

Meeting the Environmental Challenge: Managing our Former Gasworks Sites

Seumas Munro, Steve Wallace, Phil Kirby
British Gas Properties, Basingstoke, UK

Paul Walker
British Gas Research and Technology Division, Loughborough, UK

This paper describes the practical approach British Gas is implementing to manage the negative aspects of its environmental heritage during a period of company reorganisation, changing legislation and increasing public awareness of environmental issues. This paper will discuss the different technical problems and solutions required to manage operational and surplus sites in a way which will minimise the potential risk to current and future site workers and the environment and encourage regeneration. Until recently the public concern about contaminated land evolved faster than the science required to evaluate and resolve the problems. However, British Gas has been at the forefront of the development of more robust methods of site investigation and remediation. Gasworks contaminants can be dealt with and new methods are being developed and tested to locate and treat them in an improved manner.

INTRODUCTION

British Gas is a major landowner of former gasworks sites in the UK. At nationalisation in 1949 British Gas inherited some 1050 gas undertakings. The company was privatised in 1986 with around 1000 former gasworks and associated sites representing some 7000 acres and a history of almost two centuries of gas production. The average site size is around 2.8 ha, yet some 60% of the total land area is represented by 85 sites. They are typically located in cities, towns and villages within reach of former bulk transport systems of road, rail and waterways. British Gas managed its property portfolio on predominantly a regional basis until 1993, but with co-ordination and policy being provided by the corporate centre. Following reorganisation of the structure of British Gas, the whole portfolio is now managed by the British Gas Properties (BGP) business unit. Part of BGP's role is to manage the investigation and remediation of its former gasworks sites both to deal with potential environmental liabilities and to bring sites forward for redevelopment or sale.

The nature of the gasworks' feedstocks, waste residues and their location has made them a focus of attention for many years. Unlike some other industries, much of the contaminants associated with these sites are colourful, odorous, well known and easily identified during groundworks. During the period 1967–1977 many gasworks were demolished to the accepted standards of the day. This included the identification and appropriate removal of asbestos prior to demolition. Harmful waste products were identified and a national inventory of these materials was compiled. Following discussions with local authorities, surface waste and other areas of gross contamination were disposed of in an approved manner. However, some by-products of the gas-making process are

likely to be present to some degree, mainly below the site surface, such as tar and ammoniacal liquors, and waste residues and materials used for the removal of the sulphur and cyanide impurities in gas.

Although nearly all gasworks sites contain physical and chemical contamination to some degree they are not often hazardous to site users, water resources, plants, animals, or neighbouring properties. The majority of contamination problems arise during activities on or adjacent to a site following intrusive groundworks associated with investigation, construction and maintenance activities or a change of end use. The company actively works with enforcing authorities to identify the appropriate remediation strategy. Soil remediation standards are site specific and vary according to the local soil and water conditions, the proposed (or actual) use of the site and the sensitivity of the local environment. The contaminants can be dealt with and the risk managed. New methods are being developed and tested to treat them in an improved and more economic manner.

Since the time when gasworks were built they have been surrounded by expanding commercial or residential communities. Following demolition they have been recycled as local distribution depots, rebuilt as customer services centres, sold for redevelopment or have otherwise, in full or in part, lain derelict. Consequently, throughout the process of remediation it is important to communicate actions effectively to the local community.

EVOLVING ENVIRONMENTAL MANAGEMENT

Following the introduction of the Environmental Protection Act (1990) and the Water Resources Act (1991) the British

Gas Company embarked on a screening programme to assess and prioritise its sites for their potential to cause cross boundary contamination (Walker *et al.* 1994). As part of this programme, some 360 sites received a preliminary intrusive ground investigation. When added to those sites which have been investigated for development purposes, this means that some 60% of our potentially contaminated land area has had an initial investigation.

Based on the results of the screening process, a programme of further investigation and remediation is underway. This is now managed nationally by an experienced team of project managers and contaminated land experts which have been consolidated in British Gas Properties and Research and Technology. This has led to the development of national performance standards and contract criteria for our consultants and contractors with an emphasis on quality.

Only by doing this can we achieve our objectives, which are:

- to realise optimum value from surplus sites by selling or through development; and
- to add value to the existing portfolio by reducing existing liabilities.

An ongoing research programme focused on the development of infrastructure to support and validate appropriate methods of risk assessment, site investigation, soil remediation and soil chemical analysis is in progress. The close links established between the research team and on site works has proved invaluable. It has allowed the development of:

- a cost-effective site screening process based on risk (Walker *et al.* 1994);
- quality criteria to assess site investigation and validate remediation;
- pilot and field scale trials of appropriate remediation technology; and
- an archive of site assessment data.

Particular emphasis has been put on developing and validating analytical methods for gasworks contaminants (Wallace 1995). The British Gas Company has developed an accreditation system to ensure all contracting laboratories pre-qualify and are regularly audited. The cost consequences of inaccurate data are considerable. This process is now being developed to gain confidence in field analytical methods, the assessment of leaching tests, and the feedstock and products of novel remediation processes.

Recent projects have highlighted the difficulty of accurately assessing remediation costs from site investigation data. Despite intensive site investigation, considerable varia-

tion in actual physical and chemical conditions have only emerged during the remediation contract. Contingency plans are required to manage the logistics of site operations and minimise contract difficulties. This is especially so for small sites.

The Department of the Environment has, for the last few years, had an active programme of research to produce a more comprehensive range of guidance covering many of the key issues relating to contaminated land. British Gas along with other organisations is contributing to the development of a more consistent national approach to contaminated land. These reports are now becoming available and provide regulators, developers and other interested parties with informed advice on how best to identify, investigate and, where necessary, remediate contaminated land.

TO MEET THE ENVIRONMENTAL CHALLENGE OF MULTIPLE SITES

Within BGP the emphasis has been placed on ensuring that its project managers have the necessary technical background, skills and experience to ensure that sites are investigated and remediated in an effective and consistent manner. This has enabled us to:

- further develop and maintain in-house expertise to manage consultants;
- develop teams and provide clear briefs and a minimum operating standard;
- appoint consultants who have sufficient skills, experience, commitment and resources;
- appoint pragmatic consultants – with experience in site investigation *and* remediation;
- consider terms and conditions of contract including warranties;
- develop an information base of actions, achievements and costs on individual sites;
- define end use of sites at an early stage;
- critically assess and test novel investigation and remediation proposals at the pilot scale; and
- specify quality components and audit regularly.

REFERENCES

- Walker, P.L., Munro, S., Hawkings, C.L. and Shephard, F.E. (1994) The application of risk assessment to contaminated land. The British Gas experience. *J. IWEM*, **8**, December, pp. 607–614.
- Wallace, S. (1995) The use of reference materials in contaminated land analysis. *VAM Bulletin*, Issue No. 12, Spring.