PREFACE

Sulphuric acid was the first potato desiccant approved for use in the UK. Partial alternatives to sulphuric acid have been developed, such as other chemical desiccants, burning or mechanical flailing, but the industry has yet to find a more effective method of haulm removal.

Sulphuric acid is a strong oxidising agent that, on application, has very rapid activity on the crop. It desiccates potato haulm within 24 hours of application and effectively stops any further crop growth. This rapid effect allows the grower precise management of the crop to meet the exacting standards required by the marketplace. The product is effective over a wide range of application conditions and is not dependent on soil moisture or light intensity. It is the most effective method of haulm desiccation in immature crops, dense foliage varieties and late maturing crops. The rapid speed of haulm destruction prevents the development of late foliar blight infections and the need for additional blight sprays whilst the haulm dies back. This not only reduces the risk of tuber blight but also ensures rapid skin set and improved resistance to storage diseases. It is the only desiccant that delivers these benefits and, for these reasons, is also important in the production of quality seed.

Following application, sulphuric acid is very rapidly broken down to sulphate salts and water, forming a valuable source of sulphur in the soil and leaving no unnatural residues. However, it should be recognised that acid may have an adverse affect on wildlife on immediate application, or if accidental spillage occurs. Because of the strategic importance of acid to the UK potato industry, it is therefore essential that all those involved are fully aware of their responsibilities to protect the public and environment.

A comprehensive raft of legislation tightly controls acid storage and its safe application. Everyone involved with its use must have received appropriate training and, by law, must hold the statutory certificates of competence. Extensive safety precautions are also in place and only specialised equipment can be used, which has meant that the use of acid has become almost exclusively restricted to specialist contractors.

To take this one step further, the National Association of Agricultural Contractors (NAAC), following detailed consultation with manufacturers, contractors, the National Sulphuric Acid Association (NSAA), Health and Safety Executive (HSE) and Pesticides Safety Directorate (PSD), has published this Code of Best Practice, with the aim of voluntarily raising standards across the industry.

To ensure full implementation of the Code, a public register of operators will run concurrently. All those who transport, store or apply sulphuric acid for the purposes of crop desiccation will be asked to sign up to the Code and become a member of the register. This membership will be renewed annually.

This Code of Best Practice has been produced as part of the Voluntary Initiative* and the NAAC believes that the implementation of this Code will make significant improvement to the standards of application of sulphuric acid, allaying public concerns, protecting the environment and ensuring the safety of operators.

***The Voluntary Initiative is a programme of measures, agreed by Government, to minimise the environmental impacts of pesticides.**

CONTENTS

Introduction

This Code has been developed to promote best practice for the use of sulphuric acid as a desiccant of certain agricultural crops.

The handling and use of sulphuric acid already requires the specific certification of both operators and equipment. Only professional and trained personnel can handle or apply the product.

Manufacturers and contractors involved with the use and supply of sulphuric acid have co-operated to develop a set of guidelines designed to:

i) safeguard and improve the existing standards set for the handling, storage and use of sulphuric acid;

ii) continuously review options to further minimise operator and environmental risk;

iii) compliment the Department for Environment, Food and Rural Affairs (DEFRA) Green and Yellow Codes (page 12). Where appropriate the structure cross-references these existing codes to reduce duplication.

Who should use the Code

Anyone who transports, stores or applies sulphuric acid for the purposes of crop desiccation.

Companies who sign up to this Code of Best Practice will monitor their performance, agreeing to:

1. Act in a responsible manner in all activities relating to the storage, transport, transfer and application of sulphuric acid, paying due regard to the interests of users, consumers, the environment and wildlife.
2. Comply fully with all aspects and requirements of this Code of Best Practice, especially with regard to established laws, regulations, codes of practice and advice governing the manufacture, storage, transport, distribution and application of sulphuric acid for agricultural desiccation.
3. Ensure that all employees are trained and certified to meet the appropriate standards necessary for them to carry out their job responsibly.
4. Monitor performance and work towards the continuous improvement of these standards.
5. Promote the use of alternative haulm destruction methods that are both effective and protect the environment.

Areas Covered by the Code

1. Health and Safety

Objective: To minimise the risk to operators and handlers by improving the standards of handling/transport/application and, where appropriate, by exceeding the standards and regulations set by the PSD and the HSE.

2. Environment and Wildlife

Objective: To minimise any adverse impact of sulphuric acid on water and non-target species by evaluating application techniques to increase specificity, and by reviewing crop management techniques to optimise application rates.

3. Communication

Objective: To reduce public concerns regarding the use of sulphuric acid by providing improvements in practice that will minimise any adverse environmental impact, and by providing adequate information to residents adjacent to treated land (supplying other public interest groups on request).

The standards set in this Code of Best Practice have been agreed with the NAAC, NSAA and Crop Protection Association (CPA), following consultation with the PSD and HSE. Copies have been lodged with HSE offices.

1. Delivery and Storage

This section relates to the delivery of sulphuric acid to fixed storage sites and sprayers in the field.

1.1 Training and Certification for Handling and Storage for Sale and Supply

Everyone involved in the use of sulphuric acid must have achieved full certification in compliance with all appropriate regulations and codes of practice. They must receive appropriate training (including full familiarisation with this Code of Best Practice).

1.2 Handling and Storage for Sale and Supply

1.2.1 Storage of sulphuric acid will be on fixed approved sites into designated tanks of approved design. All sites should comply with the *Guidance for the Review and Inspection of Sulphuric Acid Storage Facilities, NSAA* (page 12) and meet any guidelines from HSE.

1.2.2 Transport and handling will be carried out by certificated personnel, using equipment of approved design.

1.2.3 Self-propelled and trailed crop sprayers, supply bowsers, nurse tanks and road tankers must carry and display information on the product being carried e.g. Tremcard (Transport Emergency Card) and Hazchem signs.TEC(R)-10B.

1.2.4 Prior to season, an annual review of procedures and practices will take place for all staff.

1.2.5 A minimum of 2 trained persons will be present during:

1.2.5.1 the loading and transfer of sulphuric acid to storage tanks, road tankers and bowsers.

1.2.5.2 the transfer of sulphuric acid from storage tankers and road tankers to sprayers.

1.2.6 Where transfer takes place from bowser to sprayer, it is recommended that two persons are present. However, one person may carry out the procedure, provided that a local risk assessment has been carried out.

1.2.7 Competent inspectors (e.g. Trained HSE Advisors/Officers, Dangerous Goods Safety Advisors) will carry out annual inspections of storage, equipment and operational procedures.

1.2.8 Current operational and emergency procedures, together with appropriate safety equipment, will be available at all times as required on the approvals certificate.

1.2.9 In case of contamination, emergency showers, first aid kits and eye rinse bottles will be readily available in accordance with the Health and Safety (First-Aid) Regulations 1981.

1.2.10 Guidelines have been developed by NSAA to define minimum recommended standards for the bulk storage of sulphuric acid (page 12). Signatories to this Code of Best Practice have undertaken to meet the NSAA's 'Common Vision' by the end of 2003.

1.3 Record Keeping

All equipment will have up-to-date written maintenance records. These should include a record of all work completed, by whom and on which dates servicing/sprayer testing has taken place.

2. Application

This section relates to the transfer and application of sulphuric acid in the field.

2.1 Training and Certification for Application

2.1.1 All operators involved in the application of sulphuric acid must have received appropriate training and hold the full certification (including PA1, PA2 and a vocational training certificate (VTC) for drivers of vehicles carrying dangerous goods).

2.1.2 All duties under the Food and Environment Protection Act (FEPA) and the Control of Substances Hazardous to Health Regulations (COSHH), and all other legal obligations must be met. See DEFRA Green Code (page 12).

2.1.3 A planned approach to training will be adopted which will cover hazards, risks and safe working practices.

2.1.4 All new staff to receive training and a certificate of awareness from the manufacturer.

2.1.5 Prior to season an annual review of procedures and practices should take place for all involved staff.

2.1.6 All contractors and operators will undertake appropriate periodic training. (This will include appropriate refresher driver training).

2.1.7 Users must receive training in first aid and emergency procedures from a recognised training organisation to optimise their effectiveness in the event of an emergency.

2.2 Understanding the Approval of Sulphuric Acid

2.2.1 The notice of approval for sulphuric acid (page 14) contains legally binding conditions, including the need for advanced notification of local residents prior to application.

2.2.2 Undertakings in this Code of Best Practice may exceed the minimum legal requirements. The aim is to further minimise any risk to operators, members of the public and the wider environment.

2.3 Planning and Preparation

2.3.1 Prior to the start of the season, sprayers should undergo an appropriate sprayer test to ensure that machinery is operating effectively and safely.

2.3.2 A generic risk assessment must be undertaken by the contractor, prior to application, to assess whether any further conditions need to be put in place over and above the legal requirements.

2.3.3 The contractor should also confirm that the grower has carried out a risk assessment to confirm that acid is the most suitable product to apply.

2.3.4 Copies of the certificate of approval and Tremcard should be carried at all times, in all vehicles, carrying sulphuric acid.

3. Preventing and Controlling Operator Exposure

Everyone has a responsibility for Health and Safety. Regulations are designed to minimise risks to operators and others entering work areas.

3.1 Application must be, at minimum, in accordance with the requirements of the notice of approval and must not exceed the required dose rates (see Appendix).

3.2 Personal protective equipment (PPE), including respiratory protective equipment (RPE) should be worn and all protective clothing must be properly cleaned before putting into storage.

3.3 Butyl gloves should be worn when handling acid.

3.4 Care should be taken to ensure that operators are not exposed to inhalable droplets of acid, in the form of either aerosol or mist.

4. Emergency Procedures

4.1 A suitable contingency plan must be in place to deal with all emergencies, including spillage, loss of containment, failure of equipment and accidental handling of acid by operators. This should take into account the presence of 1 or 2 people when transfer of acid is taking place (see 1.2.5/1.2.6)

4.2 This contingency plan must include measures to protect the operator, public, wildlife and environment.

4.3 This contingency plan must be brought to the attention of all staff involved with the handling, storage, transfer and application of sulphuric acid.

4.4 All staff will undergo first aid training in case of acid contamination.

4.5 In case of contamination a first aid kit and supplies of water must be available. A minimum of 2 eyewash bottles and 100 litres of clean water should be carried at all times on vehicles carrying sulphuric acid.

4.6 All staff must be aware of first aid requirements, including who is responsible for first aid and where the appropriate eye wash etc are stored.

5. Protecting the Public and the Environment

Approval for the use of sulphuric acid has specific restrictions to ensure the protection of the public and the environment. This Code of Best Practice improves still further the levels of protection by consolidating existing legal requirements (page 12) and introducing additional criteria. The public and environment must have adequate protection and it is good practice to make every effort to ensure that all persons, domestic animals and wildlife are clear of the field before application begins. Contact the Environment Agencies for further information.

5.1 Notification

5.1.1 Notification to adjacent property must take place in line with notice of approval for use (page 14).

In addition:

5.1.2 Signatories will undertake to: phase in signs and written notices, with uniform wording; give a minimum of 24 hours notice; declare a window of no more than 3 days in which the application can take place.

5.1.3 Re-notification will take place if application is to be carried out outside this window.

5.1.4 Notices are to be kept in place for 96 hours following treatment. Notices to be removed promptly after the restriction zone has passed.

5.2 Application

5.2.1 Signatories to this Code of Best Practice voluntarily agree to reduce the maximum quantity of acid to be used on potatoes per hectare from 800 litres to 700 litres/ha per crop, with the maximum individual dose for use on canning potatoes reduced from 800 litres/ha to 400 litres/ha.

5.2.2 Application conditions – Operators must strictly adhere to the guidelines as defined in the Green Code (page 12).

5.2.3 Measures to minimise drift will be deployed e.g. low drift nozzles.

5.2.4 To ensure the accurate recording of field boundaries and footpaths, all spray operators will be required to be in possession of a suitable map, which clearly shows the position of all watercourses, current footpaths, and property boundaries (e.g. Ordnance Survey, 1:20000 scale, Pathfinder series, or equivalent). The grower should provide this where only a proportion of the field/crop is to be sprayed; the area to be treated must be clearly identified before spraying commences.

5.2.5 Care should be taken to ensure that sulphuric acid does not drip from spray booms whilst travelling on public highways. This can be achieved by replacing nozzles with blanks or by purging booms with clean water where appropriate.

5.2.6 The outside of sprayers will be washed down after application and before travelling on public highways, where practical.

5.3 Buffer Zones

5.3.1 Treatment areas must not extend within 1 metre of a public footpath. There are no restrictions regarding application to the edge of the field. However, a buffer area should be allowed and this Code of Best Practice encourages up to a 6 metre untreated zone on public rights of way and around buildings.

5.3.2 Where watercourses exist, sulphuric acid will be treated in the same way as a Category B product under the LERAP scheme.

5.3.3 Growers will be discouraged from planting potatoes on areas that are likely to result in justifiable public objections to the use of sulphuric acid. For example, by leaving false headlands, planting alternative crops or establishing grass or non-crop strips adjacent to residential property, public rights of way and field margins. Where field size or footpath position prevents this from occurring then growers will be advised to grow a variety that should be suitable for an alternative haulm destruction technique.

Further Information and References

Legislation

- The Health and Safety at Work Act 1974
- Health and Safety (First-Aid) Regulations 1981
- Food and Environment Protection Act (FEPA) 1985
- The Control of Pesticides Regulations 1986 (as amended) (COPR)
- The Environmental Protection Act 1990 (c.43)
- The Control of Substances Hazardous to Health Regulations 1999
- Water Resources Act 1991
- Control of Pollution Act 1974 (as amended)

Codes of Practice

- Code of Practice for the Safe Use of Pesticides on Farms and Holdings (Green Code), DEFRA Publications 1998
- Code of Practice for Suppliers of Pesticides to Agriculture, Horticulture, and Forestry (Yellow Code), DEFRA Publications 1998
- Code of Good Agricultural Practice for the Protection of Water, DEFRA Publications 1998
- Prevention of Environmental Pollution from Agricultural Activity Code, Scottish Office of Environment, Agriculture, Fisheries Department, July 1997

Other Useful Publications

- Five Steps to Risk Assessment, HSE Books.
- Recommended Guidelines for the Bulk Storage of Concentrated Sulphuric Acid, Oleum and Liquid Sulphur Trioxide in Carbon Steel Stock-Tanks, National Sulphuric Acid Association Limited.
- Guidance for the Review and Inspection of Sulphuric Acid Storage Facilities, National Sulphuric Acid Association Limited.
- Crop Protection Association Handbook (including Code of Practice), Crop Protection Association.
- Local Environmental Risk Assessments for Pesticides (LERAP) – A Practical Guide, DEFRA Publications.

Useful Contacts

Crop Protection Association (CPA)
4 Lincoln Court
Lincoln Road
Peterborough PE1 2RP
Tel: 01733 349225

DEFRA Publications
Admail 6000
London SW1A 2XX
General Helpline Tel: 08459 556000

Environment Agencies 24 hour Emergency Helpline
Tel: 0800 80 70 60

Environment Agency General Enquiry Line	Tel: 0845 933 3111
Scottish Environment Protection Agency	Tel: 01786 457700
DARD Northern Ireland	Tel: 028 9052 4426

HSE Books
PO Box 1999
Sudbury, Suffolk
CO10 2WA
Tel: 01787 881165
HSE Infoline Tel. 08701 545500

National Association of Agricultural Contractors (NAAC)
Samuelson House,
Paxton Road, Orton Centre
Peterborough PE2 5LT
Tel: 01733 362920

National Sulphuric Acid Association Limited (NSAA)
19 Newgate Street
Chester CH1 1DE
Tel: 01244 322200

Pesticides Safety Directorate (PSD)
Mallard House, Kings Pool
3 Peasholme Green
York YO1 7PX
Tel: 01904 640500

Appendix : Notice of Approval for the Application of Sulphuric Acid to Crops

FOOD AND ENVIRONMENT PROTECTION ACT 1985 Ref No. SULPH/12/95

Control of Pesticides Regulations 1986 (SI 1986 No. 1510): Approval

In exercise of the powers conferred by regulation 5 of the Control of Pesticides Regulations 1986 (SI 1986 No. 1510) and of all other powers enabling them in that behalf, the Minister of Agriculture Fisheries and Food and the Secretary of State, hereby jointly give provisional approval for the use of the following commodity substance, subject to the stated conditions;

Commodity substance: being 77% clean SULPHURIC ACID subject to the conditions set out below.
Date of issue: 23 November 1995
Date of Expiry: 25 July 2003

Use: ONLY AS AN AGRICULTURAL DESSICANT

Crop	Max indiv dose/ha	Max no of treatments/crop	Times of application
Potato (canning)	800 litres	3 (see other restrictions)	1 May – 15 November
Potato (other)	340 litres	3 (see other restrictions)	1 May – 15 November
Bulbs + corms	280 litres	1 per year	1 May – 15 November
Peas	220 litres	1 per crop	1 May – 15 November

Operator Protection

1) A written COSHH assessment must be made before using Sulphuric Acid. Operators should observe the Occupational Exposure Standard set out in HSE guidance note EH40/90 of subsequent issues.
2) Engineering control of operator exposure must be used when reasonably practical in addition to the following personal protective equipment.
   Operators must wear suitable protective clothing as listed below.

a) When filling sprayer; spraying, carrying out adjustment to application equipment or cleaning equipment; re-entering the sprayed area within 24 hours	Face shield of acid resistant type; acid resistant coveralls either single or combination garment (or for persons operating bulk installations, acid proof); gauntlet gloves either natural rubber or PVC material, rubber boots and acid proof apron and suitable respiratory protective equipment
b) when re-entering the sprayed area within 24 – 96 hours	Acid resistant coveralls, gloves and boots

3) However, engineering controls may replace personal protective equipment if a COSHH assessment shows they provide an equal or higher standard of protection.

4) Operators must have liquid suitable for eye irrigation immediately available at all times throughout the operation.

Other specific restrictions

1) Must only be used by operators holding a relevant recognised certificate of competence in the use of equipment for the application of sulphuric acid.
2) Must not be applied using pedestrian controlled applicators or hand held equipment.
3) All equipment must be constructed of materials suitable for use with or exposure to sulphuric acid.
4) Application must be confined to the land intended to be treated.
5) Spray must not be deposited within one metre of public footpaths.
6) At least 24 hours written notice of intended operation and the possibility of hazard must be given to the occupants of any premises and to the owner, or his agent, of any livestock or crops within 25 metres of any boundary of the land intended to be treated.
7) Before the spraying takes place, readable notices must be posted on adjacent roads and paths warning passers by and drivers of vehicles of the time and place of the intended application and possibility of hazard. Notices to be kept in place for 96 hours following treatment.
8) Unprotected persons must be kept out of treated areas for at least 96 hours following treatment.
9) The maximum quantity to be applied to potatoes must not exceed 800 litres per crop.
10) Do not apply to crops in which bees are actively foraging. Do not apply when flowering weeds are present.
11) Only “sulphur burnt” sulphuric acid to be used.