were selected on the basis of existing regulatory responsibility or previous involvement with the site. Additional IPC Inspectors from the Severn Area Team and Regional IPC were selected to assist. Pre-audit discussions were held to establish the audit objectives and to plan an integrated approach to meet those objectives.

The Company were given prior notice of the audit and pre-audit discussions were held so that the necessary senior personnel would be made available at the required times and would be able to make a substantial time commitment without unacceptable impact on their business.

The Health & Safety Executive (HSE) and Local Authority were advised in advance of the audit and invited to comment. No specific comments were made - a good working relationship is maintained between the Site Inspector and other regulatory bodies and comment is exchanged as necessary.

The Company co-operated with Environment Agency personnel at every stage during the planning of the audit and senior managers were in attendance where appropriate during the audit. Inspectors were able to question Rugby Cement personnel at all operational levels and to examine operating records as required without prior notice.

The site was divided into process sections for the purpose of the audit and one or two Agency Inspectors examined all aspects of compliance and other issues within the area(s) allocated to them. Allocation was based upon the experiences and expertise of each individual.

The first section of this report gives a preliminary overview of the Company Environmental Policy and management systems.

Matters relating to the company-owned and operated landfill site are described in a separate section, as are general waste issues. Similarly an overview of the site water and effluent handling system is given in a separate section, although issues specific to parts of the process are described in the relevant section.

This is followed with section-by-section reports on the process areas from raw materials handling to storage and packing of the finished product. Each section contains a process description, a description of the issues raised during the audit and subsequent recommendations for improvement.

SECTION 3
COMPANY ENVIRONMENTAL POLICY & MANAGEMENT SYSTEMS

3.1 POLICY, RESPONSIBILITIES AND DISSEMINATION OF INFORMATION

3.1.1 Environmental policy and policy statement

The first Environmental Policy Statement was introduced in 1991. This statement was conceived at Board level and is specific to the cement Division; ie it is not generic to the group. The divisional Environmental Affairs Manager (EAM) is responsible for revision of the statement, in consultation with the Divisional Executive. The current statement was issued on 10 October 1996 and introduced an enlarged Environmental Management System (EMS) which was intended to sit alongside the previously developed Quality Assurance system and to interface with this at a number of different levels.

Southam Works are currently seeking accreditation under ISO14001; the intention was to gain accreditation by 1 January 1997. This is slightly behind schedule and the target date is now the first quarter of 1997. The Environmental Management Scheme in place at Southam is being piloted for the Cement Division.

The most recent internal review of the system was in October 1996 and was carried out for the purpose of compliance with the requirements of Lloyds Register Quality Assurance Standard. From now on the intention is to review on an annual basis.

The Environmental Manual sets out the principles of the Environmental Management System and is cascaded to supervisor level (controlled document). The detail is contained in the working procedures and instructions. Copies of the Environmental Manual are held at the Works and Rugby Cement's Headquarters at Crown House.

There is not a separate divisional or site specific waste policy. Handling of waste is considered to be part of the EMS and controlled within the legislative framework. The site produces very little special waste although the status of some waste types is currently under review. The written instruction relating to waste handling on site is acknowledged to require updating to include the Special Waste Regulations 1996.

3.1.2 Environmental responsibilities of key personnel

Head office:
The Environmental Affairs Department provides a service to all Works within the Cement Division, giving advice and information relating to environmental performance, particularly with respect to compliance with legislation. The Environmental Affairs Manager (EAM) is responsible to the Operations Director, Cement Division for all environmentally related issues.

Southam Works:
The Southam Works Manager is responsible for the overall site operation and reports to the Operations Director, Cement Division and is accountable for the environmental performance of the site. In order that environmental duties should not conflict with economic

considerations or the demands of a heavy workload, the role of the "Person Responsible for Environmental Management" (PREM) was developed. At Southam this falls to the Business Administration Manager. He is the management representative responsible for the EMS on the site and reports to the Works Manager and, functionally, to the EAM. Within this environmental management structure responsibility for releases to water, air, and land are delegated to named senior personnel on the site.

3.1.3 Dissemination of environmental policy

- *Management systems in place*

There are three management systems in place at workforce level which have a bearing on the environmental policy

1. The Health & Safety system, which was put into place several years ago. This required a culture change amongst the workforce and took some time to implement.

2. QA was already an integral part of each job and the QA system was seen as a means of formalising what was already being done, hence requiring no culture change and was more easily accepted than the imposition of earlier Health & Safety systems had been.

3. Acceptance of the EMS by the workforce is perceived by management as needing a further culture change. Awareness of environmental matters and adoption of a spirit of continual improvement, rather than a defined end-point, is in the early stages of acceptance.

- *Documentation*

There are several different documents issued at workforce level with relevance to the management systems described above:

Procedures:	set out the concepts and the systems in place for environmental management.
Work Instructions:	are "how to do it" manuals for specific tasks, containing information and instruction of relevance to environmental protection, and are part of the EMS.
Operating Instructions:	are part of the QA system. These are operator (ie person) orientated rather than task orientated.

Procedures for environmental management are produced and updated on site by the PREM - these are site specific documents (ie not generic to the Division). The format and content has been designed to interface and be consistent with the earlier QA system.

This system of Procedures and Work Instructions has only been in place since the beginning of October 1996. It is intended that previously issued procedures should be withdrawn but this seems to have been erratic. Most of these seem to have been informal/verbal. The new Procedures and Work Instructions have been produced in consultation with the operators.

There was found to be some uncertainty amongst the workforce as regards the status of various instructions and procedures which they held; operators were unsure of the relationship between, and the relevance of, the different documents.

It is intended that the Work Instructions and the Operating Instructions will eventually be merged into operating instructions containing both QA and environmental considerations.

Job descriptions are also held by individual workers; the job specification contained in these documents contains elements of QA, safety and the environment. For some jobs these can be quite specific. It appears as though some of the workforce perceive these to be a form of work instruction or procedure and use these as their main "work instruction".

The Work Instructions were written with the involvement of the workforce and were intended to reflect current practice with additional modifications as thought necessary to improve practices. Reaction to these documents is mixed, with some resistance apparent. Management believe that the workforce reaction to various on-site incidents/spillages etc have demonstrated that the written documentation is being followed, although it is acknowledged that those involved in these incidents would have been well acquainted with the proper response, with experience dictating their actions.

- *Cascade of information*

The Environmental Statement is cascaded via the Works Manager to the supervisory levels and workforce. Feedback is generally via the PREM. Quarterly meetings are held between the Divisional Environmental function and representatives from each works. These meetings cover wide ranging issues, are a forum for disseminating information on forthcoming legislation and other issues, and to set actions based on specific issues. Daily works production meetings are used as a forum for discussion on environmental matters between the Works Manager and his senior managers. These meetings are not minuted and formal, written instructions are only issued if there is a major change in the way the process is to be operated.

Environmental Committees have been set up on each works. These are made up from members of works management and volunteers from across the range of workers on the site. Two meetings have been held to date at the Southam Works. Site specific issues are discussed and the group acts as a "think tank" and a conduit for highlighting issues and elevating them

to a higher level. The Divisional EAM does not usually sit in on these meetings although request for resource can be directed to him by the group through the PREM. It is recognised that a culture change is needed to exploit the full potential of this group and of the system as a whole The imminent closure of the plant has produced some obvious motivational problems but these are claimed by management to be fewer than had been anticipated.

Other committees include a Safety Committee and the Works Committee and there is some coordination of their work that of the Environmental Committees.

Minutes are produced for each of the committee meetings and are posted around the works.

"Toolbox talks" are intended primarily for training but are also a means for cascading information on any subject and receiving feedback. Each supervisor will give a semi-formal talk to his subordinates on a selected topic; the number participating is limited by the need to maintain operational status. At the present time the training sessions are being based on the Work Instructions. Attendance is logged and fed into the training records for each employee.

Each worker on the site has been issued with a personal copy of the authorisation and subsequent variations. It is acknowledged that this documentation is not easy to follow in some respects. Some means of explaining the relevance of these documents will be required; for new entrants this is undertaken by the supervisor.

3.1.4 Liaison with local residents/the public

There is a local liaison committee made up from works representatives and parish councillors from surrounding areas. Meetings are held quarterly or as dictated by the need to communicate on specific issues. The Works have also held open days which have been widely advertised within the locality and have attracted a good response. Sponsorship is also given to local projects.

3.1.5 Compliance with the requirement to be aware of changes in legislation/practices

The company subscribe to many publications including the Institution of Chemical Engineers (IChemE), the British Cement Association and various UK and EU institutions as well as environmental publications. The Environmental Coordinator is responsible for updating the compendium of guidance and legislation held at Group Head Office (Crown House). An index to the available information is held at Southam, and is also updated by the Environmental Coordinator. The EAM will update and inform each Works on specific issues as appropriate.

3.1.6 Internal audits/reviews of practices

A full environmental assessment of Southam Works and its impact on the environment was undertaken in 1992 as a prelude to authorisation. This was repeated during 1995 but was more targeted than the 1992 assessment. Future auditing of the site will be undertaken with the intention of covering all areas of the EMS between each Annual Management Review. The Environmental Management Manual commits the works to annual auditing of the impact of its operations. This audit will identify non-conformances and the department heads will have to sign-off any remedial work.

All audits with environmental content are organised on Southam Works by the Works Electrical Engineer. Feedback to Divisional level on findings which may have implications for other works, or are of a serious nature is via the PREM.

3.1.7 Auditing of the Environmental Management System

The auditing of the EMS has been delegated to the Works Electrical Engineer who provides a site-wide service, reporting directly to the Works Manager, and is regarded as being sufficiently independent from individual departments to be unbiased. The system has only been in existence for a few weeks hence no audit work has been undertaken as yet. Annual audits are planned. The Works Electrical Engineer has received formal training in auditing in order that this duty can be undertaken effectively.

3.1.8 Setting of Works Objectives/targets

An environmental programme has been established within the EMS to formalise targets and objectives and to define the means by which these can be achieved. This is agreed between the works management and the EAM and is reviewed on an annual basis at the Annual Review. A set of Site Objectives has been drawn up between works management and the Environmental Affairs Manager. Target dates have been applied to each specific issue and the current plan covers a period up to December 1997.

A "Register of Environmental Effects" has been put into place. A system of quantifying environmental effects (developed by IChemE) has been used to identify significant issues which are then considered when setting the Site Objectives.

The performance of the Works will be assessed against the Site Objectives, although it is unclear at present as to how this assessment will be undertaken, or the criteria against which success will be determined. Systems have not yet been set up to carry out this review.

3.1.9 Performance of employees against targets/objectives

Expectations against environmental performance are written into job descriptions at **all** levels and these expectations are assessed during the job holders annual appraisal. Copies of the authorisation have been issued to all workers and will be issued to all new entrants. Updating has not been required since issue of the booklet and the means by which this will be assured is unclear.

3.1.10 Environmental Management System - Issues/Recommendations

1. The EMS appears to be comprehensive and well structured but is new and requires testing over a period in order to evaluate fully its effectiveness.

2. Successful implementation of the system will require a culture change amongst the workforce. This has been a slow process but appears to be improving. There is still some confusion amongst the workforce as regards the relevance of the different documentation. There may be some benefit in consolidating the paperwork for the QA and environmental systems: this is a long-term objective.

3. The distribution of the Work Instructions amongst the workforce is unclear to them; ie they don't know who is supposed to receive what, and some workers do not appear to have received all of the instructions that they should have. This may inhibit feedback of information which could aid improvement.

3.2 TRAINING

Training in environmental awareness and procedures is not coordinated at a divisional level; such matters are left to each works. For Southam this is the responsibility of the PREM and Site Safety Training Advisor whose own training have included attending various external courses. Senior managers at the Works are given "tool-box" talks and disseminate this information to other staff.

Prior to the implementation of the EMS very little training in environmental awareness was given.

There is a formal induction procedure for graduate trainees which includes half a day in the Environmental Affairs Department at Head Office. One graduate is placed in this department for a period of 4-6 months on an on-going basis.

Most training relating to operation of the process is carried out on the job, under the supervision of another experienced operator and the appropriate supervisor, rather than from the reading of documentation/procedures, or from attending formal courses. The line manager will take day to day responsibility for ensuring that the entrant meets the job requirements and the Safety/Training Advisor will assess the level of experience acquired and sign off the training. Training records are held on a central file on each works. Each operator is issued with a personal ring-bound copy of the authorisation and all variations - the supervisor will explain which parts of this document relate to the individual under training.

There appears to be little or no formalised training on environmental issues at operator level, other than the guidance contained in the Procedures and Work Instruction. The "toolbox talks" are currently addressing some of the need for environmental awareness at operator level. This training is, however, very generalised and the workforce might benefit from cement industry specific training.

The training records are held by the Safety/Training Advisor. The record consists of a list in date order of people attending courses and undergoing on-the-job training. It is not easy to access records for any given individual, although a database is being established at present to correct this. Training needs are identified by a training matrix. Owing to the different distribution methods, not all environmental instructions were on the matrix.

3.2.1 Training - Issues/Recommendations

1. The system of training could be more formalised. There is a lack of environmental awareness at operator level; the "toolbox talks" may address this but consistency of approach across different process areas may be difficult to assure. It is recommended that the same distribution system be adopted for safety and environmental work instructions.

3.3 COMPLAINTS REPORTING SYSTEM

There is a general Procedure ("Communications") and a specific Work Instruction relating to the handling of complaints. All complaints are logged in, investigated, action taken if appropriate and feedback communicated to the complainant. The Company also inform the Agency. During the day complaints are received by the Production Manager. Out of hours calls are routed to the Kiln Deck and the complaint is recorded by an operator before being passed to the Production Manager.

It was suggested that the log sheets ought to be numbered to ensure that all logged incidents (which may have been recorded out of hours at 4 possible locations on the site) are sent to the PREM to be progressed further. One complaint on Agency records which was made by the complainant to both Agency and the Works was followed through the system and was seen to have been dealt with effectively according to the Procedure. Except for the last entry, all of the complaints on record predate the Procedure although this was based on best practice at that time which, in effect, is mirrored in the current Procedure.

The system for dealing with complaints is well structured with effective follow-up and corrective action. There appears to be a genuine concern to deal promptly and considerately with the public.

3.3.1 Complaints - Issues/Recommendations

1. Complaints forms would benefit from being numbered or otherwise identified to ensure all complaints are dealt with and traceable. There is a need to ensure that the record of follow up action is entered fully onto the complaints form.

3.4 COMPLIANCE WITH RELEASE LIMITS, INCIDENTS & UNAUTHORISED RELEASES

3.4.1 Compliance with release limits

Compliance with limits imposed on releases to air and water from the process is good. The company forward the appropriate returns to the Agency within the permitted timescale.

The Agency has not, as yet, specified any limits with respect to the output from the recently installed continuous stack monitors. Compliance with releases to air is assessed against the results from the quarterly emissions testing as required by the authorisation. The need to consider all data will become relevant with respect to the burning of Dycal and, indeed, all information has been taken into account in determining the application to burn Dycal.

The Company are required to retain records of fuel sulphur analyses. These were inspected during the audit.

3.4.2 Reporting of incidents

The system for internal reporting of occurrences and accidents seems to be effective for health & safety related incidents but this has been slow to include those incidents with potential for environmental impact. Reports are made through the line manager or the PREM as appropriate. The Company believe this to be improving slowly but there is still some reluctance amongst the workforce report incidents. Actual incidents involving spillage or release appear to be reported, although it is thought that near misses may be under-reported.

The company would benefit from a more complete recording of episodes of abnormal operation as this would allow for more complete investigation. There is evidence that such episodes are acted upon but tend not to be documented in sufficient detail to allow subsequent investigation and follow-up to determine the cause, or to detect any inconsistencies or trends.

3.4.3 Unauthorised releases

The requirement to report unauthorised releases to the Environment Agency is the responsibility of each works (the PREM) and reports are copied to the EAM at Head Office. There is a site-specific written Procedure which dictates the occasions upon which contact should be made with the Agency ("Communications"). A Procedure outlining the full investigative and follow-up actions to be taken following an unauthorised release has yet to be written, although this is intended.

The on-site investigation into the cause of the release requires the cause/effect and preventative action to be documented on a standard form. Upon completion the Divisional Environmental Co-ordinator is responsible for ensuring that corrective action identified has been followed through to completion. Actions are reviewed at later meetings, or more urgently if appropriate.

3.4.4 Compliance, Incidents & Unauthorised Releases - Issues/Recommendations

1. The Agency will set limits for releases against the data from the continuous stack monitors as a consequence of burning Dycal in kiln 7.

2. Incident and near miss reporting may improve as environmental awareness improves amongst the workforce although the need for reporting and proper investigation in order to benefit from such incidents will require frequent reinforcement.

3. There have been very few instances of unauthorised releases. Those that have occurred have involved dust emissions.

3.5 MAINTENANCE POLICY & USE OF CONTRACTORS

3.5.1 Maintenance

The Works Engineer has overall responsibility for maintenance work. Most of the plant is on a planned maintenance scheme with a few exceptions such as the replacement of refractory lining which is undertaken on an "as required" basis. There is a planned annual shutdown when major work is undertaken. Maintenance intervals are dictated by experience and supplier recommendations. Any recommendations for change to the planned frequency is routed through the mechanical engineering department.

A computer based planned preventative maintenance (IDHAMMAR) system is in place to initiate, track and record job requests by means of a work order system. A handwritten system is used for out of hours or urgent requests. IDHAMMAR is also used for advising requirements for Non-Destructive Testing (NDT) carried out by external contractors. The system is linked to stock control of spares (including spares held on other sites in the Rugby Group) and will indicate low stock levels of maintenance items to prompt reordering as appropriate. A minimum of spares are retained on site

The plant register for the whole site is kept in the planning office. All changes to the plant are put to the planning department where the master is updated. The computer held records are periodically updated from the master record to produce up to date schematics for site distribution.

There is no evidence of priority having been given to keeping abatement plant operational, other than the fact that it has been entered into the planned maintenance system. A check on the contract inspection showed that the 250 tonne coal hopper bag filter had been omitted.

There is a system in place to ensure the ongoing training of fitters, particularly when new equipment is introduced. In these cases the manufacturer will be requested to provide a training input.

- *Plant modifications*

There does not appear to be any formal procedure for plant modification; changes are requested by memo. Any modifications made to equipment or plant should be notified via the Work Order system by the fitters making the modification and amended on IDHAMMAR. It is of some concern that (i) the appropriate personnel may not be involved in consideration of the request and (ii) the means for including such modifications in the operating procedures are unclear. It is also unclear how this work is tracked.

- *Permit to work systems*

A permit to work system has been set up within the safety management system and is used where appropriate. Hot work permits are required for some tasks.

This system was not examined during the course of the audit.

3.5.2 Use of contractors

Contractors are used to provide a flexible workforce to deal with peaks in workload, as well as with baseline contracts. Contracts have been let for some 3 monthly preventative maintenance work, eg bag filters

All contractors are given a standard safety induction to the site; this includes some information on environmental considerations. They are treated as "temporary workers" and will shadow an experienced hand until familiar with the work to be undertaken. Generic environmental requirements are a part of the conditions of employment/job specification and the contractor agrees to this when accepting the contract.

All contractors are assigned a nominated company representative who is responsible for the contractors whilst on-site. The nominated person must ensure that the contractors adhere to all relevant work instructions and incident reporting systems. All work undertaken by the contractors are signed-off through the IDHAMMAR system.

3.5.3 Project work

The procedure by which project work is both initiated and signed off was unclear. In the case of an extemally managed project the point of handover is formalised but in the case of an internal project the point at which it is formally handed over to the maintenance system upon completion of performance testing is less clear and appears to be ad-hoc to some extent. There seems to be potential for some plant to have cleared the project stage and enter service but not to "belong" to anyone from the point of view of on-going maintenance, or the requirement to be written into Work Procedures or Instruction.

A full review of project work was undertaken with reference to a specific project (the kiln dust export system). This is described in detail in Section 6.

3.5.4 Maintenance, Use of Contractors and Project Work - Issues/Recommendations

1. The planned maintenance system appeared sophisticated, but it would be worth checking whether similar items on the plant register can be identified and then have a periodic check on those with environmental impact.

2. The plastic flexible piping systems used for much of the transport of water around site is not included on any planned maintenance scheme.

SECTION 4
WASTE MANAGEMENT

4.1 WASTE MANAGEMENT

4.1.1 Description

A Waste Disposal Licence was issued to Rugby Cement by Warwickshire County Council on 29 October 1990. On 1 May 1994 this became a Waste Management Licence under the Environmental Protection Act 1990. This licence covers the operation of the landfill site and the movement of wastes. The main types of waste generated on the site and disposed of to the landfill are:

filter cake (reject / spillages)	2000 tonnes/year
filter cloths	6000 per year
lagoon sludge	500 tonnes/year
Granulated ESP dust	30000 tonnes/year
ESP dust settlement lagoon sludge	7500 tonnes/year
Kiln coating/brickwork	1000 tonnes/year
Clinker	400 tonnes/year
spilled product	1700 tonnes/year
Canal Arm sludge	350 tonnes/year

Part of the site quarry has been turned over to landfill and has been specifically engineered for this use; the clay lining resists seepage to a recognised specification. The landfill area has been developed for use in defined cells which are capped when full. Phase (cell) 3 is now in operation and has been in use for about one year. Boreholes have been drilled to monitor the quality of groundwater around the landfill area. Leachate from the cells is pumped to the lagoon.

Most of the waste generated on the site, including cement kiln dust, road sweepings, rubble and other inert wastes, is disposed of to the landfill site and a monthly weight limit has been imposed on the amount of waste deposited. The Works weigh, on a daily basis, loads destined for the landfill to assess compliance with this limit (as well as for landfill tax purposes) and operates its own transfer note system for such disposals. This system was found to be in order when inspected. There is no storage of wastes in the processing areas; waste tends to be transported to the landfill site as required.

Very little waste is sent via registered contractors for off-site for disposal. The Company audit their contractors periodically to ensure that wastes are disposed of correctly. As per the requirements of the Special Waste Regulations 1996, the Company have concluded that cement kiln dust (CKD) is not considered to be special waste. Some CKD is disposed of in the landfill site and some is sold to a water treatment/supply company for use in land spreading. This latter use is exempt from licensing under the Waste Management Licensing Regulations 1994.

The day to day responsibility for waste management on site lies with the PREM. The controlled waste transfer note system is administered by persons reporting to him. There is a written Work Instruction relating to removal of wastes from site.

4.1.2 Report/Issues of Note

Audit of the waste licence had two primary aims (i) to allow samples to be taken of leachate, and (ii) audit of the landfill operations in relation to the licence conditions. In addition, the content of the Work Instruction concerning the removal of waste from the site was critically examined.

Two liquid samples were taken (leachate wells) and the following results were obtained:

Phase 2 leachate well
Use of this cell was discontinued approximately one year ago. The two determinants of interest are elevated chromium (1010µg/l) and sulphate (8670mg/l)

Phase 3 leachate well
This cell has been in use for approx one year. Chromium (238µg/l) and sulphate (2400mg/l) were slightly elevated

Although these results are elevated, they do not pose a threat of harm to the environment because of the containment provided by the site.

Compliance was assessed against the conditions in the licence. This included looking at site records, walking the perimeter of the site to ensure the integrity of the fencing, checking that levelling of recently landfilled areas had been undertaken and that no unpermitted wastes had been deposited.

The site was found to be in compliance with the license conditions.

4.1.3 Issues Raised During the Inspection/Recommendations

The audit has identified the need for a review of the Waste Management Licence and working plan. This will provide the scope to investigate in more detail the leachate management at the site with regard to the guidance outlined in Waste Management Paper No.4.

Comments on Work Instruction "Removal of wastes from site":

1. All waste should be subject to Duty of Care and therefore a Controlled Waste Transfer Note should always be used when removing waste from the site, including scrap metal. (A Controlled Waste Transfer Note is not required when moving special waste as this is satisfied by a Special Waste Consignment Note).

2. Section 9.4 should be updated to reflect the coming into force of the Special Waste Regulations 1996.

3. With regard to the Special Waste Regulations 1996, items are identified as special waste and are therefore subject to the requirement for a Special Waste consignment Note when removing the waste from the site. Section 15.5 refers to the Duty of Care Controlled waste Transfer Note. This should be replaced with the Special Waste Consignment Note.

4. Throughout the document (eg, section 7.1) there is reference to a "licensed waste removal contractor". This should refer to a "registered waste removal contractor".

5. The off-site disposal route for Cement Kiln Dust (CKD) is limited to one contractor - there are, in fact, more routes than this.

Other comments:

6. The only analysis provided for the disposal of kiln bricks was the new brick analysis which did not account for the contamination collected in the kiln.

SECTION 5
SITE WATER SYSTEM

5.1 SITE WATER SYSTEM

5.1.1 Description

Water supplies for cooling and industrial purposes is obtained from a system comprising the quarry reservoir and the canal arm settling ponds. The industrial water supply system is almost a closed recycling system with natural land drainage and rock strata water flow feeding the system, evaporation and natural rock strata draining the system with spare storage capacity built in. Abstraction from Kaye's Arm, a branch of the Grand Union Canal, is permitted in emergencies, and consented discharges are made to a tributary of the River Itchen and into Kaye's Arm.

The surface water discharges from the site have been sampled on a regular basis for a number of years. The catchment is regarded as being particularly sensitive due to the water supply abstractions at Eathorpe and Willes Meadow.

5.1.2 Reports/Issues of Note

Several issues were examined during the course of the audit:

- *Supervision of bulk diesel deliveries*

A spill of diesel during transfer of a bulk delivery to the storage tanks in August 1996 highlighted the importance of adherence to the written procedures relating to the operation and the need for adequate supervision. The response from Rugby Cement following the spill was good although there is a need to make provision for intercepting diesel which enters the drains.

- *Pollution prevention equipment*

There are two stores of absorbent granules and absorbent pads on the Works which could adequately be used for dealing with minor spillages of eg heating oil etc.

The lagoon on the surface drainage to the River Itchen and the interceptors on the Canal Arm would act as a balancing facility in the event of a spillage. There is, however, no facility on the lagoon arm to isolate the drainage from the River Itchen. There is a need to provide the facility to isolate sections of the drainage system - the current arrangement does not allow for this and there is potential to contaminate large volumes from a localised spill.

- *Storage and use of oils, chemical additives etc*

There remain a number of outstanding requirements to improve various oil/fuel tanks on the site. The requirements relate largely to the condition of the tank bunds which should be constructed and maintained to the standards set out in the relevant guidelines.

The required improvements are listed under section (iii), below.

- *On-site sewage treatment plant*

An inspection showed the sewage treatment plant to be in a poor state of repair. The final effluent discharges to a soakaway system. The plant needs to be returned to full working order and subject to routine planned maintenance.

- *Samples*

The following samples were taken and analysed for a wide set of determinants. The significance of the results is also discussed:

Overflow from quarry lagoon to Canal Arm:
A sulphate level of 921mg/l was recorded.

Inlet to dust lagoon
Elevated levels of Biochemical Oxygen Demand (BOD) at 231mg/l, nickel (428µg/l) and sulphate (8000mg/l) were measured. These lagoons overflow to the works drainage system.

Leachate leakage into quarry
An elevated sulphate level of 4980µg/l was recorded.

The two surface water discharges from the site rely on the principle of dilute and disperse. Some of the individual point discharges within the confines of the site, such as leachate seepage into the quarry, which, taken on their own, would constitute a contaminated discharge. However, due to the recirculation and reuse of surface water within the site, any contamination is diluted out. Both the upstream and downstream samples taken from the receiving watercourse imply that the site is *not* having a detrimental effect on this watercourse. However, reliance upon the principle of dilution does not give much control over the quality of the discharges and further investigation may be necessary to calculate the contribution that the site is making to the sulphate loading in the River Itchen

5.1.3 Issues Raised During the Inspection/Recommendations

1. (a) The surface water drainage system surrounding the diesel refuelling area needs to be served by an interceptor

   (b) Transfer of diesel to storage tanks must be supervised at all stages.

2. Consideration should be given to installing some form of isolating mechanism at strategic points on the site surface water drainage system. In the event of a spill specific areas could be isolated, preventing the contamination of much larger areas/volumes. Purchase of simple clean-up equipment, such as absorbent pillows or mats, could also be considered.

3 Employees should be aware of the location of isolation points in the site drainage system and of stores of clean-up equipment, and how to use them to best effect.

4. Improvements need to be made to the following tank bunds:

Canteen: The inside of the bund needs to be sealed with a material impermeable to the oil stored.

Stores: As above.

Tank storing fuel for mobile plant:
The inside of the bund wall needs to be sealed with an impermeable material. The drain bung in the bottom of the bund wall needs to be removed and the fill point and dispensing nozzle should be located within the confines of the bund.

Fitting Shop: The tank was adequately bunded but the internal coating (in the form of a plastic film) was peeling away. The integrity of the remaining sealant needs to be established.

Waste oil tank:
The bund wall was seen to be leaking at the base and needs to be repaired so that it forms an impermeable barrier to the oil stored. The various drums surrounding the waste oil tank should be stored within a bunded area - this should be capable of containing 110% of the volume of the largest drum.

Filter Press House No.1 & No.2 tanks:
The inside of both tank bunds need to be sealed with an impermeable material.

Kiln House Road:
The inside of the tank bund needs to be sealed with a material which is impermeable to the oil stored.

5. The sewage treatment plant needs to be returned to working order.

6. In order to ascertain better the effect (if any) that the site has on the surrounding catchment, it would be of benefit to receive the results of monitoring carried out as per Condition 3.1.8 of AH8620 on a monthly basis, rather than annually as required by the Authorisation..

SECTION 6
RAW MATERIALS STORAGE AND HANDLING

6.1 CLAY QUARRY AND CRUSHING PLANT

6.1.1 Description

Stone and clay for the process are obtained from the site quarry which is located to the south of the main manufacturing plant. The material is excavated by hydraulic excavator during the daytime only and is transported by dumper truck to a separator/feeder which is located on the works. The dumpers tip directly into the hopper above the separator/feeder. A small amount of cement clinker is added to each 20 tonne load to aid later filtration.

The mixture passes through a crusher and is then fed via belt conveyors to a covered stockpile to await further processing.

Water which enters the worked area of the quarry through normal rainwater run-off and through rock strata is pumped to the quarry reservoir. Water from the reservoir can be pumped to the canal arm settlement ponds which are close to the consented discharge point to the Canal (Kaye's Arm)

6.1.2 Report/Issues of Note

- *Releases to air: Dust generation*

Despite being a dry windy day there was a minimum of wind blown dust in the quarry area. Material was being excavated and hauled to the stone crusher where there was some dust generated upon tipping. There was some spillage of material at the feed hopper to the crusher. The conveyors are not fully enclosed and there was some loss of fine material as they entered the enclosed stockpile area. The covered stockpile area was dusty but the dust did not appear to be escaping from the building.

- *Conveyor system*

The operator relies on watching material on the conveyor via a gap in the sheeting to ensure that the material is not backing up after the crusher due to blockage or a failed conveyor. The operator expressed a preference for an improved system for viewing, even if this were to be just a light, or CCTV. Facilities for the operator during inclement weather are poor and would encourage them to leave the process unattended. The environmental consequences of failure are not great however.

- *Vehicle refuelling*

Vehicles are refuelled in the quarry from 205 litre drums of diesel which are taken out in a tractor bucket. Fuel is transferred by means of a vehicle pump. This operation takes place approximately once every two days. There are no existing written procedures for refuelling and it was not covered in the recent refresher training of operators.

The potential for spillage was of concern; the worst scenario would be a spill of 205 litres of diesel being pumped with quarry water to the canal arm or to the quarry reservoir. A project has been set up to provide for refuelling by bowser. There was no file to examine but the project appears to be limited to placing an order for the equipment, with subsequent training etc left to the sponsor of the project, in this case the General Foreman. Previous discussions with this Foreman did not indicate that he had planned for this. The general impression was that whilst there were plans to improve the refuelling of vehicles, they were approached in a step by step manner rather than as an overall strategy.

- *Handling of quarry water*

Quarry sump water is generally pumped to the reservoir. No analysis of quarry sump water is carried out. The flows are dependent upon the weather, ie pumping is required once a week during summer but daily in winter. Plastic pipework with quick connect fittings is used to pump to open ditches, to reservoir or canal. This pipework is overground and is not protected. It is not included within the planned maintenance schedule.

Sludges from ditches, canal etc are spread to dry in the quarry and then used in the process.

There is a Quarry Master File that details the plans for reinstating the quarry when it is finally worked out. This was not inspected.

- *Management*

Evidence of the internal departmental system of audits was seen; the Project Engineer is responsible for auditing the quarry area every two months for all aspects of housekeeping and health and safety. This scheme operates all over site to ensure that someone who is not close to the process has a general overview.

The only operating instructions appear to be job descriptions - no other documentation could be produced by the operators. Training is undertaken on the job, suitability is determined by the supervisor followed by testing by the Safety/Training Advisor based on aspects of job description.

6.1.3 Issues Raised During the Inspection/Recommendations

1. Completion of the project to supply fuel by bowser, rather than in drums, needs to be expedited. Operators should be trained to undertake this operation.

2. Extensive use of temporary pipework would benefit from a system for control and inspection.

3. Provision of alternative means by which material back-up on the conveyor can be viewed or blockages prevented..

4. What is the fate of the quarry lagoon on cessation of cement manufacture? Is there a need to consider what is discharged to it in remaining two years?

6.2 RAW MATERIAL PREPARATION AND SLURRY STORAGE

6.2.1 Description

The crushed stone/clay mixture is fed by overhead crane into the feed hoppers of the two tube mills. Water is added in the minimum quantity practicable to produce a pumpable slurry. The mill product, a clay slurry, is fed to a sump and is subsequently pumped to a clay slurry storage basin.

Sand is delivered by road and discharged onto a concrete pad. It is then moved by front-end loader either to storage bunkers or directly into the feed hopper. Sand is extracted from the hopper by belt feeders and conveyors to the tube mill. Water is added at the mill inlet and the resultant slurry feeds to a sump from which it is fed to the slurry blending system.

Chalk slurry is received by pipeline from a quarry in Bedfordshire. and fed into two thickener basins.

Chalk, clay and sand slurries are blended together in controlled proportions to produce a kiln feed slurry. This is fed to a sump from which it is pumped to slurry basins for homogenisation and storage.

The plant is fully interlocked and all sumps contain high level alarm so that all upstream plant can be stopped in the event of a failure.

6.2.2 Report/Issues of Note

- *Raw materials testing*

An hourly proportional sample of slurry kiln feed is taken for comparison with the predicted results of the automatic blending system; this is carried out by the Tester and recorded. The Tester also carries out analysis of raw material feed to ensure consistency and check on automatic density controls.

Analysis of the stone/clay slurry is carried out on a monthly basis. The sulphur content of the clay/stone was significantly less than that outlined in the application for authorisation (the sulphur content is now as low as 0.9wt% as opposed to 5wt% in the application). This raises the question as to whether a corresponding reduction in the amount of SO_2 released should occur. However, the sulphur content of the slurry injected into the kilns has remained the same. As the ratio of calcium to sulphur in the slurry is important it must be maintained at a fairly constant level. It is unclear where the additional sulphur in the final slurry has come from.

No routine analysis is carried out on the chalk slurry or sand.

- *Raw materials section - general*

Operating instructions for the Raw Materials section were thought to exist but a copy could not be produced. The plant is generally run at night only to take advantage of cheap electricity.

The display screen arrangement required constant surveillance as some items did not have high level alarms, eg the clay basin. Alarms were only audible in the control room so the Tester cannot leave without cover being available.

Nibs from the grinding material are disposed of with general rubbish.

Iron oxide is being stored in an old sand store under cover. Sand is stored in outside bunkers. The iron oxide is not being used at present but equipment is periodically run with sand. The equipment is in good condition.

- *Chalk thickeners*

The maintenance of the underground chalk supply pipe line is the responsibility of the Pipeline Engineer based at the Rugby Works. No de-scaling or cleaning of the pipeline is undertaken although regular NDT is carried out

Generally one chalk thickener is being filled whilst other is used to feed the process. Very little water is removed from the thickeners and any that is, is sent to the canal arm, contrary to the information given in the application document. This is, however, a rare occurrence.

One thickener has been recently cleaned out and overhauled. This included cleaning out of the launders, the remains of which had been deposited on the adjacent ground. The other launders were full to the top and had vegetation growing in them. These would not act as an overfill protection as designed.

There is a connection between the two vessels but as one is higher than the other the risk of overfilling would appear to be a possibility. Discussions with the Production Manager confirmed that the thickeners could be connected together via pump discharge manifold and could lead to overflow of lower vessel. Vigilance of the shift supervisor is the main safe guard against this.

- *Clay storage*

The clay storage basin could be overfilled if the level indicator is defective or not observed as the clay sump is pumped up automatically to the basin which has no high level alarm. It appears to be the only vessel deficient in this manner.

6.2.3 Issues Raised During the Inspection/Recommendations

1. There is a need to investigate the origin of the sulphur compounds in the final slurry as they are low in the analysis of clay from the quarry.

2. The overflow alarm system needs to be improved with high level alarms on those basins/sumps which are deficient in this respect. Too much reliance placed on operator vigilance to prevent overflow, particularly when considering that the alarms are only audible in the control room.

3. The launders on the chalk thickeners need to be cleaned out with attention to waste disposal and housekeeping.

4. An assessment of the risks involved in overflow of the thickeners should be undertaken.

6.3 FILTRATION PLANT AND CAKE STORAGE

6.3.1 Description

The filtration plant converts the slurry (44-50% moisture) into filter cake by a batch process using 8 filter presses. The process is largely automated.

Slurry is pumped from the slurry basins to the slurry feed tanks. The presses are filled by centrifugal pumps in about 2 minutes and are pressurised for a further minute to minimise high pressure slurry leaks. Filtration is completed by high pressure positive displacement pumps. The cycle time of each press is from 45 to 75 minutes and the cycles are staggered. The cake is discharged onto conveyors and into rotary silos with variable speed screw discharge devices.

The filtrate is passed through a solids settlement trench and collected in a tank. From the tank the filtrate is pumped to a settlement lagoon before being discharged into the quarry reservoir. Alternatively the filtrate can be directed to a holding tank and then used for lepol grate cooling.

6.3.2 Report/Issues of Note

Presses discharge water from low pressure cycle and high pressure cycle. Both run clear water within a short time of being started. There would appear to be opportunities for separating the clear streams from the first contaminated part of the discharge.

The foundations of the holding tank appeared to be being undercut by water erosion.

The drains on the first floor of the filter press building were blocked.

Despite there being a sign instructing operators not to fill the cake storage hoppers to more than 3/4 full, one was found to be near to overflow.

6.3.3 Issues Raised During the Inspection/Recommendations

Investigation into whether the clean waters from the press can be separated before discharge to the settlement trench.

Foundations to the holding tank require attention to prevent further detcrioration.

6.4 FUEL HANDLING & MILLING

6.4.1 Description

Fuel is received by road and tipped directly into a reception hopper or onto the ground if necessary. Petroleum coke and coal are normally delivered on alternate weeks. Fuel is extracted from the reception hopper by a drag conveyor and is transported to stockpiles. Fuel is reclaimed from the stockpiles by front-end loader and fed to a mobile hopper for supply to two blending hoppers.

Weigh feeders extract the coal and petcoke from their respective blending hoppers and feed a covered conveyor which supplies a storage silo which, in turn, feeds two coal mill feed hoppers.

Each of the two kilns is fired by a vertical mill which dries and grinds the fuel. Enclosed drag link conveyors feed the fuel to each mill. Hot gases for the drying and transport of the fuel are supplied from the respective kiln hood. Particles of clinker in the hot gases are separated in a cyclone and the dust is returned to the clinker transport system..

Hot gas dries and entrains the pulverised fuel (PF) in the mill. The PF is subsequently separated by a cyclone prior to firing in the kiln.

The fuel milling systems incorporate automatic control of fuel feed-rate, temperature, airflows and system suction. The whole fuel grinding system operates under suction, thus minimising emissions of PF.

Gas oil is used to warm the kilns on start-up.

6.4.2 Report/Issues of Note

Coal and petroleum coke are generally used at a ratio of about 1:9 and 8.5:1.5 for kilns 7 and 6, respectively. The sulphur in the fuel is a small part of the total feed of sulphur fed to the kiln owing to the relatively high sulphur content of the clay. Variations in the fuel type may effect its ability to be fed to the kiln; some fuels appear to be more difficult than others to feed. A parameter known as the "coal residue" is measured (the fraction of coal particles remaining above a 90μm sieve) and is used by the Kiln Burner to give an indication of the efficiency of the coal mill.

Analysis of the coal/petroleum coke blend is carried out prior to entering the kiln. Analysis involves determination of moisture, ash content and size distribution. The only other data available is that provided by the supplier - this includes calorific value, volatile matter content, sulphur and carbon content. This latter specification, on arrival of the shipment at the port, is sent to the Works via Crown House.

No check analysis of the sulphur content of the fuel is undertaken. The authorisation uses, as the primary means of restricting emissions of sulphur dioxide to air, the setting of a condition for the sulphur composition of the fuel. Confirmatory analysis by means of randomly collected samples should be undertaken at the Works.

The fuel receipts are processed and entered onto the daily production data system. The information is logged on a monthly basis for fuel. Fuel usage data are generated by the weighers under the coal hoppers, the weighbridge and an estimate system based on the number of filter pressings. This seems to be the reference system for statements of production variance for the main process variables. End of month measurements are carried out and an error of up to 500 tonnes will not normally generate any further action. Errors greater than this will prompt investigation into usage parameters, weigh feeders etc and may in some cases cause the stockpile to be measured again.

Windblown dust is minimised by using the bowser (spraying water) though this is less effective on Petcoke. The stockpiles are generally well protected from wind whipping. The transfer to the bin system is by front end loader. At present the bins are left full at the end of the day and the mill operator transfers from the bins on the night shift.

The coal plant operator was unaware of who was responsible for maintenance of the 250 tonne silo bag filter. Checks showed that this had been left off the routine contract inspection although the item was listed on the plant register.

6.4.3 Issues Raised During the Inspection/Recommendations

1. The sulphur content of fuels as advised by the supplier should be confirmed by random sampling carried out at the Works.

2. As covered in the maintenance summary, the 250 tonne silo hopper bag filter needs to be included in the routine schedule of contract inspection.

SECTION 7
KILNS

7.1 KILNS

7.1.1 Description

Two dissimilar rotary kilns, No.6 (at 650 tes/day) and No.7 (at 750 tes/day) are operated on the site. In both cases the filter cake is preheated - on a travelling (lepol) grate and in a cyclone system respectively - before passing through the kilns

In the kilns the flame temperature in the burning zone reaches approximately 2000 degrees centigrade, the high temperatures being necessary to heat the feed material to the 1450 degrees necessary to allow chemical reaction to take place. As the feed travels down the kiln it comes into contact with gas of steadily increasing temperature and in the burning zone of the kiln cement clinker is formed by exothermic reaction of the raw materials. The clinker begins to cool once it has passed through the burning zone. Secondary air is heated over the hot clinker and is then fed into the kiln as combustion air or is de-dusted and used for other drying/preheating operations.

Gases leave Kiln 6 at approx 950 degrees and enter the calcining chamber of the Lepol Grate, passing over the feed nodules where it is cooled to 400 degrees. The gas is extracted, de-dusted and is passed through a drying chamber before passing to an electrostatic precipitator (ESP) and to atmosphere via the 91 metre stack. The level of particulates in the gases leaving the precipitator is continuously monitored.

Gases leave Kiln 7 at approx 700 degrees, enter the preheater cyclone, pass through the crusher dryer, the de-dusting cyclone and to the ESP and common stack. As with Kiln No.6 ESP, particulates in exhaust gases are continuously monitored.

Cement kiln dust (CKD), separated by the ESPs, is recycled on kiln 7 and that from kiln 6 is granulated and disposed of to landfill except for a small proportion which is amenable to recycling.

7.1.2 Report/Issues of Note

- *Use of monitoring data for process control*

The parameters SO_2, NOx, CO, dust, and O_2 are monitored continuously. This information is down-loaded by an Instrument Mechanic twice a week and the information is passed to the Electrical Engineer. A monthly summary report is produced for the Works Manager and Production Manager detailing the concentrations of the various pollutants as daily averages and monthly averages.

The Kiln Burner rarely uses the monitor display screen or the down-loaded information to control the process. The lack of knowledge of the Kiln Burner with respect to the information on the computer displaying the monitoring information was evident.

There appears to be no one on site that manipulates or uses the monitoring information in order to optimise the process or in fact to identify if there is a problem with the level of the releases of SO_2 and NOx. Dust level appears to be the only parameter which is used in any way. The information is collated at Crown House.

Upon presentation of the above findings, the Works Manager and senior managers wished to discuss the observation that none of the monitoring information is used or manipulated on the site.

The main area of discussion centred around the results for NO_x. The inspector considered that the Kiln Burner, amongst others, should be aware of the effect of process operation on the levels of NO_x released. It was argued that the Kiln Burner would be controlling the temperature of the burner by controlling the clinker's litre weight (a bulk density). Whilst this is true, it was pointed out that, owing to the fact that limits for SO_2 and NOx are to be imposed when burning Dycal, the operators should already have been made aware of the relevance of continuous monitoring data and should be using this data for process monitoring and control.

It was noted that, in the past, a conscious decision had been made by Rugby Cement not to involve the Kiln Burner in controlling SO_2 and NO_x. Following this discussion, however, it was agreed that procedures would be put in place to ensure that the monitoring information would be used to check regularly that the monitors are reading accurately and that the information being logged is consistent.

- *Production variation and releases from the process*

The audit team reviewed the attitude and knowledge of whether production variations have an effect on releases.

There is very little variation in the raw materials and fuels. Throughput is also constant and hence releases from the process under steady state conditions vary very little.

The current practice is to run No.6 Kiln continuously with no recycling of CKD removed to maintain the correct alkali specification in the product. The CKD from kiln 7 is recycled. Under these operating conditions the fuel composition is then set at 90% petroleum coke on No.7 Kiln and 15% on No. 6 Kiln.

Continuous monitors for SO_2 and NO_x have been installed and results are archived on a twice weekly basis. The Environmental Management System requires that specific responses should be made when specified particulate levels are indicated by the monitors. The NO_x and SO_2 data are not used on the plant.

The main emphasis is on the use of steady state conditions to reduce the emissions. The only data offered to support this were the shut down hours, taken from various sources. A concerted effort to reduce kiln feed outages on kiln 6 by concentrating on the metal detector trips on the belt has been successful. This has been mainly by major clean up after the maintenance work is complete. The current (last 3 days) results indicate outages of 1 to 3 minutes on average once per day. The detector is very sensitive to even small pieces of rusty metal.

- *Compliance*

Two specific conditions were investigated to assess general compliance. These were:

(i) An improvement condition relating to the return of kiln dust extracted from the Lepol Grate to the process was examined for compliance. The project to implement this requirement appeared to be adequate, with procedures having been given to operators etc.

(ii) Maintenance of emissions monitors. Procal, the manufacturer of the main monitoring instrumentation, make two visits per year to check the performance of the monitors. If a problem arises between visits (e.g. results appear suspiciously high or low) a member of the Instrument Department will check the calibration of the monitors. No adjustment is made to the monitor; instead a correction factor is introduced. Gases used for calibration are stored on the site and their reliability checked by Crown House. All other monitors used in the process, but not part of the Procal system, are checked every day by a member of the Instrument Department. No problems were highlighted on this part of the operation.

The overall state of compliance for these two conditions was good.

- *Management and reporting lines/operation of process*

It was evident that the Kiln Burner makes many of the decisions relating to the operation of the process. Such decisions are made without reference to the Shift Supervisor, who is only informed if there are major problems e.g. if the kiln has to be shut down or if maintenance work needs to be undertaken. It appears that the Kiln Burner is very much the main controller of the kiln, as well as the other activities that impinge upon kiln operation, and makes many of the decisions himself. Although the Coal Miller and Lepol Grate Operator have no official reporting management line to the Kiln Burner, from an operational point of view this is normal practice.

A visit was made to the site to coincide with the change-over between the afternoon and night shifts. A log sheet is maintained by the Kiln Burner throughout the duration of each shift. This comprises details of results of all checks, measurements etc made for the duration of that shift. Notes are also made concerning any major problems encountered. Copies of the log are sent to the main office and to the maintenance department.

This log sheet provides the basis for the transfer of information from one Kiln Burner to the next. In addition to this the departing Kiln Burner verbally briefs the in-coming Kiln Burner of the events of the shift. There was an overlap of about 10 minutes between the Kiln Burners.

During this particular change-over a problem had been experienced for much of the day with a pump and screw conveyor transferring CKD from the lepol grate to a silo. Consequently, the CKD was being returned to the lepol grate and this was giving rise to higher than normal discharges of dust from the main stack. Personnel from the maintenance section had been working on and off throughout the day in an effort to repair both the pump and the conveyor. However, the in-coming Kiln Burner had not been made aware of whether this work had been completed. He needed to telephone the Lepol Grate Operator to establish this fact.

If any maintenance work involves equipment having to be isolated a Permit to Work system is operated and the paper work is retained on the kiln deck; on signing the work off the Kiln Burner is made aware and can then re-start that part of the process.

The breakdown in communication occurs, however, during incidents such as the one encountered here when the Kiln Burner is not kept informed of the progress of the work.

- *Use of documentation/knowledge of EMS*

The Procedure for controlling dust emissions was examined. The Kiln Burner outlined exactly the steps in the EMS Procedure upon request. It seemed evident that the Procedure had been written in conjunction with the Kiln Burner, although he seemed unaware of the existence of the Procedure documentation or its purpose. A book containing the kiln operating instructions was seen. The Kiln Burner seemed more familiar with this documentation.

It was evident that there was some confusion and lack of knowledge relating to the EMS documentation. Transposition of the Procedures into the Operating Instructions might relieve the problem to some extent.

Two EMS Manuals were examined - 3/8 (Shift Supervisor) and 6/8 (Instrument Shop) - both were missing copies of SEW.W 18-22. Both the Instrument Department and Shift Supervisor believed that the manuals and updates were distributed by the Safety/Training Advisor. The Shift Supervisors office receive the new Instructions and place them on the Kiln Deck, their office, the Filter Press and the Test Cabin.

The Kiln Burner's control room also contains a manual. The No. 22 Work Instruction for the operation of the dust plant was not in the control room although the file in the office listed it (issued 11 Oct.)

A subsequent discussion with the Safety/Training Advisor revealed that distribution was, in fact, via the PREM. The Safety/Training Advisor maintains the site training records.

There also seems to be some confusion over the withdrawal of documentation. The original Work Instruction covering control of dust on No.6 has been withdrawn but no revocation nor official withdrawal has been supplied. The replacement is intended to be read in conjunction with other documentation.

- *Projects*

A specific project (transfer of CKD from No.6 Kiln to an Export Silo) was selected and its progress from conception to completion was examined.

The capital project had been formally applied for and approved through Crown House staff. There was no evidence of a formal review by the Southam personnel to establish if there were problems anticipated or that drawing of the system had been sent to operations for checking.

The item had been installed and had been operating for over 6 weeks in a satisfactory manner. The results from the continuous particulate monitor confirmed that the emissions were meeting the new authorisation limit. Operations personnel were of the opinion that the running of the system was their responsibility. They had received a basic schematic of the routing and associated kit

Once the project engineer was satisfied that there were no problems with the system, the project is signed off as complete from an accounting point of view. After signing off the project engineer will then return the file to Maintenance Planning to enter the data on the planned maintenance system and the master plant register. The schematic is then updated by the draughtsman.

There appeared to be a mainly verbal system of notifying the operators of completion and the project is only entered into the maintenance system after a period of confidence from the engineer. The Works Instruction SEW.W22 has been generated for operation of the system. The operators had a clear understanding of the new transfer system from the No6 plant dust to the export silo now being under their responsibility. The training had been by the project engineer.

Although there are no major problem with the component parts of the system there does not seem to be an overall strategy. The best documentation available is the Plant Register Schematic. The Register of Environmental Aspects only lists the original IPC application and has not been updated. The Work Instruction 22 is a stand alone item and does not cover the whole of the Lepol Grate operator's duty.

In conclusion, the inclusion of externally managed projects eg supply of mobile plant, seems to fit well in the current notification and signing off system. In the case of in-house projects, it is unclear as to who takes responsibility for operating and maintaining after successful installation and start-up until longer term reliability is established. There is no doubt as to the commitment and communication between sections - these were excellent. .

- *Complaints*

The handling of complaints, particularly out-of-hours, by the Kiln Burner was investigated.

During the day, complaints will be dealt with by the Production Manager and the Kiln Burner is contacted if the problem relates to the operation of the kiln. Out of normal working hours, all complaints are passed directly to the kiln deck and are dealt with initially by the Kiln Burner. A standard sheet is completed by the Kiln Burner and passed to the Production Manager who deals with the complaint.

In general the complaints procedure adopted at the site is adequate and every effort is made to ensure that all complaints are dealt with in-house.

One area for improvement is that, presently, the Kiln Burner does not necessarily make a note of the reason for any spikes in the quantity of dust discharged from the main stack. Therefore, in order to assist both the Production Manager and the Site Inspector during an investigation into the cause of a complaint the Kiln Burner should record the reasons for all excessive releases of dust. This should be done whether a complaint has been received or not.

- *Examination of a specific job*

A specific job (the Lepol Grate Operator) was reviewed in order to consider the impact that the EMS and associated systems has had on the individual concerned:

This covers only the dust disposal of the ESP's, the kiln feed from the wet store bin outlets to the injection to the kiln and some of the other shift work handled on days by the Kiln Greaser.

There were limited operating instructions. The information for maintenance seemed to be mainly verbally transmitted for urgent items. There is a note system for the less urgent and a work note system returned for the clearing of the item from the records. The instruction manual was available in the kiln control room but the complete manual was not as readily available in the operator's cabin and he appears rarely to go to the control room.

There are files on the various details but no overall framework. The schematic for the recently completed project on No. 6 ESP dust transfer system was available. The operator had the full copies of the authorisation to hand, but reservations on the understandability of the documents was raised. Procedures and Work Instructions would appear to be only available in the control room.

The need for full information to be set out on paper is not apparent to the operators. Their long term job experience is their main reference. The information for shift action consists of a daily check sheet to record the work undertaken during the three shifts. Apart from the tick boxes of specific points, the only listing given on this check sheet related to the number of batches of CKD granulated. The system of work and liaison seems to be largely verbal and as a support to the Kiln Burner rather than through the Shift Supervisor. The diagnosis of equipment problems (such as the breakage of a grate plate) is often made by the Kiln Burner noticing an aberration in the operation of the kiln as well as by visual inspection. The radio system is used extensively and this is appropriate as the Lepol Grate Operator has no central point at which he can view operating information; such data are only available at various switch rooms and operating platforms for local stop/start. The informal system of reporting, whereby the Lepol Grate Operator liaises directly with the Kiln Burner rather than the Shift Supervisor, is based on the information needs of individual operators.

7.1.3 Issues Raised During the Inspection/Recommendations

1. The lack of use made of the monitoring data is of concern. No assessment is made of the releases; this is true not only for purposes of controlling the process but also for identifying any trends. This needs urgent rectification in view of the application to burn Dycal.

2. Shift handover between operators seems somewhat sketchy - even when problems have been identified. This needs to be more formalised.

3. It was evident that the Work Instructions tend not to be used by operators; in fact their existence as separate documents alongside the Procedures and other instruction is questioned. There is also a problem with distribution - some documents were found to be missing from the files examined and the commonly perceived distribution route was incorrect. Consolidation of the documentation might be considered and the distribution routes reviewed.

4. There appeared to be some grey areas in terms of signing off projects. The following might be considered:

    (a) Use the current project completion system for accounting purposes ie closure of the work order.

    (b) Pass over the changes to Maintenance Planning when the major items have been installed and are generally operating satisfactorily. The correctness of the final installed system can be confirmed on (a).

    (c) Identify which plant schematic will be used as a master reference and use that (or the relevant section) along with project details before the project for communications. Before the project use the schematic to confirm with the relevant site personnel that the proposal is adequate.

5. Operator access to relevant (and up-to-date) Procedures, Work Instructions and other documentation needs to be reviewed.

6. The Kiln Burner should record the reasons for all excessive releases of dust.

SECTION 8
CLINKER HANDLING & STORAGE, CEMENT MILLS & SILOS

8.1 CLINKER HANDLING & STORAGE, CEMENT MILLS & SILOS

8.1.1 Description

Cooled clinker from the kilns is passed through a hammer mill and transported by conveyor to a storage silo or to long-term covered storage. The clinker conveying system is fitted with bag filter dust collectors at transfer and discharge points.

There are four cement mills, all of which are open circuit design where feed is introduced at one end and passage of product through the mill is aided by airflow. The air leaving the mill is de-dusted using reverse jet type bag filters and vented to atmosphere via 4 outlet stacks. The ground cement leaving the mill and the dust filter is discharged into screw conveyors.

Gypsum is delivered by road to the gantry store and is transferred to feed hoppers. Clinker is loaded into separate feed hoppers. The flow of raw materials into each mill is controlled by variable speed rotary feed tables. The finely ground product is cooled and transported via enclosed conveyors to the appropriate storage silo.

There are 6 cement silos, 5 of which are fed from the enclosed conveyor system via a screw conveyor and manually operated directional slides. The sixth silo is fed by sealed pipework from a dense phase pump.

All silos can feed bulk road tankers and three can feed the packing plant.

The silos, transfer and discharge points are served by dust filtration equipment.

8.2 Report/Issues of Note

- *Housekeeping*

The standard of housekeeping varied; some internal areas were found to be quite deep in dust (the walkway above the clinker store), whilst others were relatively clean (cement mills).

A large amount of dust was generated by the Renvac (large, mobile vacuum cleaner) when it discharged its load in the overhead gantry building - a proportion of the load left the building as dust through the open doors. The mechanical road sweeper cleans the site on a daily basis. It has a wetting and sweeping action. Observations suggested that the morning cleaning was adequate but, with no round in the afternoon, dust settled on roadways and in the yard - this was visible as vehicles moved around the site. The question as to whether one vehicle is sufficient to clean the whole site was debated, particularly as cover is needed for vehicle down-time.

There was a large amount of dust above the cement silos. Roofs are inspected every 6 months and contractors are brought in to clean-up.

Housekeeping activities carried out during the day are the responsibility of the General Foreman and during the night such activities are the responsibility of the Shift Supervisor.

A housekeeping audit is carried out every two months by senior staff; any action required as a result is the responsibility of the manager of that area.

- *Fugitive emissions*

The age of the works was apparent in some areas - there were holes in the walls of the Overhead Gantry building. This building was also open at one end, adding to the potential for dust release, and there were long-term deposits of dust on external walls. There was a wide gap in the roof apex of the shed adjacent to the clinker store. The outside door from the walkway above the clinker store had been left open on one occasion.

Large amounts of dust were being released internally from the conveyor between the hammer mill and the overhead gantry (from a 9" wide section of conveyor with no enclosure). Clinker normally runs through the redlar section which is under suction, but this had broken down and was by-passed on the day of the audit.

- *Bag filters*

Bag filters discharge points are inside the buildings, with the exception of the four cement mill extractor units and the three packer discharge vents; these latter discharge to the outside walls (out of view of operatives). The bag filters are on the 3 monthly preventative maintenance programme (which is undertaken by a contractor). The contractor produces a report containing a list of matters requiring attention which are attended to by the Works within a week or so. In addition to the 3-monthly check, a Shift Supervisor will conduct a weekly visual examination of the inside of the four main units.

The bagging operation is automated, but generates a lot of dust, although this dust is contained within the building. Manual emissions monitoring of two of the packer vents was carried out in 1992 and both were measured at less than $10mg/m^3$. No visible emissions were seen during this audit. These vents are also subject to weekly checks but as they are out of line of sight there may be advantage to fitting burst bag detectors (obscuration devices) with alarms.

All dust collected in these filters is recycled to the process.

- *Dust monitoring*

Confusion amongst the workforce was evident with respect to the dust monitor readout on the testing house control computer. Operators were uncertain as to the meaning of the data presented; specifically, whether this was presented in mg/m^3 or % obscuration. These data are logged on a daily basis, together with comment on the presence of any spikes or report of any visible emissions from the four cement mill bag filter vents. Should spiking occur, the supervisor is informed and the bag integrity is checked visually at the next possible opportunity to shut the mill down.

Extractive monitoring of the cement mill vents (to BS3405) is carried out every 3 months; results obtained during the past 18 months have been well within the release limit of $100mg/m^3$. Work Instruction SEW.W12 requires comparison of manual test results with the dust monitors and adjustments are made if the results differ by +/-25%. Discussion with the relevant personnel has revealed no correlation between the two and it is suggested that the need for adjustment should be reviewed.

- *Silos*

All of the silos are fitted with high level alarms to prevent overfilling - monitors are located in the testing house, which is manned 24hrs a day. All filling operations are controlled from this location. The discharge chute at the rear of the silos creates a lot of dust, although this is not used frequently now. It was observed that the bottom of the chute needs cleaning.

- *Use of EMS documentation/knowledge of requirements*

The Shift Supervisor had a reasonable understanding of the requirements of the authorisation and was aware of the emission limits for discharge of particulates from the mills.

The Shift Supervisor has access to procedures/work instructions and had some familiarity with them. Operatives generally did not refer to written instructions during the normal course of their work.

- *Training*

Operator training follows the same format as elsewhere on the Works. It was noted that, despite the potential for dust generation in this area, there is no specific training relating to matters such as dust minimisation etc.

8.1.3 Issues Raised During the Inspection/Recommendations

1. Review of housekeeping activities required - standards varied widely across the back end of the process. Consider whether provision of a further Renvac would be of benefit, or increase the usage of the one currently available.

2. Review the frequency of housekeeping audits.

3. A large number of points from which fugitive emissions could have occurred were in evidence - these need to be blocked off. Attention needs to be given to keeping doors etc closed - creating additional release points.

4. It is evident that operators are not aware of the relevance of environmental information presented to them - further awareness training is required.

5. The correlation between the manual monitoring and dust monitors on the cement mill discharge points needs to be reviewed.

6. The bottom of the silo discharge chute needs cleaning.

SECTION 9
SUMMARY OF SPECIFIC RECOMMENDATIONS

9.1 ENVIRONMENTAL MANAGEMENT SYSTEM

1. To avoid overcomplicating the system of documentation available to the workforce, there may be some benefit in consolidating the paperwork for the QA and environmental systems.

2. The system in place for distribution for Work Instructions and Procedures needs to be more transparent to the workforce. Gaps were found in distribution which need to be rectified.

9.2 TRAINING

1. Training at operator level could be more structured and formalised as it appears to rely almost entirely on the needs as perceived by individual line managers. Whilst this may be appropriate for training related to day-to-day work, the consistency of general environmental awareness training cannot be assured.

9.3 COMPLAINTS

1. Complaints forms would benefit from being numbered or otherwise identified to ensure all complaints are followed up. There is a need to ensure that the record of follow up action is entered fully onto the complaints form.

9.4 COMPLIANCE, INCIDENTS & UNAUTHORISED RELEASES

1. The need to report accidents and near misses with potential for environmental impact needs to be emphasised more strongly.

9.5 MAINTENANCE, USE OF CONTRACTORS AND PROJECT WORK

1. The planned maintenance system appeared sophisticated, but it would be worth checking whether similar items on the plant register can be identified and then have a periodic check on those with environmental impact.

9.6 WASTE MANAGEMENT

1. The Waste management Licence and working plan are in need of review by the Agency and the Company.

2. A number of amendments needs to be made to the Work Instruction "Removal of wastes from site."

9.7 SITE EFFLUENT SYSTEM

1. Many of the bunds need examining to ensure that they are impermeable.

2. The surface water drainage system surrounding the diesel refuelling area needs to be served by an interceptor.

3. The sewage treatment plant needs to be returned to working order.

9.8 CLAY QUARRY AND CRUSHING PLANT

1. Completion of the project to supply fuel by bowser, rather than in drums, needs to be expedited. Operators should be trained to undertake this operation.

2. The system of temporary pipework needs a system in place for control and inspection.

3. Alternative means by which material back-up on the conveyor can be viewed or blockages prevented needs to be provided.

9.9 RAW MATERIAL PREPARATION AND SLURRY STORAGE

1. The overflow alarm system needs to be improved with high level alarms on those basins/sumps which are deficient in this respect.

2. The launders on the chalk thickeners need to be cleaned out with attention to waste disposal and housekeeping.

9.10 FILTRATION PLANT AND CAKE STORAGE

1. Investigation needed into whether the clean water from the press can be separated before discharge to the settlement trench.

2. Foundations to the filtrate holding tank require attention to prevent further deterioration.

9.11 FUEL HANDLING AND MILLING

1. The sulphur content of fuels as advised by the supplier should be confirmed by random sampling carried out at the Works.

9.12 KILNS

1. The company need to review the use to which monitoring data are put.

2. Shift handover between operators needs to be formalised, particularly with respect to operational problems.

3. The distribution, use of and access to Work Instructions and Procedures needs to be reviewed.

4. The system for the signing off of projects needs to be reviewed.

5. The Kiln Burner should record the reasons for all excessive releases of dust.

9.13 CLINKER HANDLING AND STORAGE, CEMENT MILLS AND SILOS

1. A review of housekeeping activities is needed, together with consideration of whether provision of another Renvac would be of benefit.

2. Review the frequency of housekeeping audits.

3. Attention needs to be given to minimising fugitive release points by repair of gaps in the building fabric and by keeping doors etc closed.

4. It is evident that operators are not fully aware of the relevance of environmental information presented to them - further awareness training is required.

5. The correlation between the manual monitoring and dust monitors on the cement mill discharge points needs to be reviewed.

6. The bottom of the silo discharge chute needs cleaning.

SECTION 10
GLOSSARY

BATNEEC	Best Available Techniques not Entailing Excessive Costs
BCA	British Cement Association
BOD	Biochemical Oxygen Demand
BPEO	Best Practicable Environmental Option
CKD	Cement kiln dust
CO	Carbon monoxide
Dycal	A liquid fuel produced from the manufacture of Nylon
EAM	Environmental Affairs Manager (Head Office)
EMS	Environmental Management System
EPA	Environmental Protection Act 1990
ESP	Electrostatic precipitator
EU	European Union
HMIP	Her Majesty's Inspectorate of Pollution
HSE	Health & Safety Executive
IChemE	Institution of Chemical Engineers
IPC	Integrated Pollution Control
NDT	Non-Destructive Testing
NO_x	Nitrogen oxides
NRA	National Rivers Authority
O_2	Oxygen
Petroleum Coke	Solid residue from oil refining that is used as a fuel.
PF	Pulverised fuel
PREM	Person Responsible for Environmental Management

QA	Quality Assurance
SO_x	Sulphur oxides
WRA	Waste Regulation Authority

APPENDIX I

RUGBY CEMENT'S RESPONSE TO THE RECOMMENDATIONS OF THIS AUDIT

The recommendations to be found at the end of the Environment Agency report are some thirty-two in number. These are not specific requirements, nevertheless, Rugby Cement has undertaken to respond positively and, prior to the issue of this report, has, in fact, actioned twenty-two of these recommendations and has completed ten out of that number. The remaining recommendations are being taken in order and will be completed in due course.

The specific actions in hand include:

FORMAL CERTIFICATION TO BS EN ISO 14001:

1. *Achieved on 18 April 1997.*

ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

1. *Southam Works has been the pilot for this scheme within the Cement Division. It will retain the environmental system documentation separate to that of the Quality Management System and serve as a model for the development of systems at other Works locations.*

2. *The distribution of work instructions and procedures has been actioned in a formal manner as part of the Management System requirements.*

TRAINING

1. *This is being continually reviewed and actioned on an ongoing basis. Formal documentation and record keeping has been specifically improved as a result of the EMS.*

COMPLAINTS

1. *Complaints can be directed from outside the Works through three possible phone links. This makes it difficult to provide a single set of documentation in a form which ensures that no complaints are missed. However, attention is being given to this recommendation and steps have already been taken to ensure all actions required from a complaint are signed off on completion.*

COMPLIANCE, INCIDENTS AND UNAUTHORISED RELEASES

1. *The Environment Agency has set release limits which apply during the burning of Dycal in a recent Variation Notice. This action is therefore complete.*

2. *The need to report accidents and near misses continues to be emphasised and is the subject of both written instruction and training discussions.*

MAINTENANCE, USE OF CONTRACTORS AND PROJECT WORK

1. *Cross-checking on the plant identification system is already under way to ensure that like pieces of equipment with potential to have environmental impact are subject to the same conditions of inspection and monitoring.*

WASTE MANAGEMENT

1. *The Environment Agency plans to review the Waste Management Licence and working plan.*

2. *Improvements have been made to the work instruction "Removal of waste from site" and this item is completed.*

SITE EFFLUENT SYSTEM

1. *All bunds were water tested some eighteen months ago, but, in line with the recommendations made, will be checked again for impermeability.*

2. *Details have been prepared in order to provide an interceptor for the surface water drainage system surrounding the diesel refuelling area.*

3. *Financial provision has been made for returning the sewage treatment plant to working order and this will be implemented during the summer of 1997.*

CLAY QUARRY AND CRUSHING PLANT

1. *The project for the supply of a fuel bowser has been completed and operators trained in its operation. This recommendation is complete.*

2. *A system to ensure the regular inspection of temporary pipework throughout the Works will be built into the Idhammar Planned Maintenance System.*

3. *The proposal for the provision of improved viewing of the clay conveyor to monitor for blockages will form the basis of a project for completion by the end of 1997.*

RAW MATERIAL PREPARATION AND SLURRY STORAGE

1. *Overflow systems to slurry basins and thickeners are to be checked out to ensure that high level alarms give adequate protection.*

2. *The launders on the chalk thickeners will be cleaned out during the summer of 1997.*

FILTRATION PLANT AND CAKE STORAGE

1. *The investigation for the separation of clean and dirty water from the filter presses has been carried out, but there are not the necessary equipment or controls in place to fulfil this.*

2. *The foundations to the effluent holding tank will be checked out for stability during 1997.*

FUEL HANDLING AND MILLING

1. *A contract will be placed for random sampling and testing of the sulphur content of solid/fossil fuels during 1997.*

KILNS

1. *The use to which monitoring data is put has been reviewed as part of the EMS. This will be ongoing.*

2. *Shift operators will be trained in improved methods for passing on full operational details at shift changeover times. This may include modifying relevant log sheets.*

3. *The distribution and availability of work instructions and procedures has been reviewed, clarified and is in position to meet the needs of the organisation. This is now considered to be complete.*

4. *The review of project documentation, including involvement of operators prior to project approval and a system for signing off projects by the "owners", is well under way and will be completed early in 1997.*

5. *Using formal Toolbox Talks the Kiln Burner will be trained in the need for explaining all excessive releases of dust on kiln log sheets. This will be in place for the third quarter of 1997.*

CLINKER HANDLING AND STORAGE, CEMENT MILLS AND SILOS

1. *An expenditure proposal is being prepared for the provision of a replacement Renvac unit, which will be submitted by the third quarter of 1997.*

2. *Whilst the frequency of housekeeping audits is important (currently every two months) and has been reviewed, more emphasis should, in fact, be placed on the actions resulting from these audits. This is where the Works will give maximum attention in future.*

3. *Since the audit, various repairs have been completed to the shell of the building to minimise fugitive releases. In addition, standard routines to keep doors on gantries and clinker stores closed have been reinforced.*

4. *A programme of awareness training for the whole Works is an ongoing objective of the Environmental Management System for Southam Works.*

5. *Correlation between continuous monitors and manual emission measurements is under constant review as part of the Environmental Management System.*

6. *The bottom area of the cement silos, which is generally an unmanned area, will be the subject of an in-depth cleaning contract during 1997.*

APPENDIX II

RUGBY CEMENT'S ENVIRONMENTAL POLICY STATEMENT

APPENDIX III

SOUTHAM WORKS ENVIRONMENTAL OBJECTIVES 1997

RUGBY CEMENT

ENVIRONMENTAL POLICY STATEMENT

1. As a leading company within its field, Rugby Cement recognises concern for the environment as an integral part of its business strategy and pursues a policy of pollution prevention whilst continuing to develop improving standards in its operations.

In support of this policy we will:

2. *Care for the Environment*

2.1 Consider environmental implications in making company decisions at all levels.

2.2 Reduce to the practical minimum the environmental impact of emissions to air, land and water and noise from our operations.

2.3 Conserve minerals and energy resources and make the optimum economic use of suitable waste or secondary materials in the manufacturing process.

2.4 Minimise the generation of waste and take all reasonable steps to see that waste generated is recycled or disposed of in a safe and environmentally acceptable manner.

2.5 Reduce the visual impact of our operations by careful landscaping and building design, by good maintenance and housekeeping and by sympathetic restoration of quarries.

2.6 Minimise the loss of ecological habitats and restore mineral workings to appropriate afteruse, giving consideration then to public access.

3. *Comply with Legal Requirements*

Comply with or improve upon applicable legal requirements, codes of practice and industry guidelines and where these criteria may not be adequately protective adopt our own standards.

4. *Involve Employees*

Promote the involvement of employees by consultation in the setting and publication of environmental objectives, by education, by improving the working environment and by seeking individual commitment and contributions to such initiatives.

5. *Communicate with Communities and External Bodies*

5.1 Communicate as appropriate with local communities and responsible conservation groups for them to enhance their knowledge of our activities and for us to be informed of their wishes.

5.2 Co-operate closely with statutory bodies in the setting, development and implementation of environmental standards and their advancement.

5.3 Record and investigate promptly any matters brought to our attention from the public or from statutory bodies and take action as appropriate.

5.4 Environmental objectives will be made available upon request to the Works Manager on a site by site basis.

6. *Establish an Environmental Management System and Audit Procedure*

6.1 Achieve the above within the framework of an environmental management system.

6.2 Carry out as part of such system periodic environmental audits as a means of setting objectives, monitoring achievement and promoting further improvement.

6.3 Submit our systems and audits to independent inspection by accredited verifiers.

7. *Achieve a Balance between Benefit and Cost*

It is implicit in our environmental policy that in applying our resources to improving environmental performance proper account will be taken of the cost of and the benefit resulting from initiatives and actions proposed.

David McAteer

David McAteer
Chief Executive Cement Division

Peter Johnson
Group Chief Executive

1 October 1996

SOUTHAM WORKS
ENVIRONMENTAL OBJECTIVES 1997

1. Achieve accreditation to BS EN ISO 14001 by 28 February 1997.

2. Identify areas where energy savings can be made and prepare a prioritised action list by 1 June 1997.

3. Reduce wastage to the extent that the number of skips going to off-site disposal is reduced by 5% by 31 December 1997, consistent with Works housekeeping and general appearance.

4. Reduce the quantity of ESP dust sent to landfill by 10% before 31 December 1997.

5. To reduce coal usage in kiln 7 by replacement with Dycal SLF, taking regard of the maximum 40% fuel replacement by Dycal, identified in the Variation to the Authorisation to Operate.
   Target 1-6-97.

6. To reduce petcoke usage in kiln 7 by replacement with Dycal SLF, taking regard of the maximum 40% fuel replacement by Dycal, identified in the Variation to the Authorisation to Operate.
   Target 1-6-97.

7. To source and replace currently issued publicity material for EMS with new posters showing current Standard BS EN ISO 14001.
   Target 30-4-97.

RUGBY CEMENT