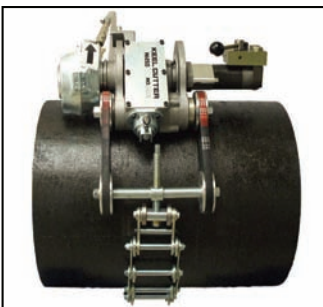


**STEVE
VICK**
INTERNATIONAL



PRODUCTS AND SERVICES USED IN
NUCLEAR DECOMMISSIONING
AND EMERGENCY REPAIR



INTRODUCTION

Steve Vick International has been carrying out projects in the nuclear decommissioning sector for the past 20 years. Our products and services involve permanently sealing off, decommissioning and diverting all types of pipework, ducts and voids in a wide variety of situations including underground and underwater. As a business founded in 1981 by the current Chairman, we have built a strong and positive reputation for innovation, reliability and customer satisfaction.

The company's primary market is the gas distribution sector and it is the products and techniques developed for this safety-critical industry which we have especially adapted for use in nuclear plants.

We have a team of highly experienced technicians who carry out projects around the country. Alternatively, some of our products are available in kit form for customers to perform their own sealing operations.

Our headquarters are in the Georgian City of Bath where we have our manufacturing, assembly and packaging facilities as well as sales and administration.

Frequently we are called upon to work closely with customers to devise solutions for specific problems. Development and testing are carried out at our HQ or in a facility outside the city. When required, we are able to call on excellent external resources such as those offered by The University of Bath and testing facilities including The National Nuclear Laboratory.



Cooling ponds—Oldbury Power Station



We have a team of highly experienced technicians who carry out projects around the country

SOLUTIONS

What we offer engineers working in nuclear decommissioning and emergency repair are solutions to the problems of abandoning disused pipework, sealing off ducts, sleeves, ventilation shafts and filling all types of voids.

The technique we offer will depend on the particular application and will be based upon our knowledge and experience. The systems we use allow sealing operations to be carried out from remote locations if required, underwater, underground or overhead.

All common pipe materials can be tackled including steel, asbestos, concrete and plastic. We are able to seal off vertical, horizontal and tapered pipes with diameters up to and even above 1000mm. Annular spaces between pipes and cables and their host pipe can be filled whilst larger voids, such as underground tanks, are usually filled with a specially formulated cement-based grout.

THE FOAMBAG™ SYSTEM

Our systems are principally based upon a polyurethane resin foam which is injected into a fabric bag which holds the foam in place as it expands.

This technique, called FOAMBAG™, was initially developed and patented by Steve Vick International in the 1980s as a safe, inexpensive yet efficient way of sealing off gas mains to be abandoned. It has become a gas industry standard technique.

The same method has been further developed to meet the needs of nuclear decommissioning and emergency repair engineers. FOAMBAGS™ are tailored to the requirements of each project and pipe diameter. The fabrics used are a combination of porous and semi-porous materials. Once the foam is mixed and injected into the bag it begins to expand and a small quantity of foam seeps through the porous section to form a bond with the inner pipe wall.

The polyurethane foam is formulated for the particular application and high performance resins are also sometimes injected. The technique is used to create a permanent plug; depending on the application, this can be prior to completely filling pipework, removing it, or repairing it. Other sealants are used in certain circumstances including a variety of grouts.

PIPE HANDLING & CUTTING EQUIPMENT

Steve Vick International also produces a range of ancillary equipment for manoeuvring and cutting pipe including pipe handlers, pipe coil trailers and machines capable of making circumferential cuts on pipes up to 1500mm diameter.

To summarise, our offer to the nuclear industry is that we provide solutions to problems—problems involving sealing and filling pipes and voids in contaminated areas. Each project is different and requires a particular set of products and expertise.

Please contact us if you would like to discuss how we could tackle your problems



A redundant manhole chamber filled with expanding resin foam. Chapelcross Power Station



Cross section of a cured FOAMBAG™ inside a steel pipe showing how the foam seeps through the bag to adhere to the pipe wall



Circumferential pipe cutter

REMOTE PIPE SEALING, DECOMMISSION

FOAMBAG™ & ITS DERIVATIVES

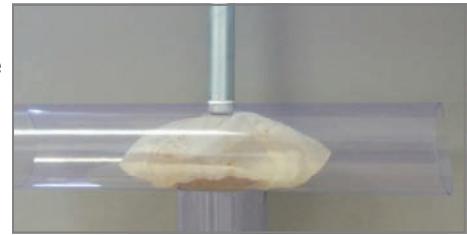
The Steve Vick International FOAMBAG™ system has been used in the gas distribution industry for over 30 years. In the last two decades it has been adapted for use in sealing off pipes, ducts and other voids in the nuclear sector.

The principle of the system involves a semi-porous fabric bag which is inserted into the void to be filled. It is possible to position the bag from a remote location up to 50 metres away with the use of CCTV cameras and can easily be pushed around bends.

Once positioned, the bag is injected with a specially formulated polyurethane foam which comprises a resin base and hardener. The two components are mixed just prior to application; the foam then expands to fill the bag and a small quantity of foam seeps through the bag to adhere to the inner pipe wall forming a permanent plug. Once the FOAMBAG™ has cured, the void may be further filled with foam or grout before being permanently abandoned. Being lightweight, polyurethane foam is an ideal material to fill pipes which then need to be removed.

HIGH INTEGRITY FOAMBAG™

In certain circumstances, for example where a pipe is filled with media, it may be necessary to use a High Integrity FOAMBAG™. The design of this product allows a second filling operation to be carried out with a high performance resin specified to suit the application. A strong chemical bond is formed between the bag and the pipe wall allowing it to withstand higher pressures, vibration and shock loadings. Where two or more High Integrity FOAMBAGS™ are installed, the pipe may be cut through the middle of the bag leaving both pipe ends sealed.

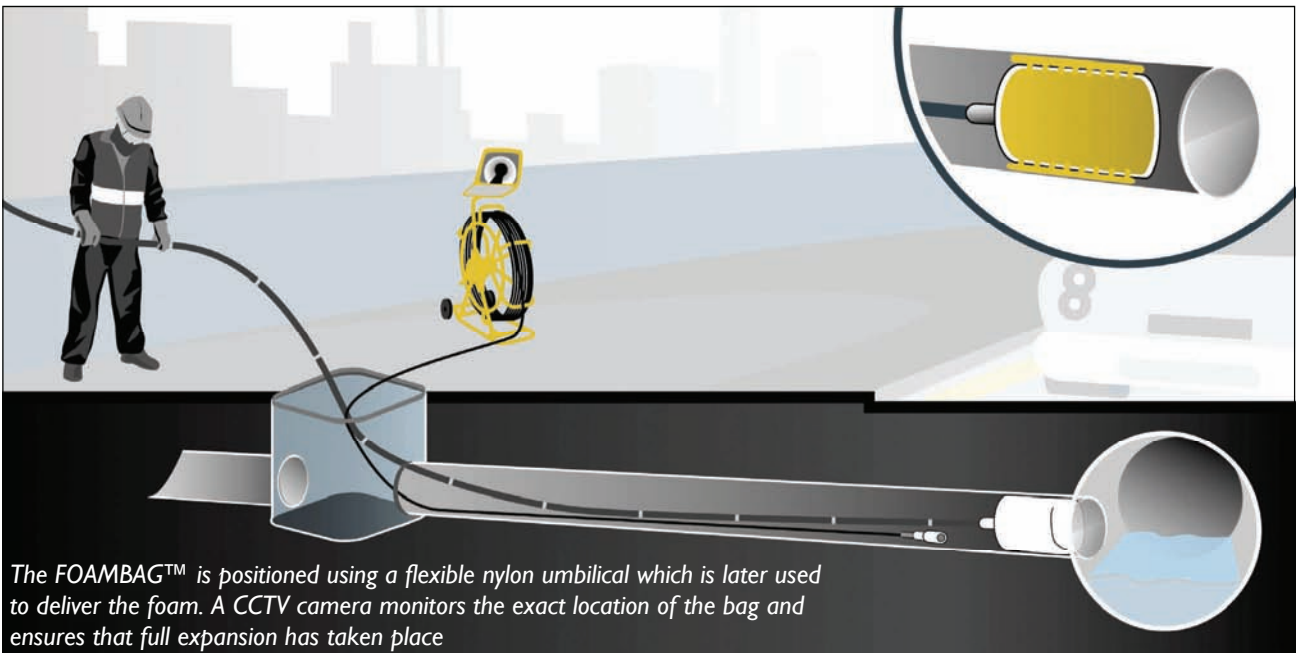


FOAMBAG™ before and after expansion of the polyurethane foam



A fully cured High Integrity FOAMBAG™ with central void injected with high performance resin

Below: Typical technique for remotely positioning a FOAMBAG™



The FOAMBAG™ is positioned using a flexible nylon umbilical which is later used to deliver the foam. A CCTV camera monitors the exact location of the bag and ensures that full expansion has taken place

NING AND DIVERSION

INTEGRAL FOAMBAG™ KITS

FOAMBAG™ kits are available to enable customers to carry out their own sealing operations as and when required. These kits can be formulated to suit the customer's requirements.

Our 'all-in-one' FOAMBAG™ kits are designed for ease of application on smaller pipes (up to 200mm diameter). The resin foam and hardener are contained within a two-part sealed sachet. The central strip is removed to allow the two components to be mixed just prior to placing inside the outer zipped fabric bag. The bag is then positioned in the pipe with the help of a CCTV camera.

As the foam begins to expand, a knife, contained within the bag, pierces the sachet allowing the foam to fill the inner then outer bag. The foam will usually form a seal within 30 minutes and achieve a full cure in 12 hours.



An 'all-in-one' FOAMBAG™ kit comprises an outer zipped bag, inner restraining bag, two-part sachet of foam and piercing knife

FOAMCAP™

For sealing off the ends of pipes and ducts (even when these have been inserted with a smaller pipe), we supply specially tailored fabric 'caps' which are filled with polyurethane foam.

CUTTING EQUIPMENT

Steve Vick International provides a circumferential pipe cutting service. Capable of automatically cutting steel, iron, concrete, plastic and other types of pipe up to 1500mm diameter, the machines are driven by hydraulic power allowing the blade to track automatically around the circumference of the pipe wall—underwater if necessary.

ANCILLARY EQUIPMENT

The company produces a wide range of pipe handling equipment including The Pipe Handler which attaches to an excavator arm to manoeuvre pipes on site from the safety of the cab. It may also be used for sliplining. We supply pipe coil trailers and pipe pushing machines as well as a range of under pressure drills.

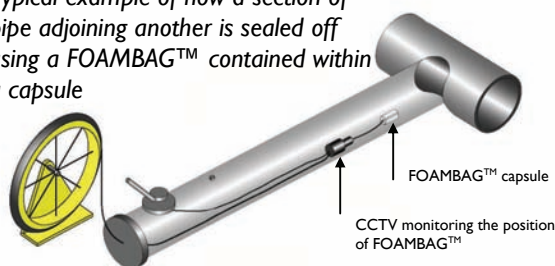
Please ask for our **Product Sheets** for further information.



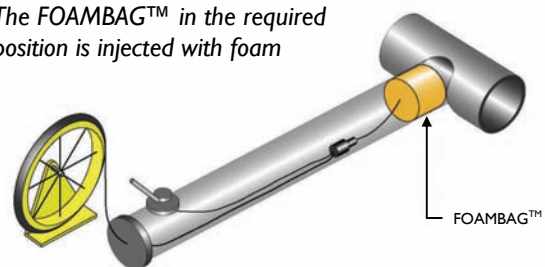
Automatic circumferential pipe cutting machine for pipe abandonment and/or diversion

REMOTE FOAMBAG™ INSTALLATION & BACKFILLING

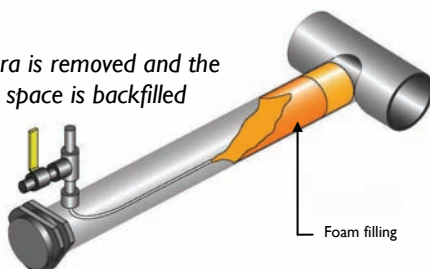
Typical example of how a section of pipe adjoining another is sealed off using a FOAMBAG™ contained within a capsule



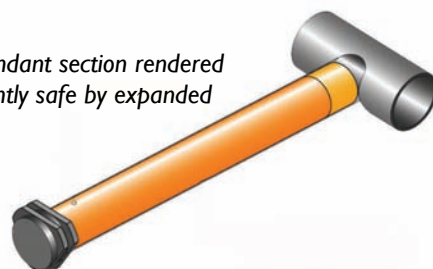
The FOAMBAG™ in the required position is injected with foam



The camera is removed and the remaining space is backfilled



The redundant section rendered permanently safe by expanded resin



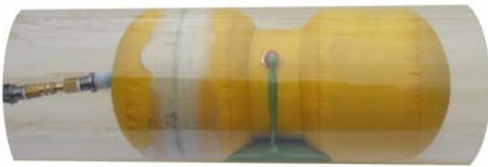
PROJECT REPORTS

SELLAFIELD NUCLEAR POWER STATION, EFFLUENT TANK REMEDIATION PROGRAMME

The project involved sealing off two redundant sludge and effluent lines connecting the Magnox storage pond to the effluent tank. Due to the potential risk of a hydraulic 'link' between the two, the isolation or sealing of these lines was critical in order to enable work to begin on sludge and effluent removal from the storage pond.

The lines were located seven metres under water within the effluent sludge sump and four metres under water within the effluent tank inlet chamber.

Working in conjunction with Corus Process Engineering, Steve Vick International developed the High Integrity FOAMBAG™ which, in trials, was shown to give the required confidence in the function of the seal.



Central void filling with high performance resin via internal injection nozzle

The bags were installed without the lines having first to be drained of liquor reducing operator dose uptake.

The Sellafield Project Manager involved said "The project was very successful and represents a major risk reduction exercise for the Sellafield site. In terms of safety, the new sealing technique provides the plant with a step change in risk reduction and negates any potential fault scenarios with the effluent and sludge tank systems.

"The approach taken on this project", he continued, "will realise an acceleration of the Effluent Tank Remediation Programme of about two years with corresponding cost savings."*

*Source: Process Engineering Online, published 10th March 2008

CHAPELCROSS NUCLEAR POWER STATION

Steve Vick International was commissioned to seal off 43 redundant manhole chambers each containing between two and six inlet and outlet pipes of varying sizes from 20mm to 300mm. The deepest manhole was 1.5 metres and the largest had a volume of 1.25 cubed metres.

The project was being carried out in order to secure a drainage system so that a sliplining operation could be carried out further downstream with no risk of flooding or contamination.



One of the 43 redundant chambers which were filled, remotely, using expanding polyurethane foam

Steve Vick engineers devised a solution based on several of the company's techniques, taking into account that at no point were the engineers permitted to enter the manhole chambers. All stages in the sealing operation therefore had to be carried out from a remote position.

The Steve Vick team inserted the fabric bags into the open ended inlet/outlet pipes using a flexible nylon umbilical which also doubled as the foam supply tube. Once all the pipes were sealed off and the foam had cured (30 minutes), the redundant manhole chambers were filled with the polyurethane foam to a level above the crown of the highest pipe in the manhole, thus stopping any egress or ingress of water into or out of the manhole chamber. The foam was injected in up to three stages depending on the chamber volume.

Manhole covers were silicon sealed into place by a Magnox North engineer once backfilling with foam was complete.

Martin Weeks, Head of Decommissioning Projects at Magnox North, Chapelcross said, "Steve Vick offered us a competitive,

engineered solution for our project and they delivered their service within the agreed timescales. We were impressed with the cooperation and flexibility that Steve Vick demonstrated under working arrangements."

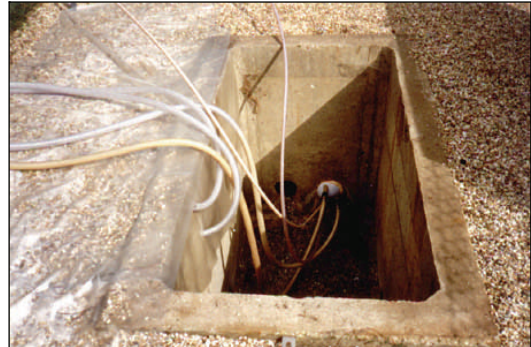
WINFRITH POWER STATION

Steve Vick International were engaged to safely seal off two 180mm underground pipes at Winfrith Nuclear Power Station. The pipes connected pits that were, respectively, 43 metres and 28 metres apart. As the pipes ran under a concrete road that would have been costly to dig up and reinstate, it was decided against removing the pipes, preferring instead to completely fill them to prevent any risk of contaminated media running through and escaping.

Foam was chosen as the ideal sealing material because of its lightness and, should the pipes need to be dug out at a future time, they could be easily crushed up and disposed of.

FOAMBAGS™ were installed at either end of the pipes creating a dam to prevent the possibility of contaminated material seeping out. Filler tubes were then inserted through the Foam Bags so that the cavity between could be filled with foam. The entire operation was carried out via access chambers at a safe distance from the pipes.

A spokesperson who watched the final trials, said, “We were satisfied that the foam sealing method devised by Steve Vick International would provide us with the long-term security we need on the site.”



UKAEA, HARWELL

This project required Steve Vick International to fill a sump and 3-4 metres of redundant 10mm diameter clay pipe that contained residual contamination from historic operations. Steve Vick technicians made several visits to the site and carried out specific workshop trials. Based on the information gained and on previous experience of similar projects for UKAEA, the project was completed using the FOAMBAG™ technique.

As there was no line of sight in the pipe to be sealed off, Steve Vick technicians deployed CCTV cameras to position four FOAMBAGS™ at strategic positions. The resin foam was then pumped into the bags, via tubes, from a mix-and-inject machine located at a safe distance.

Once the FOAMBAGS™ had cured, the remaining voids in the pipe and sump were filled with foam. Due to the lightness of the cured material, it was then easy for UKAEA operators to break up and remove the abandoned structures.

A spokesman for Harwell Projects Department, who witnessed the onsite filling operations, said, “The pipe and sump were both successfully removed following Steve Vick International’s work and the hole backfilled. We were very pleased with the job.”



TESTING

The Steve Vick International Foam products and systems have been rated as having up to a 50 year lifecycle in the gas distribution industry. The National Nuclear Laboratory has carried out tests on the cured foam used in Steve Vick International’s FOAMBAG™ and associated systems and have rated it as having a 8-10 year lifespan in an area with a background radiation level of 7–9Sv.



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