

Distr.
RESTRICTED

LC/R.1010 (Sem.61/17)
26 June 1991

ORIGINAL: ENGLISH

E C L A C

Economic Commission for Latin America and the Caribbean

Regional Seminar on Policies for the Management of Urban and Industrial Wastes, organized by the Economic Commission for Latin America and the Caribbean (ECLAC) under the Project on Guidelines and Consultancy Services on Controlled Environmentally Sound Waste Management, carried out with the support from the Government of the Federal Republic of Germany.

Santiago, Chile, 1-3 July 1991

FORMAL QUALITY ASSURANCE SYSTEMS AS A BASIS FOR
ENVIRONMENTALLY-SOUND MANAGEMENT PRACTICES
IN THE PUBLIC AND PRIVATE SECTORS

This document was prepared by Mr. Michael Betts, consultant to the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). The views expressed in this work are the sole responsibility of the author and do not necessarily coincide with those of the Organization. Document not subjected to editorial revision.

CONTENTS

	<u>Page</u>
1. INTRODUCTION	1
2. THE MEANINGS OF QUALITY, QUALITY ASSURANCE AND QUALITY MANAGEMENT	1
3. THE RELEVANCE OF QA TO ENVIRONMENTAL MANAGEMENT AND PROTECTION	2
4. NATIONAL AND INTERNATIONAL STANDARDS FOR QUALITY SYSTEMS .	3
5. PRINCIPLES AND OBJECTIVES OF QUALITY ASSURANCE	4
6. THE APPLICATION OF FORMAL QA SYSTEMS	5
7. POSSIBLE BENEFITS OF FORMAL QA SYSTEMS	7
8. RECENT DEVELOPMENTS IN FORMAL QA SYSTEMS FOR ENVIRONMENTAL MANAGEMENT AND PROTECTION.	8
APPENDIX 113
APPENDIX 221

FORMAL QUALITY ASSURANCE SYSTEMS AS A BASIS FOR ENVIRONMENTALLY-SOUND MANAGEMENT PRACTICES IN THE PUBLIC AND PRIVATE SECTORS.

- A Paper to support a Presentation by Michael Betts, GTZ Short-term Consultant.

1. Introduction

'Quality Assurance' (QA), and the rather more ambitious concept, 'Total Quality Management' (TQM), are terms which relate to a philosophy and approach for managing and operating virtually any business, productive activity or service.

QA and TQM systems are now being widely and increasingly applied within a diverse range of commercial, industrial and public sector organisations in developed countries, and have recently begun to play a key role in helping companies and local authorities to monitor, manage and improve their environmental performance. The concept of formal Quality Assurance was originally developed to assist manufacturing industry to improve the standards, quality and competitiveness of its products. However, in recent years, formal QA Systems have been increasingly used in activities and sectors other than manufacturing, for example, building maintenance, hospital services, transport services, water supply, sewage treatment, and wastes treatment and disposal.

2. The Meanings of Quality, Quality Assurance and Quality Management

So what is meant by 'Quality'? A formal definition is:

'The totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.'

Stated simply, quality is consistent conformance to the customers' expectations.

'Quality Assurance' may be defined as:

'All those planned and systematic actions necessary to provide maximum confidence that a product or service will satisfy given requirements for Quality (at minimum cost).'

Accordingly, 'Quality Management' is defined as:

'That aspect of the overall management function that determines and implements the Quality Policy'.

The above definitions are slightly modified versions of those developed by the International Standards Organisation (ISO).

Some less formal expressions of what Quality Assurance and Management is all about are:

"Common sense written down and acted upon."

"Getting it right first time, every time."

"Prevention is better than cure."

These expressions convey the concept of Quality Assurance as 'perceived good management' which, in any efficiently-managed organisation, would also include environmental management. It is not a strict set of rules or mechanical system - it is much more a management philosophy, involving a commitment to achieving Quality, and a change of culture, throughout the entire organisation.

3. The Relevance of QA to Environmental Management and Protection

The 'stated or implied needs' which a product or service must satisfy can be interpreted more widely to include environmental needs. Similarly, the term 'customer', besides the conventional meaning, can also be interpreted to refer to others who may have a direct interest in the quality of a product or service, and the processes used to produce it. For example, the 'customer' could also be taken to mean the regulatory agencies, including environmental agencies, who have a direct interest in a company's ability to satisfy their regulatory requirements, or a company's shareholders who are concerned to ensure that their investment is not put at greater risk by a failure to satisfy environmental or other regulatory requirements.

Likewise, the 'given requirements for Quality' may be interpreted to include environmental requirements such as those determined by environmental/safety standards and regulations, or even the environmental/safety policies and objectives which have been determined additionally by the senior management of a company or local authority.

The application of QA by companies and local authorities to satisfying environmental objectives and standards is a comparatively recent phenomenon, which has evolved for a variety of reasons including:

- o a rapid increase in the range and complexity of health, safety and environmental regulations and standards which must be addressed and complied with by management.
- o conversely, increasingly severe penalties for failures to comply with regulations and standards, and for meeting the costs of environmental damage caused.

- o pressure from customers who wish to be sure that the products or services they buy are produced and supplied in an environmentally-responsible manner.
- o in the case of companies, pressure from investors who need to be reassured that their company is complying with all relevant health, safety and environmental regulations and is giving proper attention to environmental concerns.
- o the need to satisfy environmental objectives and requirements in an efficient and cost-effective manner.

For these and many other reasons, companies and local authorities alike are increasingly having to integrate environmental considerations into their plans, policies, procedures and practices. There is also ample evidence to demonstrate that companies and authorities which take their environmental responsibilities seriously are often those which are the best-managed and most-successful.

It is also worth mentioning that, as a rule, regulatory agencies tend to look favourably upon those companies or local authorities which have established and are operating a formally-recognised QA system. Such organisations tend to be inspected and monitored less frequently, because the regulatory agency has the confidence that proper procedures are being operated by adequately-trained personnel, and that comprehensive records are being kept. This in turn helps to reduce the administrative burden and costs of the regulatory agency.

4. National and International Standards for Quality Systems

Formal QA Systems must comply in all respects with a recognised Standard.

There are several nationally and internationally-recognised Standards for Quality Systems, for example:

International Standards Organisation	-	ISO 9000
European Community	-	EN 29000
Germany	-	DIN 9000
United Kingdom	-	BS 5750

The above Standards are all identical in scope and content.

A company or other organisation wishing to obtain formal assessment and recognition of their QA System will need to seek certification from an accredited 'Certification Body'. A Certification Body is defined as; 'An impartial body, governmental or non-governmental, possessing the necessary competence and

reliability to operate a certification system, and in which the interests of all parties concerned with the functioning of the system are represented' (ISO Guide 2:1983).

The arrangements for certification vary from country to country. In the UK, for example, there are fourteen such Certification Bodies, all accredited and supervised by the National Accreditation Council for Certification Bodies (NACCB).

5. Principles and Objectives of Quality Assurance

QA is good management which contributes to the achievement of the quality of the product or service through analysis of each task to be performed, the identification of the skills required, the selection and appropriate training of personnel, the use of the correct equipment, the creation of a satisfactory environment in which the task can be performed, and a recognition of the responsibility of the individual who is to perform the task.

There are five principal elements to a Quality system:

- i) Documented Organisation and Responsibilities.
- ii) Written Procedures, available to those carrying out the activities.
- iii) Verification, that the Quality requirements have been achieved.
- iv) Records, of the achievement of the Quality and operation of the system.
- v) Audit (periodic monitoring), carried out both internally by the organisation and externally by an independent third party, to ensure that the system is being implemented and is effective.

In essence, a Quality System is a feedback loop (see figure).

In order to be sure that a product or service can be, and is, supplied or performed to the satisfaction of the customer (or regulator, investor, community, etc.), it is essential to ensure that:

- The required 'Quality' is properly defined.
- The required Quality is achieved.
- The attainment of the required Quality is verified.
- The required Quality is periodically reviewed.

For example, in the case of the operation of a waste disposal site, the minimum Quality requirements are usually defined by laws, regulations, the licensing

authority, etc.. It is the responsibility of the site operator to consider these 'Quality requirements' and to develop and implement operating procedures which ensure that the necessary standards are achieved consistently.

The objectives of a Quality system are therefore to:

- o Provide a product or service which meets or exceeds the specified Quality requirements.
- o Ensure the inclusion of good design, reliability, safety and environmental considerations in the product or service.
- o Develop improved standards of performance and operation ('best practices').
- o Ensure the most beneficial interaction between all the functions within the organisation.
- o Encourage open and regular dialogue between all members of the management and staff.
- o Reduce the multiplicity of assessments and inspections, both internally and externally by 'customers' and regulatory authorities.
- o Promote efficiency within the organisation.

Quality Assurance is founded on the development and application of documented systems, and the training and motivation of people (see figure).

6. The Application of Formal QA Systems

The Standard for Quality Systems comprises a number of separate parts:

Part 0, Section 0.1:	Guide to Selection and Use
Part 0, Section 0.2:	Guide to Quality Management and Quality Systems Elements
Part 1:	Specification for design/development, production, installation and servicing
Part 2:	Specification for production and installation
Part 3:	Specification for final inspection and test
Part 4:	Guide to the use of Parts 1, 2 and 3.

Part 1 is applicable to the design (and any changes to the initial design) and development of a plant or facility. Part 1 is also applicable to operational aspects if the operation of the plant or facility involves periodic re-assessments of the design e.g. periodic process modifications.

Part 2 of the Standard applies to activities which perform work upon materials but do not involve design aspects. Part 3 of the Standard is relevant to operations which do not perform processes upon materials.

There are various ways of approaching the documentation and implementation of QA systems to satisfy the Standard. A tried and tested approach is as follows:

- a) Survey current operations and document in outline.
- b) Formally define the scope of the operations and facilities for which certification should or could be sought.
- c) Plan the programme for development of documentation; training of staff and operatives, and the provision of resources; and decide the proposed dates for assessment by an accredited third party.
- d) Formally identify and define activities which are 'critical' to the business or operations, and to satisfying the requirements of the Standard.
- e) Develop the Quality Manual; obtain the formal commitment of senior management to QA, and management's endorsement of the QA Manual.
- f) Develop Procedures and Work Instructions for the control of 'critical activities' and the requirements of the Standard.
- g) Provide training for staff and operatives in order to achieve:
 - Quality awareness at all levels;
 - Skills in document preparation;
 - Skills in Quality auditing;
 - Record-keeping requirements.
- h) Implement procedures, work instructions, etc.
- i) Internal audit of Quality Systems.
- j) External audit of quality systems by an independent auditor.

- k) Seek assessment and certification under the Standard by an authorised Certification Body.

Several of the above elements would normally be undertaken concurrently.

By way of illustration, Appendix 1 provides an overview of the QA systems for development of waste handling facilities, from the initial feasibility stage through design, construction, operation and monitoring. Appendix 2 presents a typical Procedures Classification of a Quality System for a waste disposal site.

Developing and implementing QA systems, which satisfy the requirements of the Standard, demands considerable expenditure of time, money and (above all) effort. It also requires the full commitment of everybody in the organisation, especially the senior management.

7. Possible Benefits of Formal QA Systems

There are many benefits which can potentially accrue through the application of formal QA systems. The nature and value of the benefits depend very much on the type and circumstances of the particular organisation or business. Above all, the process of developing and implementing formal QA systems forces management to review and critically assess the ways in which they manage and operate the business or facility including, for example:- the purchase and use of raw materials; operating processes and practices; the generation, handling and final disposal of wastes; the organisation's performance in complying with safety, environmental and other regulations and standards.

Possible benefits may include:

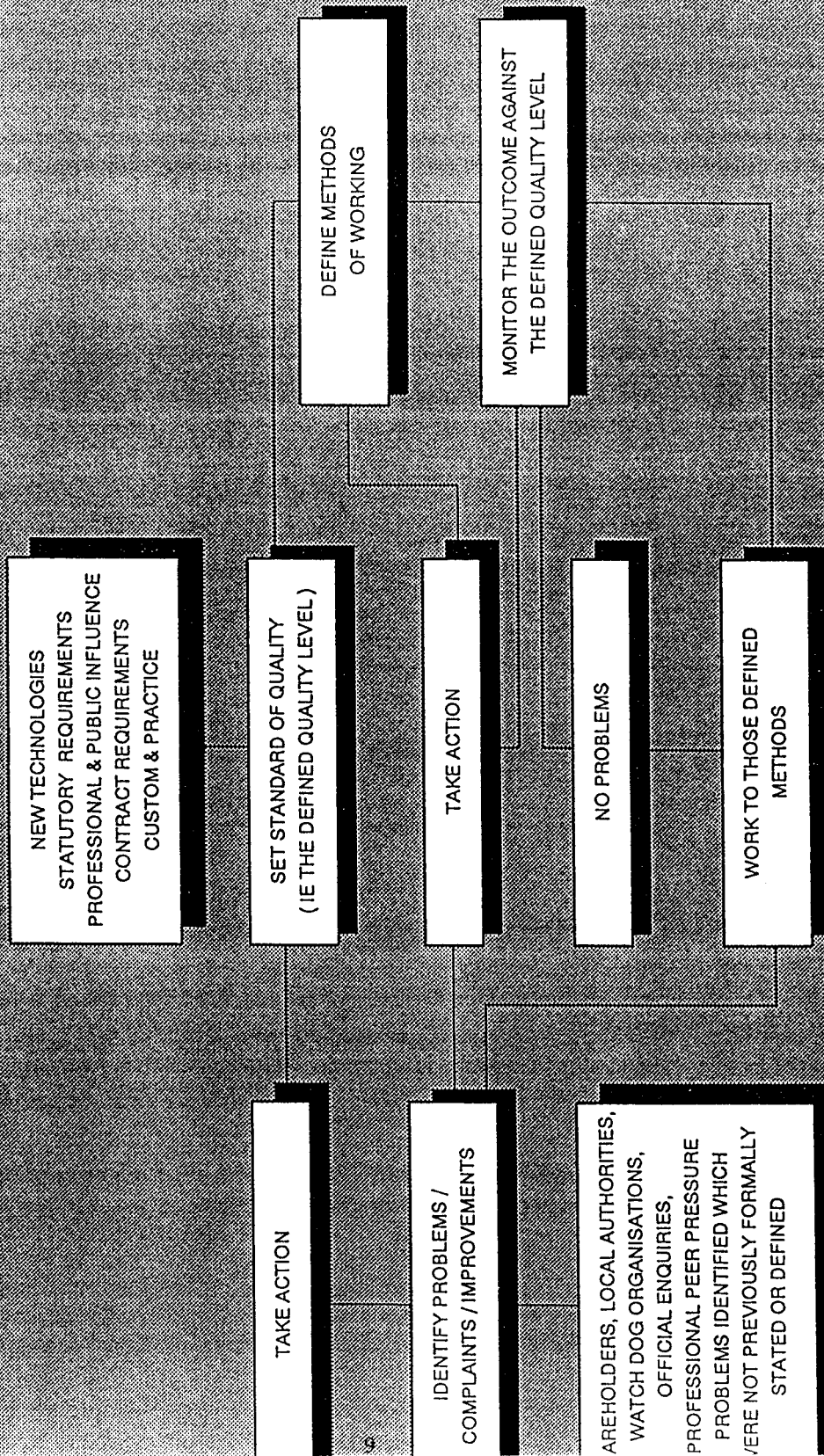
- o More clearly defined responsibilities
- o Clearer reporting routes
- o Greater awareness of safety/environmental considerations
- o Better performance and control of processes
- o Enhanced confidence in designs
- o Reduction in wasted effort, raw materials and other resources
- o Over the longer term, reduction in costs of achieving and maintaining the required standards of performance of plant and facilities
- o Better control and consistency of documentation
- o Documented evidence to prove performance and defend liability claims

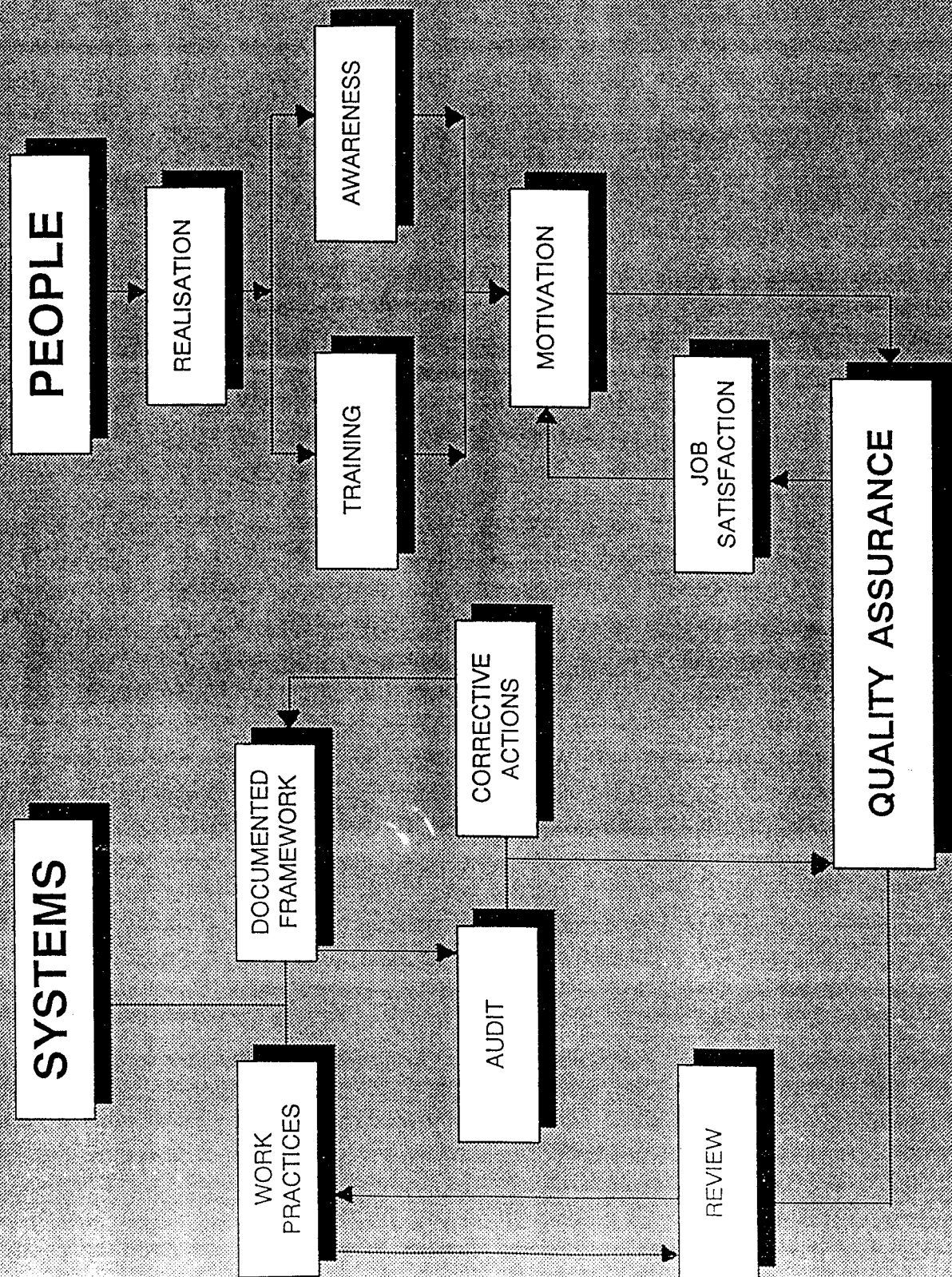
- o Greater investor confidence
- o Pride and "ownership" of the values, systems and performance achievements of the organisation amongst staff and employees
- o Greater acceptability and competitiveness of products or services in export markets
- o Improved confidence and image with both customers and the public.

8. Recent Developments in Formal QA Systems for Environmental Management and Protection

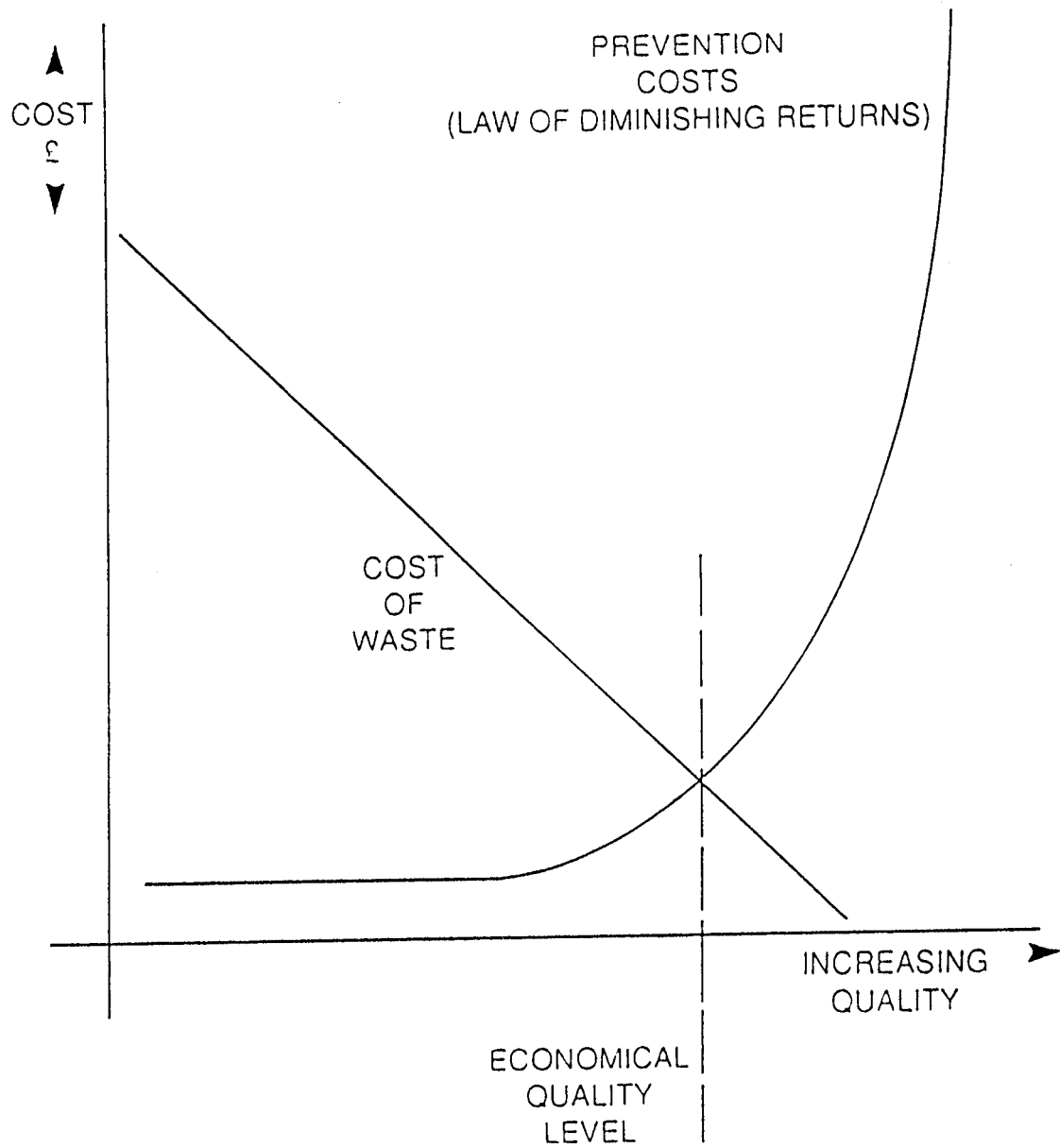
The British Standards Institution (BSI) has recently announced an initiative to develop a new Quality Standard specifically for environmental management systems. A first draft of the proposed Standard has just been published for comment. The draft standard will be further developed and refined in collaboration with the International Standards Organisation (ISO), the Comité Européen de Normalisation (CEN), and the national standards organisations of Austria, France, Germany and the Netherlands.

A QUALITY SYSTEM IS A FEEDBACK LOOP

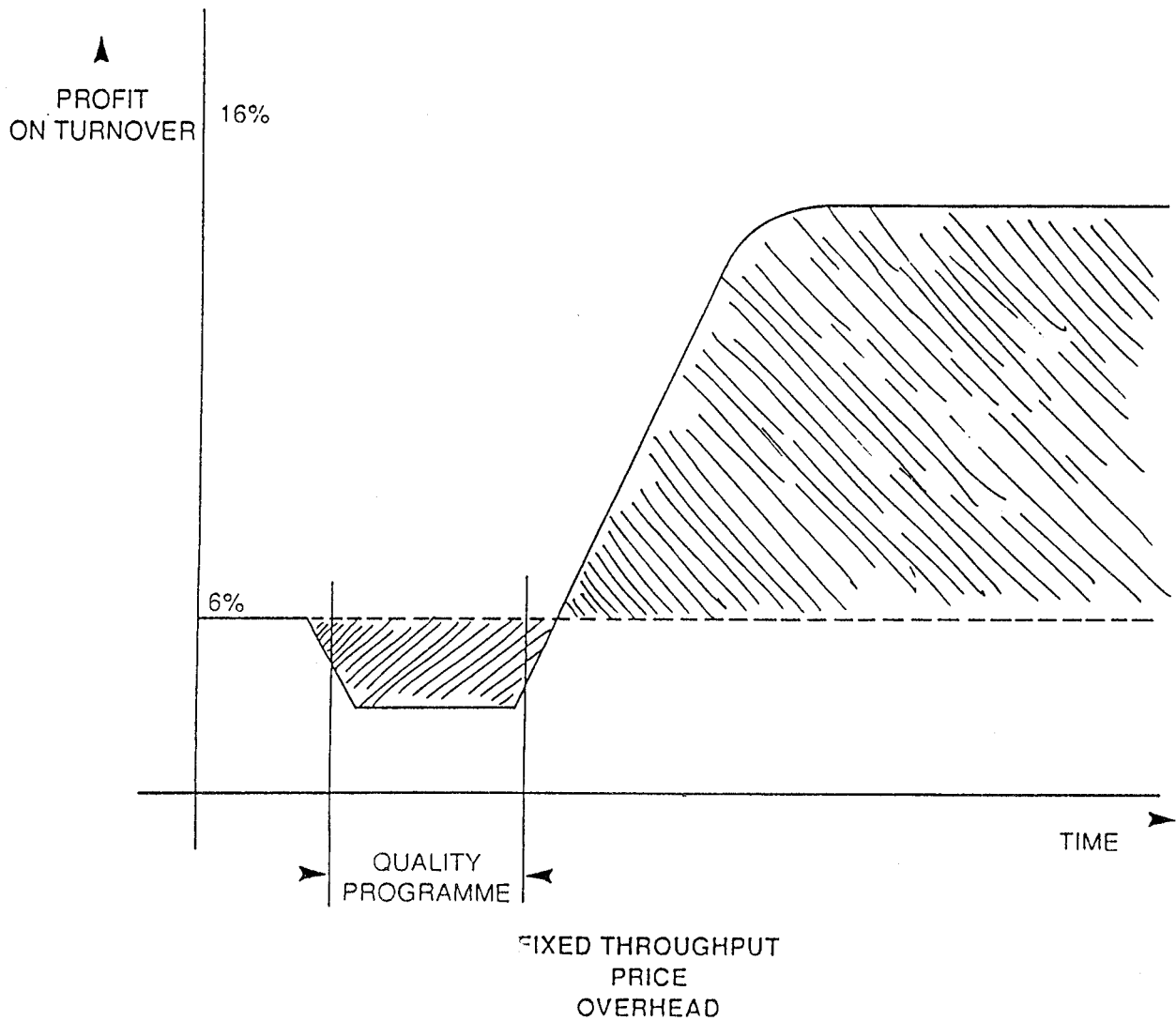




ECONOMIC QUALITY LEVEL



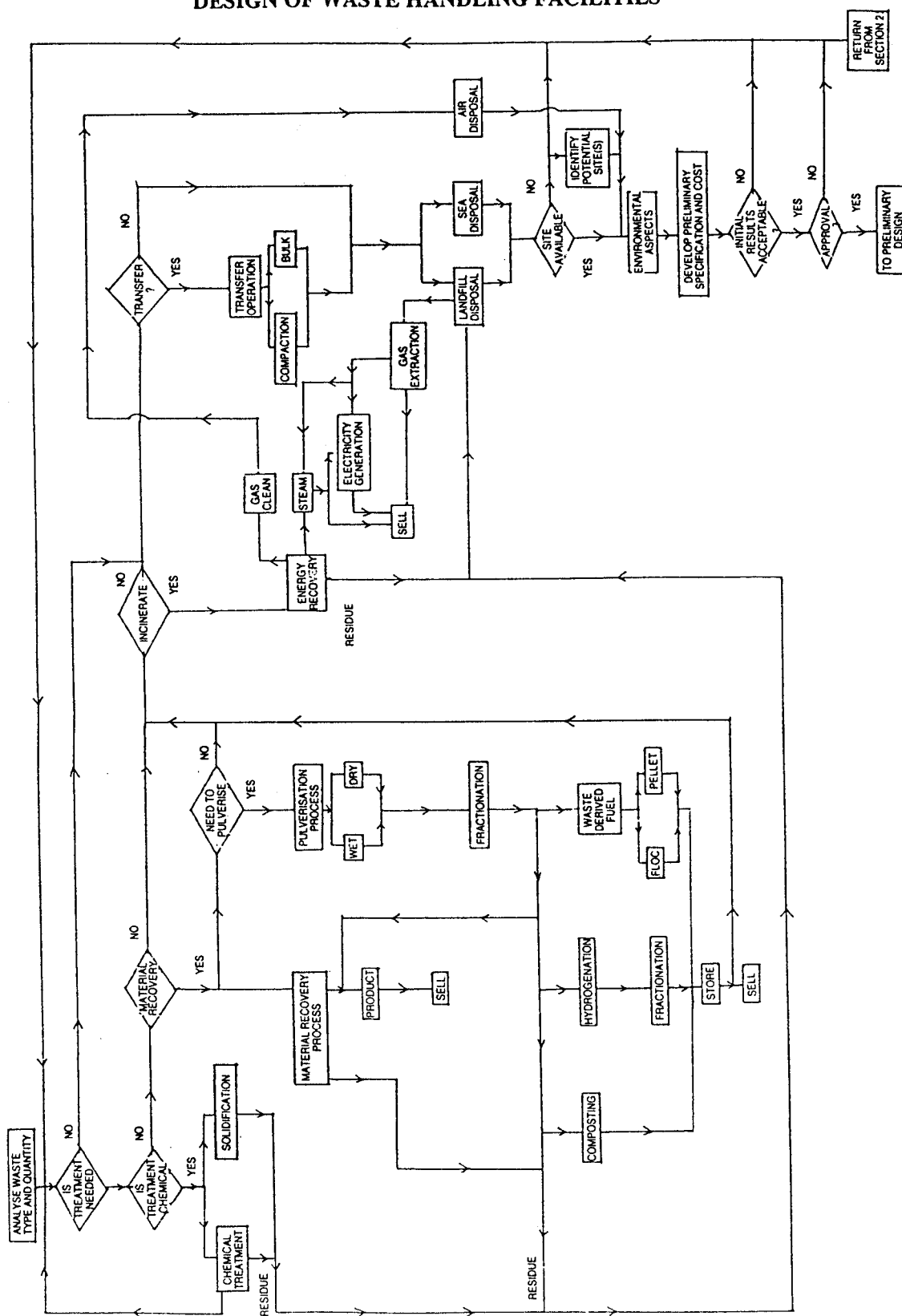
EXAMPLE OF A DOCUMENTED INCREASE IN PROFITS AS A RESULT OF
IMPLEMENTATION OF A QUALITY PROGRAMME



APPENDIX 1

DESIGN OF WASTE HANDLING FACILITIES

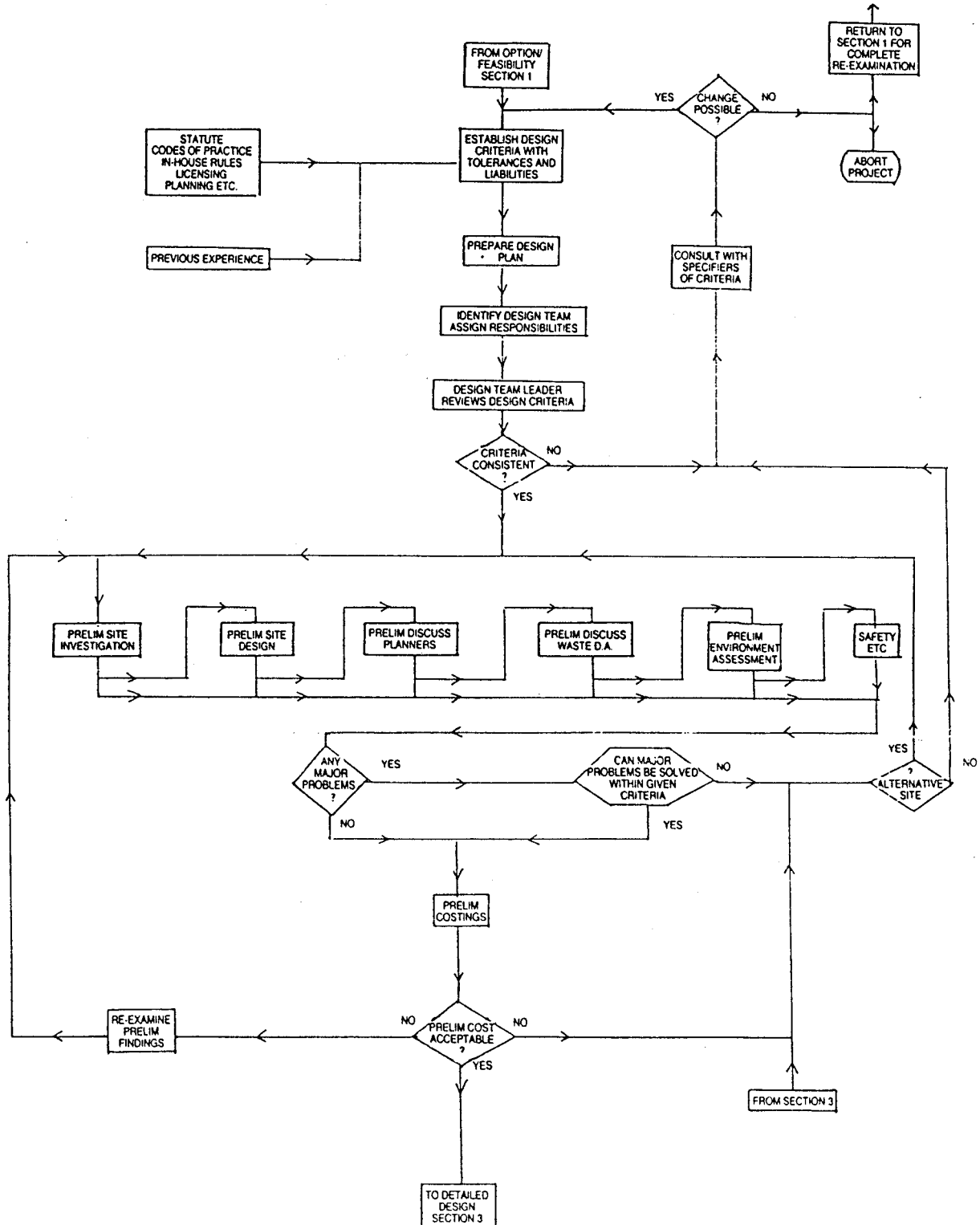
DESIGN 1 — PROCESS OPTION AND FEASIBILITY



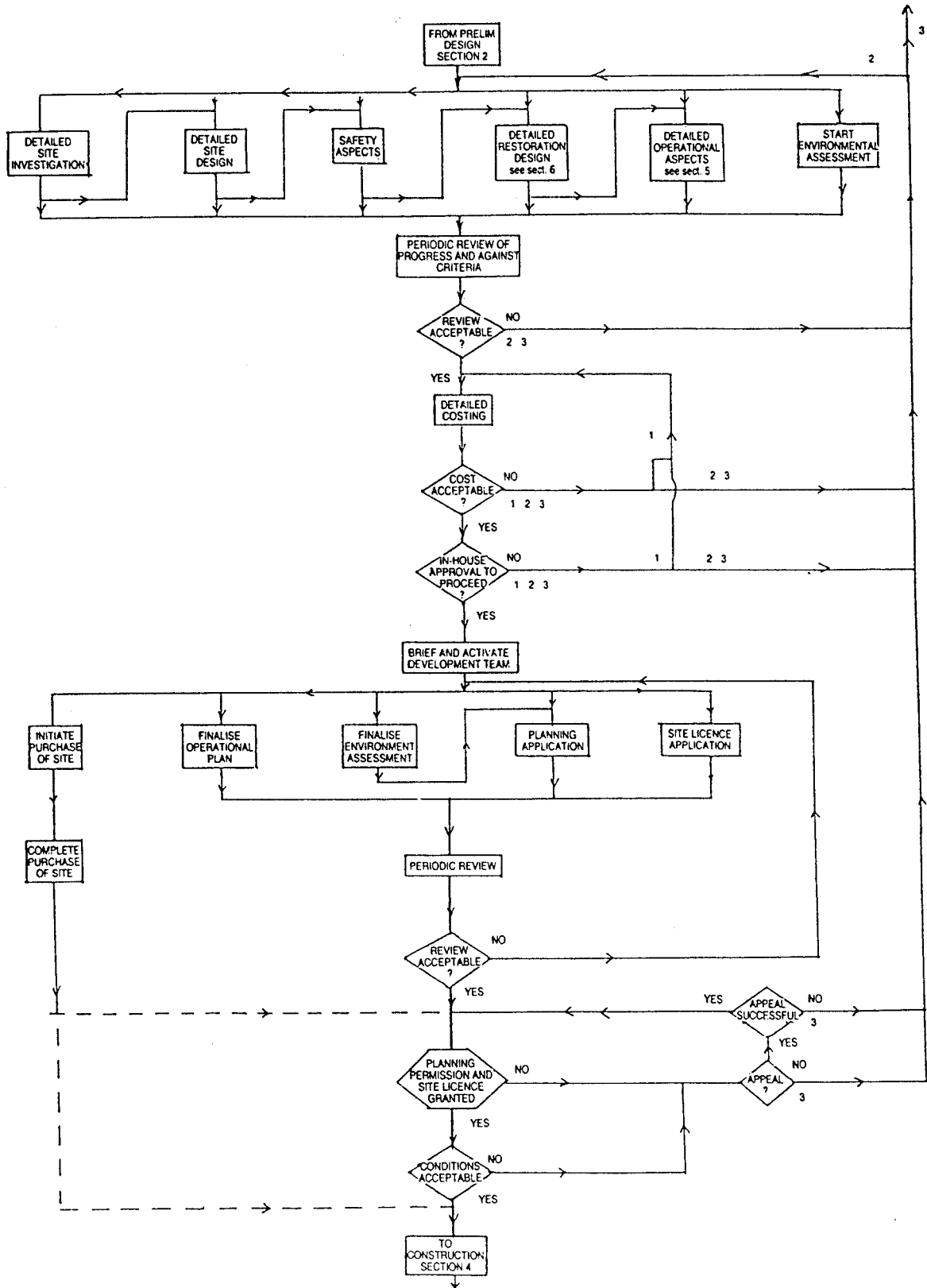
APPENDIX 1 (Continued)

DESIGN OF WASTE HANDLING FACILITIES

DESIGN 2 — PRELIMINARY DESIGN OF FACILITIES



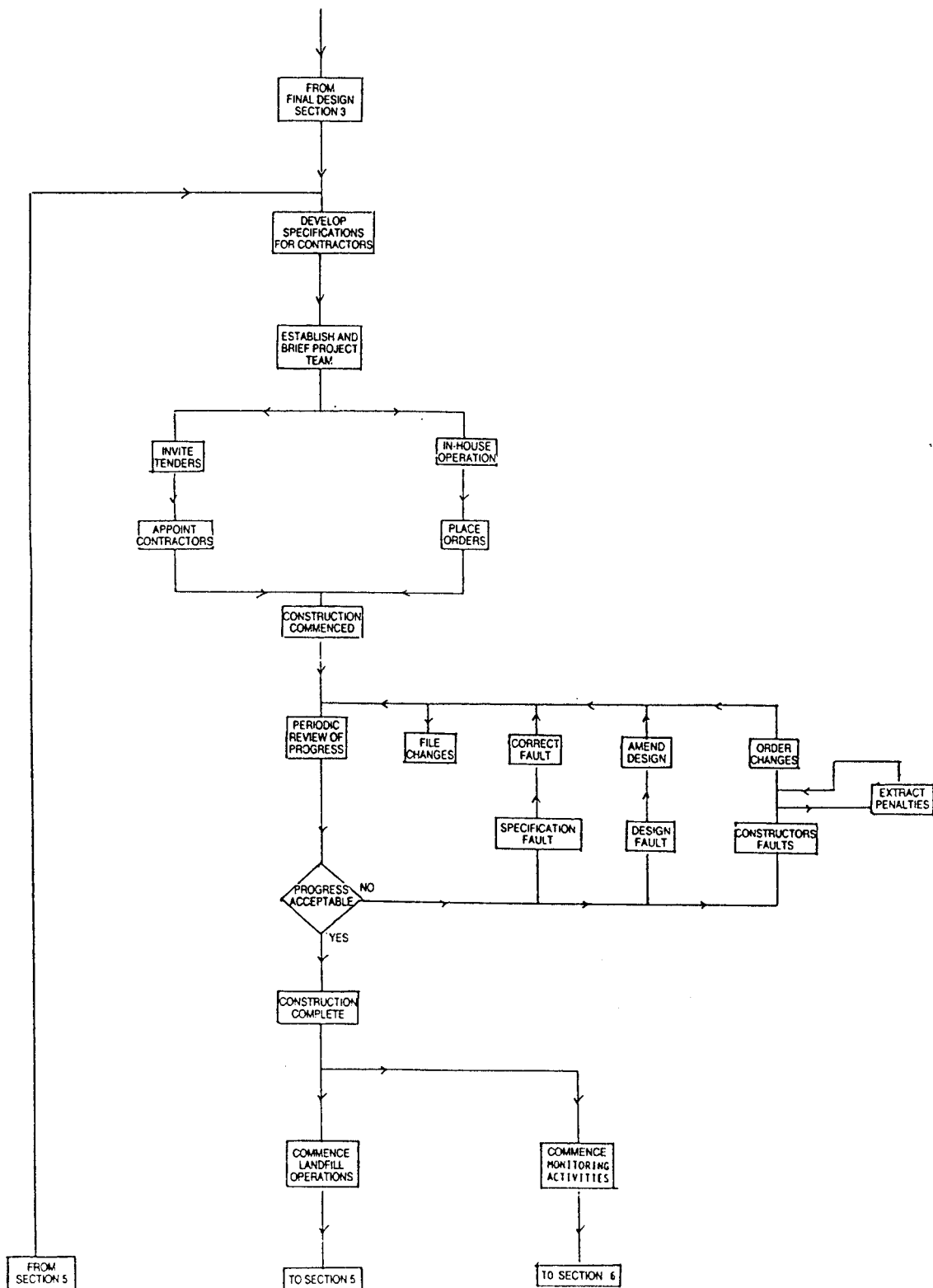
APPENDIX 1 (Continued)
DESIGN OF WASTE HANDLING FACILITIES
DESIGN 3 — FINAL DESIGN OF FACILITIES



APPENDIX 1 (Continued)

DESIGN OF WASTE HANDLING FACILITIES

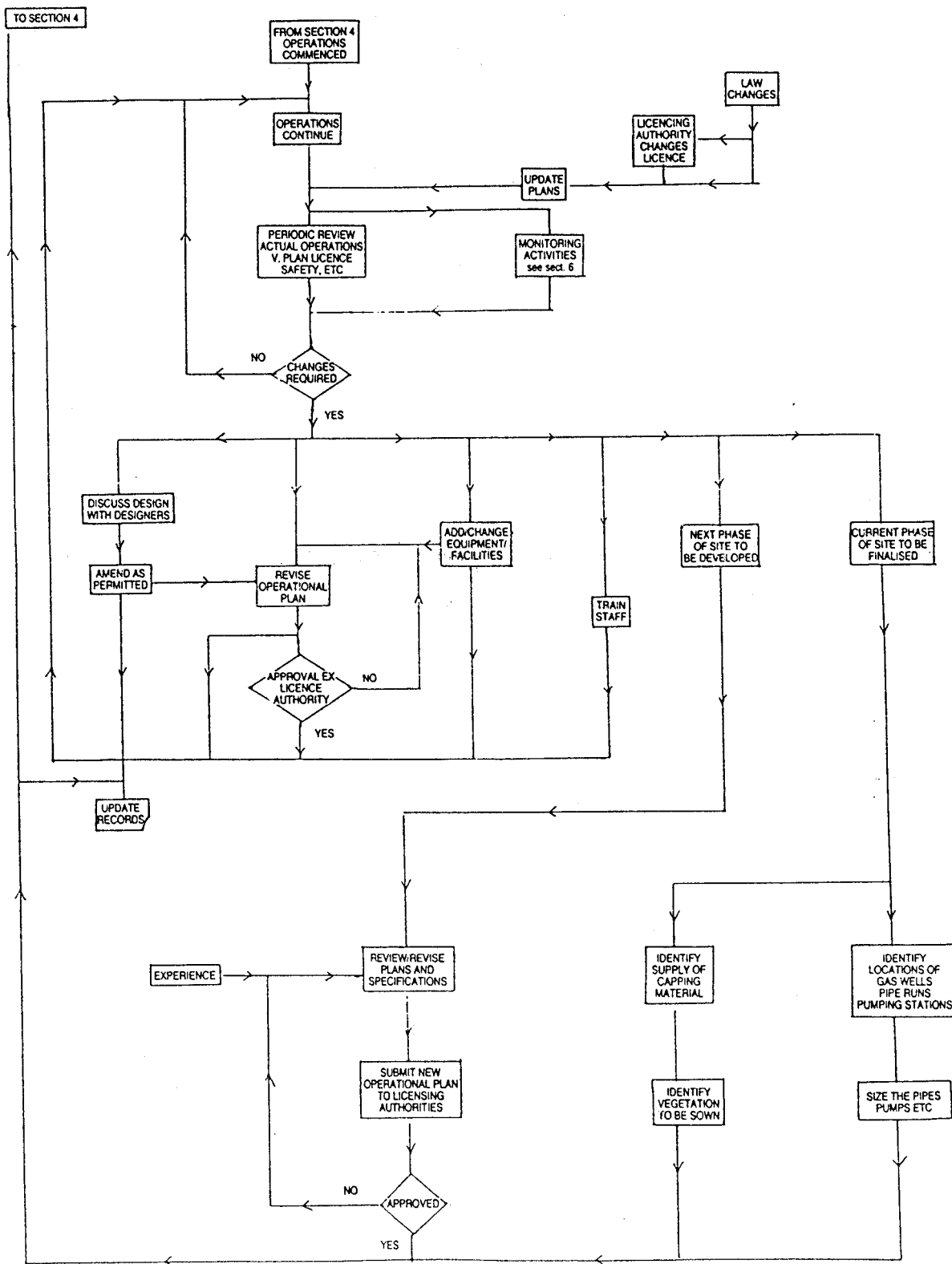
DESIGN 4 — CONSTRUCTION OF FACILITIES



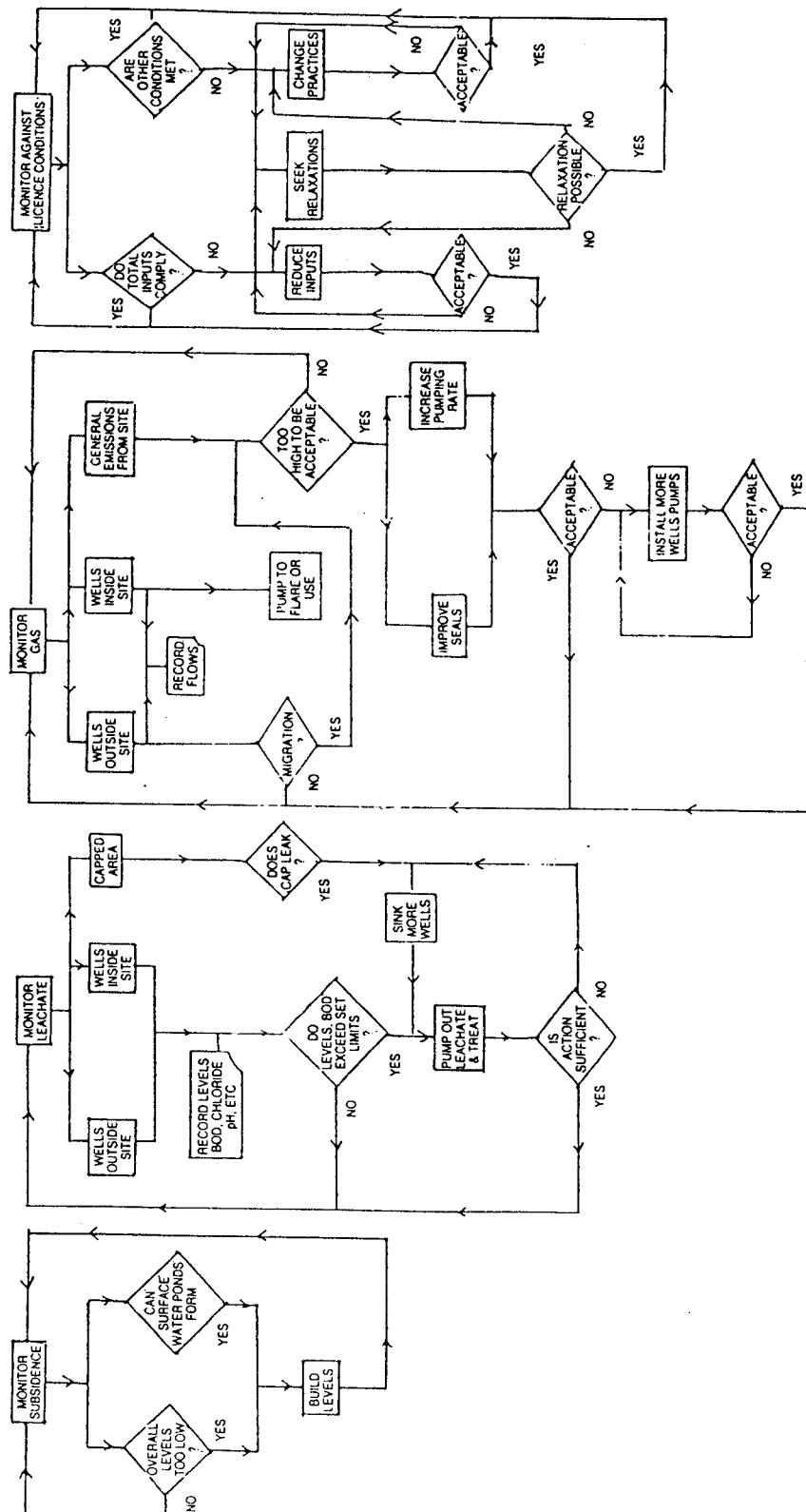
APPENDIX 1 (Continued)

DESIGN OF WASTE HANDLING FACILITIES

DESIGN 5 — OPERATIONAL CONSIDERATIONS



DESIGN OF WASTE HANDLING FACILITIES



DESIGN 6 — MONITORING (SOME EXAMPLES)

APPENDIX 2

APPENDIX 2

Typical Procedures of a Quality System covering Waste Disposal

(Generic Titles)

Operational Matters

- 1 Identification and Handling of Wastes
- 2 Movement of Vehicles and Plant on Landfill Sites
- 3 Deposit and Landfilling of Wastes
- 4 Leachate and Water Control
- 5 Gas Management and Utilisation
- 6 Restoration and Aftercare of Landfill Sites
- 7 Monitoring of Waste Handling Facilities
- 8 Operation and Maintenance of Vehicles, Plant and Equipment
- 9 Workshop Operations and Calibration
- 10 Health and Safety
- 11 Laboratory (Q.C.)

Administration

- 1 Recruitment and Training of Employees
- 2 Purchasing, Control of Stores, Assessment of Suppliers
- 3 Contract Review
- 4 Handling Customer Complaints

Quality Assurance

- 1 Definition and Review of Quality System
- 2 Quality Audits
- 3 Non-conforming Product and Corrective Action
- 4 Inspection and Test: Concessions
- 5 Control of Documentation and Records
- 6 Customer Supplied Product

Design (for Part 1 of the Standard)

- 1 Planning Permission Applications and Site Licence Applications
- 2 Design of Landfill Sites
- 3 Implementation of Designs

Collection and Transfer

- | | | |
|--|---|---|
| <ol style="list-style-type: none">1 Customer Servicing2 Reception of Waste3 Operations at Transfer Station4 Civic Amenity Facilities and Material Recovery5 Bulk Transfer of Waste | } | These are
included for
completeness |
|--|---|---|