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Management of procurement activities in a nuclear installation

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FOREWORD

Discussions held within the framework of IAEA regional technical co-operation projects implemented in the Latin America, Asia-Pacific and eastern Europe regions revealed an area of frequent difficulties related to the proper control, by the management of nuclear utilities, of the effective fulfilment of contractual quality and safety requirements. Evaluation of the results of a number of OSART missions has also pointed to a need for improving the control that some utilities exercise on their suppliers. The IAEA was thus prompted to initiate the development of a technical document providing guidance on these subjects.

In October 1995, a consultants meeting was convened to determine the target users of the technical document and to develop the scope, contents, structure and the reference material. A first draft was then prepared. An Advisory Group meeting consisting of experts from 17 Member States was held in Vienna in May 1996 to review and complete the draft.

The technical document is intended to provide practical guidance on controlling procurement, with supporting information for senior management, line managers and line supervisors in a nuclear installation. Although the guidance is structured to address the needs during the operating stage of a nuclear power plant, much of the material is also applicable to the construction and decommissioning stages and to other nuclear installations.

The guidance included in this technical document supports requirements set out in the revised NUSS Quality Assurance Code and Safety Guides, Safety Series No. 50-C/SG-Q (1996) and particularly in Safety Guide No. 50-SG-Q6, Quality Assurance in Procurement of Items and Services.

It is the intention of the IAEA to give wide distribution to this technical document and eventually to prepare a revision on the basis of comments received.

The IAEA received generous support from several Member States through the provision of experts and submission of material for this publication. The efforts and assistance provided by the participants in the consultants and Advisory Group meetings are appreciated. Special acknowledgement is due to the main drafter, R. Connett, of the United Kingdom. The IAEA officer responsible for this work was N. Pieroni of the Division of Nuclear Power and the Fuel Cycle.

EDITORIAL NOTE

In preparing this publication for press, staff of the IAEA have made up the pages from the original manuscript(s). The views expressed do not necessarily reflect those of the governments of the nominating Member States or of the nominating organizations.

Throughout the text names of Member States are retained as they were when the text was compiled.

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1. INTRODUCTION

1.1. BACKGROUND

Poor performance in controlling suppliers can result in re-work, cost over-runs, lost output, accidents or reductions in safety margins. It appears that the need to obtain quality and safety as an integral part of any item or service supplied to a nuclear installation is well recognized. However the means of achieving appropriate results by applying systematic control may not be as well understood or well deployed throughout organizations.

In this technical document both safety and quality are regarded as attributes of the supplied item or service, which result from systematically applying management systems that help to define expectations and communicate these to all persons involved in the work.

This technical document takes as a fundamental basis to the supply of any item or service that suppliers cannot be expected to anticipate and allow for unstated requirements or expectations.

It focuses on practices that are relevant to supporting plant operation and safety, and seeks to provide only brief guidance on financial or monetary controls or practices that are relevant to ensuring probity.

1.2. OBJECTIVES

The intent of this technical document is to provide fundamental concepts and methodologies to organize and manage procurement activities in support of a nuclear installation.

The guidance is intended for use by all levels of management in a nuclear installation, from senior management to line supervisors, but it is not limited to these groups, as its content is applicable to any person involved in procuring items or services.

This technical document provides guidance based on industry experience for defining, and achieving the desired levels of quality and safety in all items and services supplied to a nuclear installation.

It is intended that it will promote understanding between all people in the organizations involved in the process of procuring or supplying items or services, of the need for and means of ensuring quality and safety. These organizations include typically:

- The nuclear installation (or customer),
- The supplier,
- The purchasing agent (whether part of the nuclear utility or not).

It seeks to promote this mutual understanding by providing examples of practices that might help to solve known problem areas.

1.3. SCOPE

The contents of this technical document can apply to all types of procurement contracts, for all parts or systems of a nuclear installation. The types of contracts it covers include:

- Modification to existing items or services,
- Supply of new items or services,
- Supply of labour only,
- Turnkey contracts,
- Supply of replacements, spare parts and consumables.

The content is structured around a model of a NPP in operation, although most of the guidance it contains is applicable to the construction and decommissioning of NPPs, as well as other nuclear installations.

The content is applicable to both the management of specific projects, as well as the management of the whole procurement process running through an organization.

It is intended to complement or supplement applicable Member State laws or regulations, but it does not take precedence over them.

These laws or regulations should be addressed as appropriate by senior management in the organization at a level which is consistent with any approvals or licenses.

1.4. STRUCTURE

This technical document contains sections covering the various phases of the procurement process which are based on a nine step model of:

- Procurement planning,
- Specification of technical requirements,
- Specification of the management activities required of suppliers,
- Selection of prospective suppliers,
- Control of procurement documents,
- Assessment of tenders and award of contract,
- Performance of the work,
- Acceptance by the nuclear installation,
- Closure of the supply contract and performance assessment.

Each section describes key responsibilities based on a model of three levels of management, shown in Fig. 1, including:

Senior management:	responsible for setting policy and strategy, provision of resources/manpower, etc.
Line management:	responsible for organizing and deploying manpower and resources; defining management systems/procedures, etc.
Line supervisor (or person doing the work):	responsible for implementing systems/procedures; supervising work and ensuring compliance with requirements, etc.,

and contains guidance on practices and methodologies relevant to specific activities.

Annexes included at the end of this technical document contain examples of practices used by contributing utilities and other parts of the nuclear industry.

1.5. HOW TO USE THIS TECHNICAL DOCUMENT

This technical document should be read and compared with existing management policies and relevant procedures. The relevant policies and procedures should be modified or developed to respond to improvement opportunities identified during the review, and used to improve the conduct of procurement activities.

It may be most effective to allow managers and supervisors at all levels to review this technical document, and participate in identifying potential improvements to relevant policies and procedures together with implementing the necessary changes in practice.

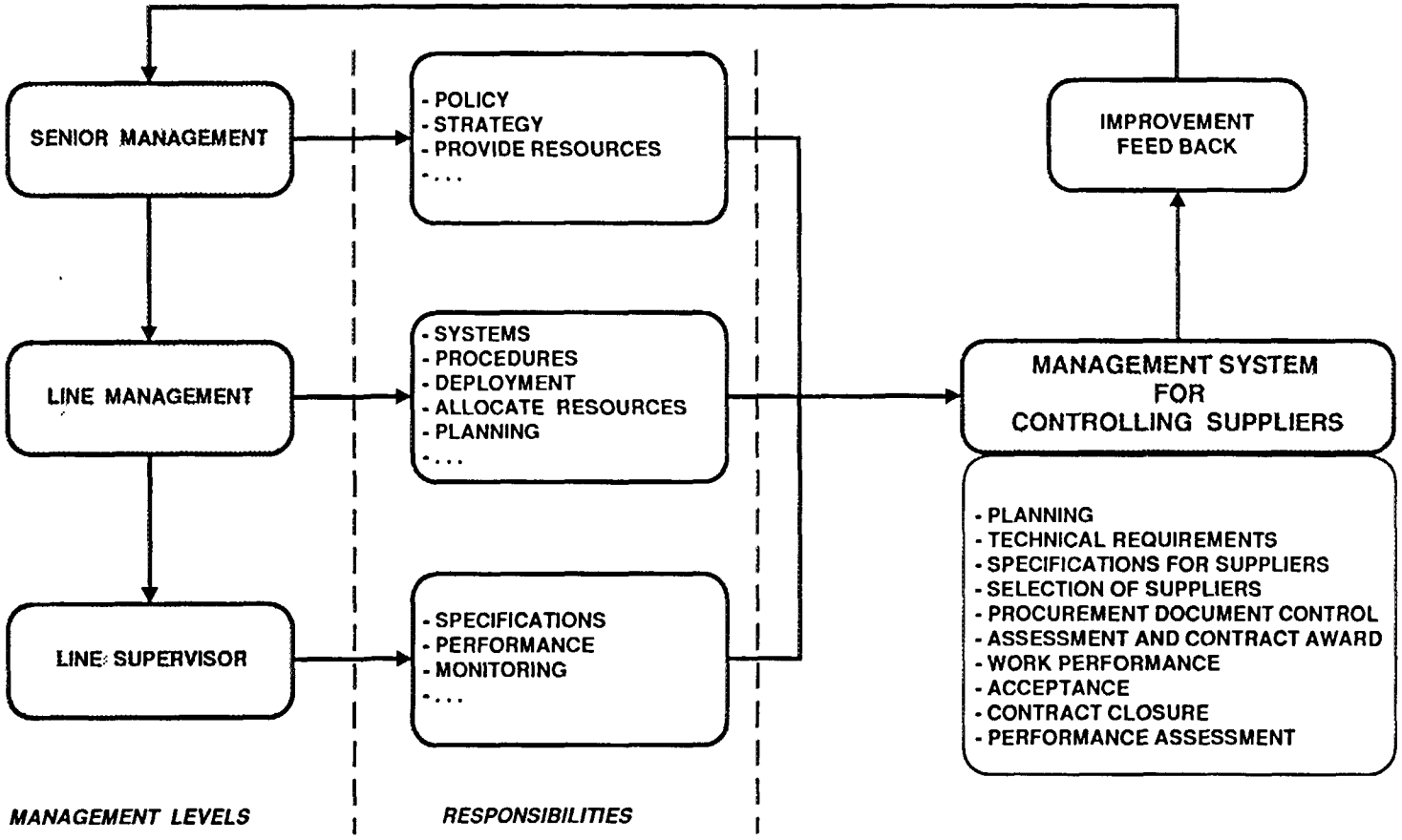

FIG. 1. Model for improvement of the management control of suppliers.

The technical document is intended for use as a set of guiding sections that can be consulted as necessary. It is structured so that any section can be used individually to help in reviewing the policies, procedures and practices associated with any part of the procurement process.

It is felt that most benefit will be derived by eventually considering all sections of the technical document.

The Annexes may be used as applicable to improve existing procedures where this could offer benefits.

2. PROCUREMENT PLANNING

2.1. GENERAL

Procurement is an activity that can involve many groups in the nuclear installation and many separate organizations outside it. It is important that activities are planned so that the activities of all the groups and individuals involved are adequately co-ordinated, and fully developed before work on any systems or structures starts.

Inadequate planning from the very beginning of any proposed procurement work can cause significant problems at later stages of the work. Typical problems may include:

(a) Late identification of true costs or small benefits leading to wasted effort.
(b) New plans or proposals being developed that conflict with established strategies or long term plans.
(c) Developing plans or proposals that ignore the needs of other parts of the customer organization.
(d) Finding that the proposed work clashes with the established plans of other groups.
(e) Late alteration of work because of late identification of a constraint known to other groups.
(f) Delays due to conflict with other work in the same area controlled by a different group.
(g) Late identification of material deficiencies or poor progress due to inadequate monitoring.
(h) Work stoppages because of the lack of key components or information in the absence of contingency plans.

Procurement planning should take place to address three distinct aspects of managing procurement:

(i) Priorities for allocating resources:

- Use of money and time in a way that is consistent with the overall strategy for the installation taking account of aspects such as remaining operational life; regulatory expectations, etc.,
- Planning of the work of procurement (project planning).

(ii) Advanced planning to take account of:

- The necessary completion date,
- Availability of key personnel,
- Manufacturing or suppliers capability and commitments, etc.

(iii) Integration with operating requirements and other concurrent work on the installation

- Harmonizing work with available outage periods,
- Co-ordination between working parties on different tasks,
- Access to facilities or resources controlled by the nuclear installation, e.g. radiological protection, decontamination, etc.

This section of the technical document supports requirements set out in the Safety Guides 50-SG-Q6, Quality Assurance in Procurement of Items and Services, 50-SG-Q10, Quality Assurance in Design, and 50-SG-Q7, Quality Assurance in Manufacturing, with respect to planning of procurement activities.

2.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies that will influence the way that all procurement activities are initiated, planned and co-ordinated to ensure that they are:

- Decided and priorities defined for procurement that meet the plans and strategies for the nuclear installation,
- Identified in adequate detail, together with acceptance standards and criteria,
- Adequately developed to take account of expectations from the customer group in the nuclear installation,
- Communicated to all people involved in an appropriate level of detail,
- Supported by adequate resources of all types,
- Monitored for acceptability,
- Reviewed for adequacy and any areas of improvement,
- Arranged to involve the regulatory authority in clearance or acceptance of the proposals and plans as necessary,
- Agreed with relevant groups in the nuclear installation, including finance and quality sections.

2.3. LINE MANAGEMENT

Line management should establish systems and define procedures to ensure that adequate planning, development, co-ordination, performance monitoring and review control and acceptance of all activities takes place.

They should ensure that the monitoring and review takes place frequently enough to permit any necessary corrective action to be implemented early enough to correct any shortfall in performance standards and to confirm that work is proceeding in accordance with relevant procedures required by the customer.

2.4. LINE SUPERVISORS

Line supervisors or those people performing or controlling procurement activities, including the actual work with suppliers, should ensure that appropriate actions are implemented regarding:

2.4.1. Use of suppliers

Any proposed use of suppliers should be adequately recorded and reviewed as early as possible to examine the total costs of the work against the likely benefits. The records can ensure that the original requirements or intent of the work are not lost at a later stage. Hence it can be ensured that any detailed proposals still meet the original requirements.

Benefits might include:

(a) Improved output or efficiency.
(b) Improved operability or ease of maintenance.
(c) Compliance with regulation, or legislation.
(d) Correction of safety deficiencies.
(e) Extension of plant item life.
(f) Reduction of environmental impact.

Costs might include:

(i) Direct costs of the supply contract.
(ii) Maintenance costs for additional surveillance.
(iii) Additional training costs for nuclear installation personnel.
(iv) Extended outages to allow time for all work.
(v) Updating of documentation, drawings and instructions.
(vi) Increased radiological doses.

The proposals should also be examined for consistency with long term plans or strategies already defined for the nuclear installation.

2.4.2. Outline plans

Outline plans for accepted proposals of procurement work should be developed as early as possible, drawing on the expertise of all functions in the nuclear installation.

This has the advantage of acquainting all functions with the proposal for entering into a supply contract at an early stage, and allowing them to contribute to development of the contract.

All functions in the nuclear installation should identify:

- Activities for inclusion in the plan,
- Resources to support it,
- Duration of activities,
- Other work scheduled to take place at the same time, or on the same item,
- Any known constraints,
- The need to obtain consents (e.g. planning or siting consent, fire authority approval),
- Interface and co-ordination issues between nuclear installation functions, and other parts of the company (e.g. headquarters staff),
- Acceptance criteria for all aspects of the work.

Specialist assistance may be needed during the preparation of plans.

2.4.3. Harmonization of outline plans

Following on from receiving the input of other functions in the nuclear installation, it is important that the outline plan is harmonized with other work or plans already existing. Line management should be consulted as necessary to resolve any known conflicts or clash of interests.

Similarly if the total of activity durations exceeds the original estimated time, this needs attention. The accuracy of the time estimates, and the validity of the original programme estimate should be reviewed and harmonization achieved if possible.

2.4.4. Detailed plans

Outline plan steps should be developed into detailed plans by people or groups with appropriate expertise to permit:

- Accurate time estimation, to ensure that adequate time is available for all activities,
- Identification of the effects on nuclear installation items and the likely duration (e.g. outage requirements on plant systems; the need to complete work during a shutdown),
- Identification of work packages, and the skills or expertise needed for their completion,
- Aid later decisions on the supply of suitable skills, and suitable suppliers,
- Identification of the technical features that need to be addressed in specifications,
- Definition of the way that work will need to be managed by suppliers, for inclusion in a specification of management activities, including necessary provision for quality assurance or control,
- The nuclear installation to identify critical or highly significant activities to monitor or witness.

2.4.5. Overall plan

Following their development, detailed plans should be consolidated into an overall (or project) plan. The consolidated plan should be reviewed by all interested functions on the nuclear installation, for example:

(a) Operation,
(b) Maintenance,
(c) Planning,
(d) Licensing,
(e) Radiological Protection,
(f) Nuclear Safety Section (including consultation with the regulatory body as necessary),
(g) Quality Assurance,
(h) Construction and Commissioning.

To ensure that typically it:

(i) Agrees with power production plans.

(ii) Allows for necessary plant configurations to meet safety justifications for all likely plant conditions during the work.

(iii) Is consistent with any overall plant strategy or long term plan.

(iv) Is acceptable within current safety justifications, or new ones can be developed within the necessary time scales.

(v) Meets relevant codes and regulations, including quality requirements.

(vi) Is acceptable within radiation dose budgeting.

(vii) Includes for adequate co-ordination between all groups involved in the work.

(viii) Identifies the means for permitting work to start (e.g. formal plant release certificate to be issued).

2.4.6. Performance monitoring

As development of the supply contract progresses, and then as the specified work proceeds, it is important that the progress and adequacy of the performance are monitored against plan dates and targets.

Any shortfall in progress (that is: failure to meet plan dates) or inadequacy of performance (that is: failure to meet specified standards or criteria) should be reviewed as early as possible to determine the cause. Appropriate remedial action should be identified, and implemented so that the work can meet future plan dates and targets.

2.4.7. Contingency plans

Contingency plans should be developed so that overall programme targets and dates can be met in the event of unavailability of key items, services or personnel.

If contingency plans cannot be developed for certain occurrences or circumstances, the consequent risk of failing to achieve the plan should be considered, along with any likely extra costs or penalties.

A judgement on the significance of the risk should be made, and for high risks extra controls should be established (if possible) to prevent the circumstances arising.

Alternatively arrangements and plans could be made to reduce the risk and limit the consequences.

2.4.8. Training

Consideration should be given to any necessary training, or special briefings to familiarize the personnel performing maintenance and operation functions with the proposals. As part of this they should also be requested to comment on the proposals.

2.4.9. Acceptance of outline plans

The final version of the outline plans should be accepted by the nuclear installation (usually the final customer) as meeting its needs. Records of this acceptance may be helpful in later parts of the procurement process.

3. SPECIFICATION OF TECHNICAL REQUIREMENTS

3.1. GENERAL

As part of the procurement process described by the Safety Guide 50-SG-Q6, a clear and unambiguous specification is required to define the requirements expected of the item or service. This is the main means of identifying what the customer organization wants and against which the supplier will prepare its proposals for supplying the item or service.

Any ambiguity in the specification will mean that the supplier may not fully understand what the customer expects to receive.

Typical problem areas encountered during preparation of technical specifications include:

- Duplication of efforts or omission of key aspects,
- Incorrect specification of features,
- Late production of completed specification,
- Rushed production of key aspects of the specification,
- Failure to identify the requirements of all people affected by the new item or service,
- Other parts of the customer organization not knowing of the work,
- Conflicting information from the specifying group regarding people affected by the work,
- Unnecessary checking or reviews introducing delays,
- Failure to identify foreseeable risks that may be caused by the work,
- Inadequate or ambiguous description of key features,
- Poor definition of records that are to be supplied for the item or service,
- Unresolved issues still existing during supply or installation phases.

This section of the technical document supports requirements set out in the Safety Guides: 50-SG-Q6, Quality Assurance in Procurement of Items and Services, preparation of procurement requirements, 50-SG-Q10, Quality Assurance in Design, management and performance.

3.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies to guide the way that the technical and quality requirements for any procurement are:

(a) Developed from customer requirements.
(b) Identified with detailed technical requirements, recorded and agreed with the customer.
(c) Allocated adequate resources for their development according to the safety significance of the work.
(d) Programmed to allow adequate time for their detailed development.
(e) Developed to a suitable level of detail by adequately qualified and experienced staff.
(f) Reviewed for technical and quality adequacy, compatibility with licenses, etc., and acceptability to the customer.
(g) Able to take advantage of new technology and exploit commercial advantage as appropriate.
(h) Incorporated into specifications for submission to prospective suppliers.

In setting policy the senior management should describe their commitment to key topics which may affect the approach to defining technical and quality requirements in the company. These topics might include:

(i) The maintenance of a design and engineering capability within the nuclear installation.

(ii) The adoption of proven designs or components, compatible with original plant design specifications.

(iii) The use of a system of grading plant structures, systems and components according to their safety significance and corresponding graded use of controls in the preparation of technical requirements in accordance with quality programmes.

(iv) The involvement of the regulatory body in key design decisions, clearance of safety justifications, etc. where necessary.

(v) Consultation with the end-user to ensure the proposed solution will meet their expectations.

3.3. LINE MANAGEMENT

Line management should define procedures and establish systems to ensure that adequately detailed specifications are produced for all procurement activities, which conform to the policies and follow the strategies defined by senior management.

The system should contain controls to ensure that:

(a) Production of specifications is properly planned as part of the overall task, and that adequate time is allowed for its:

- Preparation,
- Review,
- Amendment,
- Approval (by responsible organization or regulatory body as necessary).

(b) Responsibility for preparing the specification is clearly assigned to an individual (who may be supported by assistants or specialists).

(c) Specifications are prepared, reviewed and approved by suitably qualified and experienced persons.

(d) Specifications are adequately developed and detailed for their purpose, e.g. ranging from:

- outline requirements requiring substantial development by a supplier before use for manufacturing/supply, to
- fully detailed specifications requiring only manufacture/supply.

The extent of development will depend on the capability or expertise available in the organization.

(e) Responsibility for independent or peer review of the specification is assigned to a person independent of its production.

(f) Specifications are adequately reviewed by the people affected by the proposed work, for example:

- Operation,
- Nuclear safety and quality section,
- Maintenance staff,
- Engineering,
- Radiological protection,
- Construction and commissioning group,

and that the scope of the reviews are adequately defined to avoid overlap and to ensure that no necessary review aspects are omitted, e.g.:

(i) Interfaces between co-operating groups are defined.
(ii) Records are produced to satisfy any relevant codes, regulations or specific requirements.
(iii) Changes to operating rules, instructions, maintenance practices, training, etc. are identified and the details considered by an operations review committee.
(v) Any unresolved issues requiring further work, or site investigations are clearly identified.
(vi) Compatibility with original specifications for the plant is verified.
(vii) Adequate quality arrangements are included.

3.4. LINE SUPERVISORS

Line supervisors or those people defining the technical requirements for the work to be done by the supplier should ensure that appropriate actions are implemented regarding:

3.4.1. Responsibilities

Overall responsibility for producing the specification should be assigned to an individual, with assistance as necessary. The responsibilities assigned to all people producing specifications should be reviewed with the assigned people, to ensure that they understand them, and any necessary clarification should be sought from the responsible supervisor.

3.4.2. Persons producing specification

Persons involved in producing specifications should ensure that they are capable of undertaking the work (either with their own skills or by using the skills of assistants assigned to them) and should identify any deficiency to the responsible supervisor.

Possible deficiencies might include:

- Skills shortage/lack of specific expertise,
- Time constraints imposed by other work,
- Lack of available specialist assistance.

The responsible manager should seek to resolve the deficiency in co-operation with the person.

3.4.3. Programme for producing specification

The overall programme period for producing the specification should be defined and reviewed to ensure that it is compatible with the overall project programme. A contract strategy should be defined, to determine the extent of detail that is appropriate to the needs of the project. Factors affecting the extent of detail that can be produced might include:

(a) Expertise available within the organization.
(b) Knowledge of specialist process.
(c) Development of novel solutions or technologies.
(d) Availability of suitably qualified and experienced people, and their planned commitments.
(e) Available time for development.

Any:

- constraints,
- conflicts with other work,
- unavailability of key people or resources,
- programme problems,

should be identified and resolved. The programme should identify deliverables/specific items or documents that have to be available and at what time.

3.4.4. Planning for production of specification

Activity planning for production of the specification should ensure that the overall programme provides adequate time for all activities necessary before the required completion date, e.g.:

- Preparation of enquiry documents,
- Operational constraints,
- Hold points,
- Reviews,
- Approvals (including any necessary regulatory body approval),
- Selection of potential suppliers,
- Tender periods,
- Tender opening and review,
- Post-tender negotiations,
- Issue of instructions to start work,
- Procurement of necessary facilities, material or components,
- Work off-site,
- Work on-site,
- Testing,
- Commissioning,
- Preparation and approval of revisions to operating rules, instructions, maintenance practices, etc., and any necessary training,
- Handover,
- Withdrawal from site,
- Contract closure.

3.4.5. Independent review

The programme of independent or peer reviews should be identified and the reviewers informed of the programme. Confirmation should be sought that adequate time is available for all reviews.

3.4.5.1. Specification review

Before a specification is released it should be reviewed. Each specification should ideally receive the following reviews:

- Independent review (including review of quality arrangements),
- Supervisor review,
- On-site review,
- Off-site review (this review is intended to be organizationally independent of the site).

The independent, supervisor, and on-site reviews are in-line reviews and should be performed prior to release of specifications to potential suppliers.

The purpose of the in-line reviews is to identify and correct deficiencies in the specification before the specification is released to suppliers and production starts.

3.4.5.2. Responsibilities for each review

The focus of each review: independent, supervisor, on-site, and off-site, should be different.

3.4.5.3. Responsibilities for the independent review

The independent review verifies the completeness and adequacy of the specification. It is generally performed at the same level (in the utility organization) as the work of producing the specification.

The independent reviewer should be the person most qualified in the required engineering discipline, other than the preparer of the design change. The independent reviewer should be assigned by engineering management at the time the project engineer is assigned.

The independent review is an in-depth review of all aspects of the engineering package for the specification.

3.4.5.4. Responsibilities for the supervisor review

The supervisor review need not be an in-depth technical review of the details in the specification. The primary responsibilities of the supervisor review are to:

(a) Check that the package of engineering details is complete. This check ensures that proper communication takes place throughout the entire review process.

(b) Evaluate the complexity of the design and assign additional technical reviews, as required.

(c) Consider the experience and skills of the project engineer and the independent reviewer, and assess the need for any additional technical reviews.

(d) Confirm that the specification and its requirements meet the objectives set for it and is not unnecessarily complex.

(e) Confirm that the approach used by the independent reviewer is adequate to verify the design.

(f) Confirm that a test plan exists and that it is based on design objectives and criteria.

(g) Confirm that plant design criteria have been considered in the design change.

3.4.5.5. Responsibilities for the on-site review

The on-site review is a multi-discipline review performed at the plant technical management level. This review typically is performed by the following individuals:

(i) Plant superintendent,
(ii) Plant technical support staff manager (including quality assurance),
(iii) Plant instrument and control engineer,
(iv) Plant operations manager,
(v) Plant maintenance manager,
(vi) Health physics manager,
(vii) Plant nuclear engineer,
(viii) Plant construction and commissioning manager.

These individuals form the Plant Review Group (PRG). The PRG should meet on a regular basis to review proposed work to the plant and associated specifications. Each member of the PRG should be given a copy of the specifications for review in advance of the scheduled meeting at which the proposed work is to be discussed. The project engineer for the work should attend the PRG meeting at which the proposed work is discussed to provide additional information to the PRG members.

Like the supervisor review, the on-site review need not be an in-depth technical review of the design details such as calculations and other analyses. The primary responsibilities of the on-site review are to:

- Assess the impact of the work on the safety and operation of the affected equipment or systems, and the plant as a whole,

- Assess the impact of the work on the maintainability of the equipment or systems,

- Consider the overall safety implications of the work,

- Assess the impact of the work on training requirements and radiological dose control considerations,

- Verify that the proposed testing is adequate to demonstrate that the completed work will perform its intended function, and that interfacing systems are maintained as operable,

- Verify that the quality assurance requirements are adequate.

3.4.5.6. Responsibilities for the off-site review

This review is intended to be organizationally independent of the"site". The off-site review can be performed using either of the following organizational approaches:

(a) By a multi-discipline committee comprised of management and supervisory personnel from different departments in the utility headquarters organization, e.g., individuals from the mechanical, electrical, nuclear, civil, quality assurance, etc. groups.

(b) By a permanent nuclear safety group comprised of experienced engineers with varied discipline skills.

Regardless of which organizational approach is taken by a utility, the off-site review function generally will not be able to provide an in-depth review of all proposed work, considering the number of specifications which must be reviewed in one year.

Any findings or potential improvements identified by this review should be considered and resolved.

3.4.6. Interface arrangements

The interface arrangements should be established reviewed, and suitable people identified in each participating organization who will act as focal points for communications/review/feedback with that organization.

Typical group that interface with the people preparing the specification might include:

- Operating staff,
- Maintenance staff,
- Nuclear safety section,
- Plant engineering,
- Radiological protection,
- Design authority,
- Independent review group,
- Regulatory body,
- Quality assurance staff,
- Construction and commissioning group.

Authority for final arbitration of any unresolved conflicting comments should be established for use as and when necessary.

3.4.7. Interfacing

The interfacing groups and reviews are intended to provide specialist input and considerations of the proposals, with an independence of view to provide confidence that a sensible design solution is reached.

They do not provide a full detailed check on all design decisions and calculations. That responsibility should remain with the originators.

The person or group preparing the specifications should act with all due diligence to ensure that all reasonable considerations are taken into account.

3.4.8. Risks caused by the intended work

The work being specified should be reviewed to identify any risks that might be caused by the intended work, for example at each stage of:

(a) Fabrication,
(b) Installation,
(c) Testing/commissioning,
(d) Operation,
(e) Decommissioning and disposal.

The risks might arise from:

- The work methods (eg working at height, confined spaces),
- The materials (eg asphyxiating gases, toxic chemicals),
- The system (eg pressurized fluids, combustible gases, radiological inventory) and conditions at its boundary,
- Other work in the same area,
- Incompatibility with existing items and services.

See Annex 1 for some examples of risks that may be encountered by persons involved with suppliers.

3.4.9. Identification of all features

To ensure that all necessary features are identified and adequately defined (including quality arrangements) the responsible person may find it helpful to produce a standard basic list. The list should identify all considerations and factors to be addressed by all specifications.

Annex 2 shows a procedure for the preparation of technical specifications.

Annex 3 shows an example of a nuclear QA purchase specification.

Any limits to available information, or areas of possible extra work which might arise (e.g. depending on physical condition of plant once access for inspection is available) should be identified. Suitable options to cope with these limitations or extra work should be defined.

3.4.10. Schedule of records

The person responsible for producing the specification should agree with the customer a schedule of records to be produced during this work, together with the responsibility for retaining the records and their retention periods. Examples of such records are given in Safety Guide 50-SG-Q3, Document Control and Records.

3.4.11. Unresolved issues

As production of the specification proceeds all persons involved should record any unresolved issues, and any assumptions made in the work. These should be notified to the responsible person, and formally resolved, or clarified, or noted as issues requiring further development/investigation by the supplier.

Such issues may arise where it is not possible to get access to some plant areas during operation to determine the exact state or configuration of plant, or certain expertise is not available in the specifying organization.

4. SPECIFICATION OF THE MANAGEMENT ACTIVITIES REQUIRED OF SUPPLIERS

4.1. GENERAL

An integral part of the procurement of any item or service is the way that the supplier is expected to manage the activities that lead to satisfactory delivery of the item or service. The supplier's management activities are extensive, and include things such as:

(a) Ensuring delivery to programme,
(b) Preparation and submission of documents for approval,
(c) Controlling the work of subsuppliers,
(d) Managing work and personnel on the nuclear installation.

Where the management of the supplier's activities may affect the quality or safety of the item or service, it is necessary to define the controls expected by the customer or his agent.

Typical problems that may be encountered if the management activities are inadequately defined can include:

(i) Supplier's personnel violating standard practices such as radiological controls.

(ii) Cross contamination of materials (e.g. boron on reactor water side components) and inclusion of foreign material.

(iii) Work programmes conflicting with operational requirements.

(iv) Poorly controlled subsuppliers.

(v) Interface problems, for example causing delays in providing security clearance for access to site.

(vi) Excessive demand on services such as radiological protection.

(vii) Delays due to other work in the same area preventing access at the necessary time.

(viii) Delays due to operational requirements preventing access.

(ix) Late submission of documents requiring approval by the nuclear installation.

(x) Inadequate control of testing and demands to witness unscheduled tests.

(xi) Delayed acceptance of the item or service by the customer group due to poor control of the handover process.

(xii) Incomplete or unsuitable records being provided.

(xiii) Unresolved issues or non-conformances still open during the very late stages of work, or at handover leading to rejection by the customer group.

(xiv) Unauthorized work has been done and extra payment is demanded.

(xv) Unclear or poorly identified formal completion of the work leading to additional work and extra costs.

This section of the technical document supports requirements set out in the Safety Guides 50-SG-Q6, Quality Assurance in Procurement of Items and Services, 50-SG-Q7, Quality Assurance in Manufacturing, 50-SG-Q2, Non-conformance Control and Corrective Actions, 50-SG-Q4, Inspection and Testing for Acceptance, and 50-SG-Q12, Quality Assurance in Commissioning.

4.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies for the way that suppliers are expected to work on or for the nuclear installation whether on or off site, and for the extent of involvement that nuclear installation staff will have in controlling or directing the work of the suppliers.

In setting policy the senior management should set out their commitment to key topics influencing the way contract companies are used by the nuclear installation. For example, the policy could:

(a) Commit to using nuclear installation staff for all possible work.

(b) Commit to using suppliers to fill only skills or availability gaps in the capabilities of the nuclear installation staff.

(c) Commit to the use of suppliers for non-safety related work.

(d) Commit to using suppliers for key operational work (for example radiological protection, security, etc.).

Strategic considerations could include:

(i) The way suppliers are to be engaged

- Turnkey contracts,
- Management contracts,
- Long term partnership,
- Design and build,
- Time and material contracts,
- Provision of labour only – e.g. consultants, NDE staff, cleaning staff.

(ii) The available time for development of the specifications and programmes and the need for forward planning.

(iii) Expertise or resources available in the nuclear installation for certain types of work.

(iv) The time available from nuclear installation staff to manage the work, and the costs of that time.

Factors affecting both policy and strategy will include:

- The attitude of the regulatory authorities (both nuclear safety regulation and industrial safety agencies).

- National law assigning responsibilities for operation of the nuclear installation, with any associated restrictions on delegation of responsibility.

- The expertise in managing suppliers available from nuclear installation staff.

- The capability of available suppliers, especially where established suppliers no longer have dedicated nuclear programmes or facilities and the need to consider suppliers from "conventional" industry.

- The costs incurred in developing "nuclear" capability in new suppliers.

4.3. LINE MANAGEMENT

Line management should define procedures and establish systems that implement policy and take account of the strategy.

As described in Safety Guide 50-SG-Q6, Quality Assurance in Procurement of Items and Services, the system should contain adequate controls to ensure that:

(a) The information provided is clear, concise and unambiguous, fully describes the items and services, including the technical and managerial requirements.

(b) Identifies the type and extent of monitoring and/or reporting that will take place to confirm satisfactory performance.

(c) Items and services will conform to the identified requirements and specified performance.

(d) Adequate documentary confirmation is provided before installation or use.

(e) Interfaces between organizations are defined and controlled.

(f) Communication routes are identified for all aspects.

(g) Responsibilities are clearly defined for all types of procurement (e.g. safety issues for contract labour).

Line management should ensure that people assigned to define the management requirements expected of the contractor are: (Annex 4 contains an example of an instruction to NPP staff for this topic)

(i) Adequately experienced to understand the implications of the specified requirements and their effect on:

  - Contract duration, programmes, schedules and interrelation with other work plans,
  - Contract costs,
  - Nuclear installation resource and personnel workload,
  - The capabilities that the supplier and any subsuppliers must have.

(ii) Required to consult with other groups within the installation who will be affected by the activities of the supplier.

(iii) Aware of other work scheduled to take place in the same area, on the same plant system, or related systems that may affect progress.

(iv) Aware of requirements specific to the nuclear installation for example:

  - Access,
  - Welfare and messing facilities,
  - Prohibition of certain materials (e.g. chloride based cleaners, materials containing boron),
  - Operational safety considerations,
  - Housekeeping/contamination control.

4.4. LINE SUPERVISORS

Line supervisors or those people defining the contract management activities to be done by the contractor should arrange to provide adequate specification of:

4.4.1. Management requirements

Nuclear installation management requirements which may override the normal practices of the supplier, should be identified and compiled into a standard listing for use in all contracts. They might include:

(a) Qualification of suppliers staff in accordance with requirements of the nuclear installation.

(b) Fire or emergency arrangements.

(c) Radiation exposure budgeting restrictions and dose measurement (recording).

(d) Access limitations and restrictions.

(e) Integration of work with operational plans.

(f) Time restrictions due to:

- Operational constraints,
- Physical space and limits on the number of people able to work in the area at the same time,
- Dose control,
- Limited special access equipment or clothing (e.g. breathing apparatus),
- Security clearance.

(g) Special administrative requirements, forms to be used, etc.

(h) Reporting results on nuclear installation derived forms.

(i) Physical fitness (e.g. for use of breathing apparatus).

(j) Use of special personal protective equipment.

(k) Restrictions on certain processes (e.g. burning/welding).

(l) Disposal of waste.

(m) Radiological clearance before removal of equipment.

(n) Checking for computer viruses and their elimination.

(o) Permits to start work.

(p) Nuclear installation acceptance before progressing past certain hold points.

4.4.2. Changes to practices

Changes to normal accepted industrial practices should be identified and compiled into a standard list, together with the circumstance in which the changes will be imposed.

For each specification, the list should be edited to identify those changes necessary for the requirements of the work and the changes clearly identified in the specification. To aid understanding at a later time (e.g. when work starts) it is helpful to record the reasons for the changes. This can avoid later duplication of effort.

Changes might include:

(a) Materials segregation (e.g. physical separation of stainless and ferritic steels, separation of safety and non-safety related items).

(b) Cleanliness of materials.

(c) Materials inventory requirements, e.g.:

- Amount of absorber,
- Accounting for fissile or strategic materials,
- Loss of tools in sensitive areas.

(d) Demonstration of techniques, and/or competence for certain processes e.g.:

- Special NDT applications,
- Special welding techniques/special tools,
- Practice on a simulator.

(e) Inspection to be provided by the supplier.

(f) Use of personal competence log books.

(g) Direct control or supervision by nuclear installation staff of certain critical activities.

(h) Provision of instructions at the work place.

(i) Approval of certain specific data relating to the work, e.g.:

- Procedures/instructions,
- Management of records (see Safety Guide 50-SG-Q3, Document Control and Records),
- Traceability of materials,
- Approval by nuclear installation of remedial action to deal with non-conformances,
- Provision of instructions/data before setting to work,
- Levying of penalties and use of incentives to ensure completion of schedule,
- Joint material condition inspection of work area before starting work.

4.4.3. Activity programmes

(a) The need to integrate programmes with nuclear installation requirements, and the activities of other group or suppliers working in the same area, or on the same system.

(b) The need to obtain approval for the programme.

(c) The inclusion of "witness/hold points" which require formal notification or approval before moving to the next stage of work.

(d) The need to report progress against the programme, and to make arrangements to retrieve any slippage.

(e) Contingency plans to accommodate work only identified after specified work has begun.

4.4.4. Control of subsuppliers

It is important to identify to the supplier any restriction on engaging subsuppliers, and the way that the main supplier is expected to manage them. It is usual to specify that subsuppliers shall:

(a) Conform to the same standards as the main supplier or an alternative standard acceptable to the main and the customer.

(b) Provide the nuclear installation staff with same access to the works.

If this is not clearly specified, then many difficulties may result, and adequate control of the work may be jeopardized.

It should be specified that the supplier will evaluate their subsuppliers for capability and that objective evidence of their suitability will be provided to the customer.

4.4.5. Interfaces with nuclear installation functions

Interfaces with nuclear installation functions might include:

- Clearance of design proposals/content of work packages,
- Access to existing nuclear installation documents/records,
- Planning requirements/scheduling,
- Granting of permission to start work,
- Security clearances, deliveries to site,
- Assessment of environmental effects.

4.4.6. Services supplied by customer

Services to be supplied by the nuclear installation and its staff might include:

- Radiological protection and dose monitoring,
- Inspections and audits,
- Security and access to site,
- Industrial safety and induction training,
- Fire fighting,
- Canteen,
- Accommodation and welfare services,
- Electricity/water,
- Collection and disposal of waste (including notification to waste regulators),
- Storage areas,
- Driving permanently installed cranes and handling equipment.

The extent of any services and limits on their availabilities (e.g. notice to be given in advance, time the service is available, weight limits, etc.) should be identified.

The nuclear installation staff providing the services should be advised of their involvement, and the cost and programme penalties that result from failing to meet any agreed service obligation made clear to them.

4.4.7. Interface with suppliers

Any interface with other suppliers should be identified by consultation with other nuclear installation staff who may be considering engaging suppliers; or who are responsible for suppliers already on site; or have responsibility for the affected plant items.

For large or complex work (e.g. refuelling outage, exchange of steam generators) many NPPs have found it beneficial to have a single co-ordinator who is advised of all work planned in the identified area or for the same programme period.

4.4.8. Interface with operational work

The work of the supplier may have to interface with nuclear installation operational work going on in the same area, or on the same systems. Detailed co-ordination between the responsible nuclear installation personnel and the supplier's supervisor is necessary. Aids to this co-ordination can include:

(a) Detailed descriptions of the work to be done in smaller packages (e.g. 1 or 2 days work, resulting in an identified final state, such as certain valves blanked off; pipe sections removed, etc.) submitted for acceptance.

(b) Written clearance to proceed with the identified work, with limits on action that can be taken before it is necessary to seek permission for further work.

(c) Attendance by the supplier at the nuclear installation planning meetings and agreements noted.

(d) Regular meetings of supervisors controlling work in the area.

4.4.9. Submission of documents

Controls for submission of documents should identify:

(a) The format for the document, the numbers to be provided and any nuclear installation specific requirements.

(b) The person in the nuclear installation to receive the document (document submission requirements).

(c) The person in the nuclear installation who can provide approval (approval requirements).

(d) The time required by the nuclear installation to process documents.

(e) What approval signifies:

- Approval to manufacture/install,
- Acceptance of design proposals.

Approval of any document should not remove responsibility from the supplier to exercise all due diligence.

(f) The route for handling any emergency or unscheduled approvals that may be needed to cope with unknown conditions

(g) The controls for handling changes to approved documents.

4.4.10. Timing/witnessing of tests

Timing/witnessing of tests: any requirements or restrictions on the conduct of tests should be identified. This might include:

(a) Confirmation of completion of assembly or installation before testing.

(b) Provision of written test instructions, and their approval by nuclear installation staff before use.

(c) Demonstration of performance with inert fluids prior to testing with the working fluid (e.g. chemicals or radioactive liquids, low pressure air testing prior to hydraulic testing).

(d) Clearance of personnel from the work area before testing by radiography or pneumatic pressure tests.

(e) Availability of plant experts or responsible people to participate in tests.

(f) Availability of special test or recording equipment.

(g) The need to shut down or isolate operating plant before making test connections.

(h) Requirements to flush pipework to ensure the removal of all debris before testing.

(i) Requirements for testing of sub-units before integrated system testing.

4.4.11. Handover controls for operation

Prior to acceptance for the nuclear installation might require the supplier to ensure that:

(a) A programme is prepared for approval by the nuclear installation, which shows how the handover activities will be phased and controlled to ensure a smooth transition, and to avoid any overload for key nuclear installation personnel.

(b) The supplier confirms that they have examined the item for conformance to requirements before offering it for acceptance by the nuclear installation.

(c) The installation is complete and testing finished.

(d) Temporary connections are removed.

(e) Temporary supports and attachments are removed.

(f) Blank flanges are removed as necessary.

(g) Drawings of the new or modified items are available.

(h) Records are complete, and as necessary independently checked.

(i) Instructions are available for maintenance operating staff.

(j) Any non-conforming items are identified and corrected, or remaining non-conformances confirmed as presently acceptable and remedial action agreed.

(k) Any specialist training provided to nuclear installation staff.

(l) Supplier's staff are aware of the need to obtain permission from the nuclear installation before doing any further work on the system.

4.4.12. Record preparation and storage

The records that are required, their format and any requirements for suppliers to store them on behalf of the nuclear installation should be identified. This might include:

(a) Providing a register of records, or identifying the types of records required, e.g.:

- Weld records and NDT results,
- Electrical tests,
- Software integration tests,
- Design data and calculations.

See Safety Guide 50-SG-Q3, Document Control and Records, for guidance on the types of records.

(b) Special format requirements, e.g.:

- Use of nuclear installation reporting forms,
- Specific data to be included to meet the needs of the nuclear installation,
- Microfiche (or microfilm) to national standards and arrangements to confirm accurate transfer of data, followed by destruction of originals,
- Electronically stored data on computer disc, and details of backup requirements with any special operating system needs.

(c) Storage requirements prior to handover to nuclear installation.

(d) Long term storage by supplier on behalf of the nuclear installation.

4.4.13. System for clearing unresolved issues

When the contract is placed, some work may remain unidentified (e.g. because access is not possible until the plant is shut down), or design issues may remain unresolved (e.g. due to lack of expertise, or the need to do further development work). This must be clearly identified, with the means of controlling any additional work that might result. The supplier's part in clearing these issues should be identified, and might include:

(a) The need to obtain data when access is available e.g. initial plant surveys.

(b) The need to engage specialist staff (e.g. stress analysts, computer software specialists, etc.).

(c) Submission of proposals to clear the issue and suspend work until approval is granted (both technical and financial).

(d) Dates for submission of proposals and any penalties for late submission.

(e) The means of obtaining approval and the time needed by the nuclear installions to process the proposals.

4.4.14. Control of non-conformances

Actions required by the nuclear installation for the control of non-conformances and processing of requests for concession (i.e. leave the non-conforming item as it is); threshold limits on size of defect/nature of non-conformance within which repair or correction is permitted without special permission; the route for submitting and receiving approval of special remedial action, must be identified to the supplier. These actions might include:

(a) Reporting on nuclear installation forms to ensure that adequate data is reported to enable assessment and approval or rejection of the proposals.

(b) The need to record all non-conformances (including those inside any permitted threshold size or type) for reporting to the nuclear installation, possibly with details of repair work.

(c) The reporting of the clearance of the non-conformance.

(d) The use of a non-conformance log or register to provide an overall view of the extent of non-conformances occurring and to allow evaluation of the data for trends (e.g. type of non-conformance; defective materials; operator error, etc.).

(e) A minimum period required by the nuclear installation to approve an application for remedial action.

See also Safety Guide 50-SG-Q2, Non-conformance Control and Corrective Actions.

4.4.15. Sanctioning of work and authorization to incur extra work

Any work that cannot be totally quantified during preparation of the specification may mean that some work is only allowed to be done on condition that specified investigation work is complete, and a report on the extent of work, together with cost is provided to the nuclear installation (see also system for clearing unresolved issues above).

The necessary investigative work, the detail required in the report from the supplier, and the way that approval is to be obtained (i.e. time for nuclear installation approval, person who can give approval, etc.) should be specified.

4.4.16. Closure of the contract

Closure of the contract and withdrawal from site requirements imposed by the nuclear installation for closure of the contract might include:

(a) Retention of a portion of the contract money until a period of satisfactory performance has been demonstrated.

(b) Formal review of completion by nuclear installation experts, and listing of any incomplete work, remaining non-conformances, etc.

(c) Requirements for withdrawal from site might include:

- Material condition inspection of the work area to identify any damage caused by the supplier, and to be repaired at their cost,
- Inventory checks on material provided by the nuclear installation,
- Monitoring of equipment from radiologically controlled areas.

5. SELECTION OF PROSPECTIVE SUPPLIERS

5.1. GENERAL

The selection of prospective suppliers should be based on an evaluation of their capability to provide items or services in accordance with the requirements of the procurement documents. Assessment of their capability should be made against specified criteria that are appropriate to the type

of work, and which are relevant to the needs of the customer. This assessment may need to be done by a team drawn from specialist groups depending on the type and complexity of the items or services.

Various methods of assessment are described in the Safety Guide 50-SG-Q6, Quality Assurance in Procurement of Items and Services. Poor or inadequately detailed assessments of the capability of prospective supplies may lead to problems in the following areas:

- The supplier departs from specified requirements without appropriate authorization,
- Relevant technical aspects affecting quality or safety are not considered due to lack of specialist technical knowledge by the person making the assessment,
- The supplier not allowing for any special requirements which are different from their normal practices,
- Engaging suppliers deemed by other groups in the customer organization to be unsuitable,
- Difficult comparison of bids due to selecting prospective suppliers of widely differing capabilities,
- Accepting the lowest price, without considering other cost aspects, such as maintenance costs or durability of the items,
- New, capable suppliers not being included,
- Excessive administrative and assessment work load due to inviting too many prospective suppliers to bid.

5.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies about using suppliers that are expected to be deployed by the nuclear installation.

Nuclear installation should define requirements for selection of suppliers that address:

(a) National legislation or policies affecting open competition between suppliers, protection against cartels, anti-trust laws, etc.

(b) The requirement to attain value for money, including consideration of lifetime costs.

(c) The company business goals.

(d) Ethical behaviour in the conduct of procurement.

(e) Compliance with other nuclear installation policies for example, quality, environmental, etc.

Strategic issues affecting the nuclear installation may include:

(i) Long term partnership with certain key suppliers, for example:

- Outage management contractors,
- Fuel suppliers,
- Specialist suppliers of materials or equipment (such as alloyed steels, nuclear qualified components, etc.),
- Non-destructive testing of nuclear installations.

(ii) Long term planning to ensure that adequate work is placed with key suppliers so that they remain in business or maintain their specialist nuclear capabilities and hence can meet the needs of the nuclear installation.

(iii) Government policies on international trade.

(iv) Support for local communities by hiring of local labour or purchasing of goods from local suppliers where possible.

(v) Common administration of procurement across the organization.

5.3. LINE MANAGEMENT

Line management should define procedures and establish systems that implement the nuclear installation's requirements and take account of policy and the identified strategic issues. The defined procedures and systems should ensure that criteria are specified for evaluating and selecting suppliers, that responsibilities for this are defined and that adequate consultation takes place with other groups in the nuclear installation.

Criteria for assessing suppliers might include:

(a) A history of providing satisfactory performance.
(b) Quality arrangements assessed as meeting suitable national or international standards.
(c) Facilities and personnel assessed as capable for the type of work.
(d) Records demonstrating adequate past performance.
(e) Acceptable current production.

The data regarding suppliers assessed as acceptable against the defined criteria should be made accessible to the persons preparing lists of potential suppliers for specific enquiries. The data should also identify the range of products, or services that have been assessed, together with any restrictions or time limits that are felt to be necessary. This data can be stored in any convenient form, paper registers, electronic databases, etc. Suitable arrangements will have to be established to maintain the data current and to incorporate feedback on the performance of suppliers.

Line management should ensure that people assigned to select potential suppliers are:

(i) Adequately experienced in the type and aspect of work being procured to make informed judgement about the suitability of potential suppliers.

(ii) Suitably trained or knowledgeable about the database of potential suppliers and the criteria used to compile it, so that they can use if for identifying potential suppliers.

(iii) Required to consult other groups in the nuclear installation about any special restrictions affecting a potential supplier's capability, for example:

- Current cumulative radiation exposure of key personnel,
- Potential over commitment of one supplier by having too much work in progress.

(iv) Free from any conflict of interest that might affect commercial judgements, for example:

- Family connections with the nuclear installation or financial interests in the company.

5.4. LINE SUPERVISORS

Line supervisors, or those selecting potential suppliers should ensure that appropriate actions are implemented regarding:

5.4.1. Departure from normal requirements

Departure from normal requirements may be necessary due to plant breakdown or emergency. In these circumstances it is advisable to:

- Follow any prescribed emergency plan,
- Record any commitments given,
- Consult senior management and nuclear installation staff as soon as possible,
- Bring the situation back to conformance with procedures as soon as possible.

5.4.2. Specialist technical input

Specialist technical input may be necessary where:

(a) The expertise to assess the supplier does not exist in the nuclear installation, for example:

- Seismic qualification of equipment,
- Materials technology,
- Demolition.

(b) Assistance could be sought or purchased from:

- Support groups assigned to the nuclear installation, for example technical specialists,
- Universities,
- Other purchasers of similar equipment,
- Trade associations,
- Independent inspection bodies,
- National government procurement agencies.

Details of any assistance that is obtained should be recorded, to demonstrate that reasonable steps have been taken.

5.4.3. Special requirements

Special requirements affecting the choice of potential suppliers may include:

(a) Knowledge of special processes: for example:

- Application of special coatings,
- Heat treatment capability,
- Radiation exposure budgeting,
- Qualification of operatives (e.g. ultrasonic testing),
- Use of specialist access techniques (e.g. diving),
- Exposure to biological hazards,
- Disposal of special wastes (e.g. asbestos, radiological, toxic chemicals).

(b) Ability to deploy adequate numbers of suitable staff, for example:

- NDT operatives,
- Welders,
- Radiological protection personnel.

(c) Prescribed dates for the work, and supplier's existing commitments.

Annex 5 presents an example of evaluation of suppliers of equipment and materials and Annex 6 an example of evaluation of design consultants quality assurance documents.

5.4.4. Other interested groups

Other interested groups to be consulted would include those:

- Who have experience of the potential supplier,
- Forward planning groups for key dates and possible access problems due to several activities occurring simultaneously (for example during outages),
- Security personnel for any known misdemeanours,
- Radiological protection personnel for dose budgeting.

5.4.5. Suppliers of similar capability

Large differences in capability between potential suppliers might result in:

- Some placing excessive reliance on subsuppliers with the resulting difficulty in managing their work,

- Some being unable to deploy adequate numbers of suitable staff to meet the required programme,

- Inadequate management capability being available leading to inadequate control with consequent overrun of time and budget,

- Difficulty with making sensible comparisons between bids due to differences in the resources the nuclear installations can deploy,

- A superficially attractive low price being submitted by a company that is not making adequate provision for managing the contract, and subsequent difficulty of accepting a higher price from a capable supplier.

These difficulties can be avoided by clear identification in the specification of the capabilities that are required of the supplier, both management and technical.

5.4.6. Value for money

Value for money considerations include an assessment of lifetime operating costs for the hardware, or the total extent of services to be supplied, and the costs of what the nuclear installation might have to supply to complete the level of service, or achieve full performance.

For example:

- The higher initial cost of a heavy duty plant item may be offset by reduced long term maintenance costs,

- The additional costs that may be incurred by requiring a technician to use standard nuclear installation report forms may be less than the extra costs of transferring data onto the nuclear installation forms, the subsequent necessary verification, and the costs of correcting detected errors.

5.4.7. Records of new assessments

Records of any new or additional capability assessments will help to reduce future efforts, by avoiding repeated assessments of the same suppliers, even if they are not accepted as being suitable.

(a) Electronic databases held on computer or computer networks provide ready access to updated information for all users. Any database needs to be adequately controlled to protect the data from inadvertent alteration and must confirm to any national requirements concerning electronic storage of commercial/personal data.

(b) Results of assessment can include:

- Supplier name,
- Location,
- Department,
- Type of supply assessed (e.g. valves /software/NDT services),
- National standards met,
- Means of assessment (e.g, historical performance, quality system examined, capability assessment, etc.),
- System certified to appropriate national or international standard for management systems.

5.4.8. Suppliers not previously engaged by the nuclear installation

Continuing use of the same suppliers has certain advantages (for example familiarity with plant, equipment and nuclear installation specific management systems). It can also lead to missing new practices or innovations that may have advantages.

Examples of potential benefits that might be lost by not considering new suppliers might include:

- Mechanical seals for pumps instead of packed glands,

- Developed quality management systems providing better assurance of a product that meets requirements and enabling a reduction in inspection by the customer,

- Resin compounds for pouring into cracks to repair concrete instead of hacking out and filling with concrete,

- New portable radiological monitoring equipment with self-checking functions allowing reduced calibration;

- Cold applied epoxy metal repair compounds permitting the repair of cast components (for example pump bodies) instead of heat treatment and deposition of metal by welding.

Engaging new suppliers can result in having to deploy more extensive monitoring or supervision during at least the initial phase of work to obtain confidence that acceptable performance standards are achieved.

5.4.9. Potential suppliers

Appropriate number of potential suppliers are selected.

Selecting too many potential suppliers may result in:

- A large number of bids that have to be processed, evaluated and a decision made about acceptance or rejection. This results in an unnecessary use of the time of nuclear installation administrative and technical staff,

- Many potential suppliers being rejected, who may put less effort into any subsequent bid.

This could subsequently lead to them not making adequate allowance for all requirements in future contract enquiries, being awarded the work on an apparently low price and then trying to recover their losses by contractual claims. This also uses the time of nuclear installation staff unnecessarily.

6. CONTROL OF PROCUREMENT DOCUMENTS

6.1. GENERAL

Procurement documents should be controlled, reviewed and approved before issue to ensure that all requirements have been included and are in accordance with the specified requirements, the nuclear installation procedures and the regulatory requirements.

Changes to procurement documents should be undertaken in a controlled manner, and the supplier or prospective supplier should be notified of approved changes. Changes to procurement documents should be subjected to the same level of control as the original documents, to ensure that consistent information is provided.

The typical problems that are encountered about the topic of controlling procurement documents include:

- Inadequate or defective specification that do not adequately identify all requirements,

- Inconsistent levels of detail being provided, following changes to the documents,

- Changes that are inconsistent with the intent of the originator and needs of the customer,

- Failure by prospective suppliers to comply with administrative requirements leading to invalid or rejected bids,

- Information being made available to only one prospective supplier following a question or clarification.

6.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies relating to the control of procurement documents.

The nuclear installation's requirements for the control of procurement documents should address the following features:

- Preparation,

- Review prior to approval,

- Approval before release to suppliers,

- Control of information not included in the procurement documents, but provided to suppliers during the preparation of their quotations,

- Control of any changes to procurement documents.

Strategic considerations around the features identified above should include the following aspects:

- The availability of qualified and experienced people to prepare procurement documents, and the need to maintain an adequate capability in the company,

- The need to independently review procurement documents to verify their adequacy in technical and commercial aspects,

- The need to confirm and formally approve documents to show that all reviews have been completed, and any identified remedial action completed before releasing the documents to prospective suppliers,

- How any information which was not included in the original specification, and later found to be necessary will be prepared, reviewed, approved and issued to prospective suppliers,

- The need to ensure fair treatment of all prospective suppliers,

- How any changes to the procurement documents will be reviewed, approved and distributed, to ensure that the change is still consistent with the original design, commercial intent or safety justification constraints.

6.3. LINE MANAGEMENT

Line management should define procedures and establish systems that implement policy, and take account of any strategic considerations. The following paras are consistent with Safety Guide 50-SG-Q6, Procurement of Items and Services.

A system should be established to ensure that all procurement documents are:

(a) Reviewed before release: ideally by people independent of those producing the documents.

(b) Approved for release: ideally by people independent of those producing the documents.

(c) Controlled to ensure the same information reaches all potential suppliers, so that meaningful comparison can be made between competing bids.

(d) Controlled to ensure that any changes proposed after submission of the documents to potential suppliers are subject to adequate review and approval before incorporating in the revised documents and that responsibilities for these activities are defined.

The review prior to release should consider whether:

(i) All necessary requirements are included for the work.

(ii) The requirements are in accordance with the specification (i.e. they are consistent), and adequately take account of any safety justification.

(iii) The specification adequately takes account of customer procedures, standards and regulatory requirements.

It should not be a detailed technical review, any detailed reviews should have taken place as part of the process for producing specifications.

The approval should be taken to signify that the review, or series of reviews, has been completed satisfactorily, and that the documents may be released to potential suppliers.

Controls for any proposed changes must ensure that the change is reviewed to check for any deleterious effects on:

- The safety justification for the original work,
- The work identified in the procurement documents,
- Any surrounding structure, system, or component.

Any identified deleterious effect should be recorded and measures introduced to mitigate it, or the change rejected.

Changes should be subjected to the same level of controls as the original documents.

The system should also provide for the control of any non-conformance identified by review: requiring it to be recorded; reported to the originator of the document (and line management if necessary); resolution of the non-conformance and inclusion of the resulting change in a revision to the procurement documents.

6.4. LINE SUPERVISORS

Line supervisors or other people controlling the preparation of procurement documents should ensure that appropriate actions are implemented regarding:

6.4.1. Reviewing procurement documents

When reviewing procurement documents prime reliance should be placed on design reviews done as part of the design process and in accordance with established procedures. It is useful to produce a checklist that identifies the features that must be addressed by all procurement documents. This might include:

- The identity of the person preparing it,
- The experience and skills of the preparer to demonstrate that he/she is competent to do the work, and consideration of the need for any additional technical reviews,
- The adequacy of the information to ensure that proper communication with suppliers is possible,
- Confirmation that the work requested of the supplier meets the original (or subsequently modified and agreed) needs of the customer,
- The adequacy of consultation with the end-user of the goods or services,
- Conformance to procedures for completion of quality plans, etc. and provision of records concerning the preparation of the procurement documents,
- Consistency with established and defined requirements.

6.4.2. Identified problems

Any identified problem resulting from the review should be recorded, with adequate detail to describe the non-conformance, and referred back to the originator of the document.

- Any problem about the suitability of the experience and skills of the person preparing the document should first be raised with the person to determine if any supplementary controls or assistance were used during preparation to attend to the non-conformance,

- If the problem still remains, it may be necessary to seek the assistance of the preparer's line management in its resolution,

- Any problem in following procedures or instructions should be identified, details sought to determine if other adequate controls were used and can be confirmed as acceptable and any necessary rework identified,

- Any remaining unresolved issues should be identified, treated as a non-conforming item and clearly identified as such.

6.4.3. Changes to procurement documents

Changes to procurement documents should be subject to the same controls as the original documents to ensure that:

- It is consistent with the original customer requirements, standards, and intention of the original documents,

- It does not adversely affect the work requested by the documents, any associated or surrounding structure, system or component,

- It does not adversely affect any safety justification, risk assessment or hazard identification already prepared,

- It does not affect the co-ordination of the work with nuclear installation operational requirements, maintenance work or the work of other contractors on the same system or in the same area,

- It does not adversely affect the commercial strategy adopted for the work.

6.4.4. Administrative controls

The procurement documents should identify all necessary administrative controls, e.g.:

(a) The contact person and address for:

  - Technical issues,
  - Commercial issues (if different).

(b) The date for submission of tenders/bids and the address to which they should be sent, including any requirements to mark the outside of the tender to aid identification, and to help ensure that it is not opened until the due date.

(c) The way any late tenders/bids will be handled – e.g. returned unopened to the originator, to ensure that no information that might be obtained from other opened bids can have been included, and hence unfair advantage obtained.

(d) The need to submit sealed (possibly double sealed inside a second envelope) tenders/bids (to ensure that information from all prospective contractors is treated equally) quoting any reference number on the outside of the package to aid identification.

(e) The need for all prospective supplies to respond to all sections of the enquiry, with any alternatives to the requested work (i.e. potential improvements, different ways of working, etc.) being separately identified. This will ease comparison between all tenders/bids.

(f) Formal requirements concerning access to the nuclear installation for inspection of the work area.

(g) How questions or requested clarifications are to be handled (e.g. in writing to the contact persons for technical issues).

Annex 7 shows an example of the topics that might be addressed in a contract enquiry and Annex 8 shows an example of a set of instructions to bidders.

6.4.5. Questions or requests for clarifications

Questions or requests for clarifications should be formally controlled to ensure that all requests are:

- Recorded,
- Reviewed for their effect on the procurement documents and to identify any potential changes (see 6.4.3 above),
- Responses prepared by suitably qualified and experienced people (preferably those who prepared the original documents),
- Any response to one prospective supplier should be provided to all bidders to aid comparison between all bids by ensuring that all prospective suppliers respond to the same set of information.

7. ASSESSMENT OF TENDERS AND AWARD OF CONTRACT

7.1. GENERAL

It is important that submitted quotations (bids or tenders) from prospective suppliers should be evaluated in a structured manner to ensure that they conform to the requirements of the procurement documents and provide for all identified work.

The evaluation of quotations may be done by a team involving the organizational units responsible for the technical and procurement activities. The size of any such team undertaking the evaluation should be relevant to the size and complexity of the item or service being purchased.

The award of the contract should be based on the capability of the supplier to meet the requirements of the procurement documents. Failure to evaluate bids properly, or to award the contract on the basis of capability may lead to problems during completion of the work, typically:

- Failure to complete work to programme,
- Inability to supply the required quality of items or services, or breakdowns in safety management,

- Accusations of unfair treatment of prospective suppliers and the associated costs incurred by investigations,

- The introduction of unacceptable alternatives or substitutions to the items or services,

- Increased costs due to passing the bid validity date before deciding on the successful bidder and subsequent increase in prices,

- Inadvertent financial commitments being made because of poor control of communications with prospective suppliers,

- Negotiated and accepted changes not being included in the final contract documents with consequent delays and extra costs.

7.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies relating to the assessment of tenders and award of contract.

Nuclear installations requirements for this aspect of the control of suppliers should address the following features:

(a) Compliance with transnational and national legislation affecting contracts and their control in Member States.

(b) Equitable treatment of all potential suppliers.

(c) The need to demonstrate financial probity.

(d) The need to secure commercial advantage and subsequent control of bid assessments.

Strategic considerations around the features described above might include:

- Adequate planning and preparation for bid assessments, including the availability of suitably qualified and experienced people,

- Separation of responsibilities for financial and technical issues,

- Strategy for determining acceptance of bids, e.g. lowest initial costs, total lifetime cost basis, etc.,

- The need to monitor the totality of work placed with one supplier to avoid over commitment,

- The need to provide adequate work to certain suppliers to assist their long term viability and hence maintain competitiveness in key market sectors,

- Contingency planning to cope with the possible commercial failure (bankruptcy) of key suppliers after award of contract,

- The control of interfaces with prospective suppliers to ensure adequate and consistent control of information.

7.3. LINE MANAGEMENT

Line management should define procedures and establish systems that implement nuclear installation requirements, and take account of any strategic considerations. The following section is consistent with Safety Guide 50-SG-Q6, Quality Assurance in Procurement of Items and Services.

The system should ensure that:

(a) Prospective suppliers are informed of the criteria for evaluating bids (for example lowest price, best technical solution, etc.).

(b) Bids are evaluated in a logical manner to ensure that conform to the requirements of the procurement documents.

(c) The evaluation of bids is a team effort involving those responsible for technical and procurement activities, the size of the team being appropriate to the size and complexity of the procurement.

(d) Contracts are awarded on the basis of the supplier's capability to meet specified requirements and the overall project schedule.

(e) Evaluation or assessment actions are documented and any queries resolved, including the grounds for awarding the contract.

Adequate time should be made available to the team assessing or evaluating bids to ensure that a sensible judgement on a suitable supplier can be made in accordance with the overall programme for the work.

Suitable controls should be established to ensure that any query or alternative that is offered is adequately investigated for any adverse effects on:

- The safety justification for the original work,
- The work identified in the procurement documents,
- Any surrounding structure, system or component,
- Any other work on the same system or in the same area,
- Previously established contingency arrangements or plans.

Resolutions should be adequately documented and included in the final form of the contract.

7.4. LINE SUPERVISORS

Line supervisors or those people assigned to assess bids and make recommendations should ensure that appropriate actions are implemented regarding:

7.4.1. Assessment of bids

Assessment of bids should be carried out by people competent to understand both the specified requirements and the detail of what is offered by the potential supplier in their tender, preferably the people who developed the specifications. Adequate time should be allowed for the assessment taking account of the:

(a) Complexity of the specified requirements.
(b) The number of bids to be assessed.
(c) The need to seek clarification of any alternatives, or assess the adequacy of submitted designs.

The assessment should address the adequacy of both the managerial controls offered, as well as the technical responses, to ensure that the tenderers have allowed for all aspects and specified requirements (see Sections 3 and 4).

The assessment should consider whether what the supplier offers in terms of arrangements, controls, personnel or items and the acceptability of what is offered:

- Correctly meet the specified requirements, including technical and quality management aspects,
- Are acceptable when considered against any necessary safety justification,
- Alters any specified requirements and the acceptability of the proposed alteration,
- Could adversely affect any surrounding structure, system or component,
- Could adversely affect other work in the same area or on the same system.

7.4.2. Systematic assessment

Assessments should be carried out systematically to ensure that all requirements are met. It can be helpful to use a checklist format listing each requirement and recording against each one whether or not this has been allowed for in the tender or whether any alternative is acceptable. This can give assurance that all aspects have been considered, and it aids comparison between the different tenders.

For large or complex tenders it may be advisable to establish a team to carry out assessment of individual aspects, systems or structures. Responsibilities for all individuals should be clearly defined and suitable interface controls set up (e.g. regular meetings, etc.) to ensure co-ordination between the groups.

The results of assessments should be documented and reported as necessary, including the final decision.

7.4.3. Controls for receiving and opening bids

Controls for receiving and opening bids might typically include for:

(a) All bids to be securely stored and left unopened until the declared date for formal opening. Opening individual bids on arrival could provide opportunity for information to be leaked to other suppliers who have not yet submitted their bids, with possible weakening of any commercial advantage held by the nuclear installation.

(b) Different arrangements for tender opening to demonstrate fairness and ensure probity depending on the value of the work, for example categorizing procurement into Low, Medium and High value depending on appropriate local limits. See Annex 9 for an example.

(c) Bids received after the due date should be returned unopened to the supplier, because it is possible that the supplier might have obtained commercial information from previously opened bids and used this information to their unfair commercial advantage in their tender.

(d) Any unsolicited bids (that is from a company not originally invited to tender) should not usually be considered, because that company will originally have been deemed unsuitable for the work when the list of potential suppliers was prepared.

However should an unsolicited tender may show advantages that would benefit the nuclear installation, advice should be sought from senior management about any further consideration.

Where a company has passed a procurement enquiry to another part of the same company (e.g. another division or department), this should not usually be treated as an unsolicited tender. Care must

be taken to ensure that the company, division or department submitting the bid meets the original criteria for selecting a supplier (see Section 4).

7.4.4. Alternatives to the specified requirements

Alternatives to the specified requirements must be assessed for both technical and commercial acceptability.

(a) Technical acceptability should be judged by using similar controls to those described in Section 5 of this document for changes to procurement documents. The controls should ensure that the alternative does not have any deleterious effect on:

- Safety justifications,
- The work identified in the original technical and management specifications,
- Surrounding structures, systems or components.

(b) Commercial acceptability should be judged on the basis additional costs against any technical, programme or other advantages that might be obtained.

7.4.5. Bid validity periods

Bids are only usually valid for a limited period and if acceptance of the tender extends beyond that period the tenderer may have the right to adjust their prices. Hence it is necessary to monitor the validity period, and seek from the potential suppliers an extension to that period if necessary.

Any proposed price increases should be carefully reviewed to ensure that they are reasonable and only reflect changed conditions such as increases in labour or component prices.

7.4.6. Communication with bidders

Communication with bidders should be formally controlled, if possible through a single person (possibly in the procurement group). It may be helpful to put all enquiries as separate specific questions, as it can help to ensure that clear and specific responses are obtained to each individual query.

The questions should contain typically the following information:

- Question number,
- Both nuclear installation and suppliers tender reference numbers,
- Details of the question,
- The return address and person to receive it,
- The supplier's response, with the name and title or post of the person replying for them.

7.4.7. Awarding the contract

Awarding the contract should be formally recorded, and this may be done by a contract letter. The contract letter should confirm acceptance of all the issues covered by the bid and any correspondence, clarifications, negotiations, etc. that have taken place after bidding. It should not introduce any new or amended requirements or conditions not previously disclosed to the supplier.

It should include identification of all correspondence, clarifications or negotiations that are to form part of the contract, to ensure that both the nuclear installation and the supplier understand the basis of the contract.

Unsuccessful bidders should be formally notified.

8. PERFORMANCE OF THE WORK

8.1. GENERAL

The performance of the work means that the supplier is expected to meet the commitments accepted as an integral part of the contract, in accordance with documented requirements and supply the items or services they have agreed to provide.

These requirements include: the original specification; any approved changes made to them; any clarifications or extra information provided at the time of quoting; the results of negotiations during evaluation of the quotations or subsequently and any contractually binding agreements.

There are also requirements that have to be fulfilled by the nuclear installation, and any group acting on its behalf during the contract.

With the start of work, responsibilities often pass from one group to another in both the nuclear installation and supplier's organizations. Because of this transfer it is important that confirmation of the understanding of the roles, responsibilities and requirements of the specification is obtained from the suppliers management, supervisors and workforce as appropriate.

Similarly it is important to ensure that any sub-supplier personnel share this understanding and to confirm that the main supplier will deploy suitable management or supervisory personnel to ensure that the subsupplier's performance is satisfactory.

Failure to manage this transitional phase adequately can result in severe performance problems, typically:

- Inadequately trained or experienced people not having the competence necessary to achieve quality and safety,
- Local safety requirements being ignored due to failure to provide adequate instructions or briefings,
- Violation of established safety practices, or required standards of behaviour,
- Different work groups trying to work on the same item at the same time,
- Late identification of non-conformances due to inadequate monitoring,
- Accidents or diseases due to inadequate monitoring of health or safety,
- Violation of regulatory requirements by work causing the wrong plant configuration, or removing essential items,
- Delays due to poor progress monitoring and late implementation of remedial action,
- Radiation over-exposure,
- In-correct working methods and wrong results due to not following instructions,
- Material damage during handling and storage,
- Repeated work to permit a missed verification activity to take place,
- Failure to resolve non-conformances due to poor control of reporting,

- Tests going wrong and causing damage, due to no emergency contingency being prepared in advance,

- Failure to keep track of commissioned systems,

- No instructions being available to operating staff for plant already released to the customer,

- Unavailability of required records.

8.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies that will determine the way that all aspects of work are performed by suppliers and should clearly identify any specific requirements for work that will take place at the nuclear installation and work that will be done off-site (e.g. in manufacturers' works).

It may be helpful to define the policies and strategies around a simple model of the progression of work, e.g.:

(a) Commencement of work.
(b) Preparation off-site/manufacture off-site.
(c) Establishment of the supplier on-site.
(d) Permission to start work on nuclear installation's systems.
(e) Hold points and inspection activities.
(f) Monitoring of work.
(g) Pre-commissioning testing.
(h) Commissioning and start-up or initial test.
(i) Non-conformance control and corrective action.
(j) Release for operation.
(k) As built documentation.

Any policies or strategies regarding performance of work must be consistent with those in Section 4, or it must be ensured that they are adequately addressed by amendments to those defined in Section 4.

In setting policy the senior management should convey their commitment to key topics influencing the detailed planning, execution and control of work on site. This might include:

(i) The use of only appropriately trained and experienced people by the supplier and the nuclear installation.

(ii) The requirement for conformance to the same standards as nuclear installation personnel.

(iii) Their support for conformance to requirements specified in procurement documents.

(iv) The need to monitor progress, standards of work and conformance to design, including monitoring the compliance with quality programmes, etc.

(v) The control of radiation exposure (ALARA).

(vi) Limiting environmental effects of the work.

(vii) Configuration management (e.g. updating training, drawings and records).

(viii) Conformance with Member State or nuclear installation health and safety regulations.

(ix) The use of direct supervision of supplier personnel by staff from the nuclear installation.

Strategic considerations could include:

- Provision of nuclear installation specific training to all suppliers,
- Waiving training by accepting prior experience,
- Clear identification of any nuclear installation standards different from normal commercial practice,
- The deployment of monitoring resources in relation to the safety significance of the work,
- Processing payments promptly,
- Radiation dose budgeting,
- Limits on returning plant to service before the configuration documents are updated,
- Surveillance of conformance with health and safety legislation.

8.3. LINE MANAGEMENT

Line management should establish systems and define procedures that implement policy and take account of strategy.

As described in Safety Guide 50-SG-Q11 Quality Assurance in Construction, the system should contain adequate controls to ensure that:

(a) Suppliers are controlled and supervised.

(b) Suppliers are established on the site in a controlled manner in allocated areas and are provided, where appropriate, with the necessary site services, information and instructions regarding the applicable industrial safety requirements.

(c) Safe working procedures are defined, including industrial safety procedures, for issue to the supplier's personnel and establishing that the supplier's site industrial safety arrangements recognize the relevant requirements.

(d) The industrial safety policies and activities of all supplier's personnel on the site comply with statutory and regulatory requirements.

(e) The progression of work is planned and monitored to achieve completion to programme, including where appropriate the co-ordination of the activities of multi-discipline suppliers responsible for discrete technical areas.

(f) Adequate contingency plans are in place to cope with any work that may be necessary once access to a plant item is available.

(g) Supplier's work in accordance with procedures, specifications and drawings, QA requirements are defined and implemented and installation checks are appropriate and in accordance with surveillance schedules.

(h) A maintenance programme is carried out for equipment that could deteriorate during the course of work, such as dehumidification of electrical equipment and preservation of critical surfaces that could rust.

(i) The handover of completed work from supplier to the nuclear installation is controlled.

(j) Baseline data for in-service inspection and surveillance is recorded and passed to nuclear installation.

Line management should ensure that people assigned to monitor or supervise the work of the supplier are:

- Competent to perform their assigned work, or given adequate supervision or directions,
- Aware of, and understand the safety consequences of their role,
- Aware of, and understand the commercial implications of their role and the limits of their authority to control and direct the work of the supplier and that they do not substitute for supervision the supplier's personnel,
- Adequately informed about the work, its objectives and any limits on their actions (e.g. restrictions imposed by safety justifications or requirements),
- Informed of any interfaces or programme overlaps within their area of responsibility to ensure that all work is adequately co-ordinated,
- Aware of nuclear installation special requirements (e.g about access, security prohibited materials, environmental policy, etc.).

8.4. LINE SUPERVISORS

Note: *This section is addressed to Line Supervisors, but it is recognized that they may be assisted by other people. When this happens, it is important that any assistants are adequately briefed about their duties.*

8.4.1. Confirmation of arrangements with the supplier

Confirmation may be sought that the following features are adequately addressed and understood:

(a) The suppliers's site management team and structure complies with that described in the contract.

(b) The supplier understands programme and sequence requirements or constraints.

(c) The supplier will deploy the level and type of resources described in the contract and their continued adequacy will be monitored.

(d) Suitable controls will be applied to subsuppliers to ensure that they comply with the contract.

(e) The supplier will use the specified methods or equipment, materials, etc. required by the contract.

This confirmation can be obtained by interviewing suitable suppliers' representatives in a structured programme of meetings depending on the extent of the work. Annexes 10 and 11 give examples of meeting agendas for a contract inaugural meeting for use immediately after placing a contract and a start on-site meeting respectively.

8.4.2. Supervision of work

Nuclear installation personnel supervising the work of suppliers should:

(a) Be aware of the status of the plant items affected by the work of suppliers.

(b) Provide work authorizations (permits) at appropriate times in accordance with programmes.

(c) Monitor the work to ensure that it is being conducted safely, cleanly and in accordance with requirements.

(d) Ensure that non-conformances are identified and resolved.

(e) Be alert to opportunities for improvement.

The nuclear installation supervising personnel should periodically evaluate the conduct of activities, operation and documents, examine non-conformances and evaluate the implementation of corrective actions in order to assist in the planning of future work, and deciding on appropriate levels of supervision.

The supervising personnel should consider the following aspects in order to recognize and encourage good work practices:

- Attention to detail,
- Good industrial safety practices such as housekeeping, appropriate use of industrial safety equipment and proper handling of hazardous chemicals,
- Good radiological protection practices such as the proper use of ALARA concepts and minimizing the spread of contaminants,
- Proper use of pre-briefings and applicable training (for example, mock-up training),
- Adherence to documents and compliance with work hold points,
- Accountability for tools, chemicals and materials,
- Use of correct tools and equipment,
- Use of decontamination facilities to reduce the volume of radioactive waste, permit clean work on formerly contaminated equipment and reduce contamination on reusable items,
- Correct use of temporary containments for work on contaminated equipment to prevent the spread of contamination,
- Clean and orderly work areas,
- Sensitivity to the time required to perform work, especially if limited time is available because of programme requirements,
- Proper provision of reports and records,
- Other aspects of nuclear safety objectives.

8.4.3. Work planning and scheduling

The nuclear installation supervising personnel should monitor the supplier's work to ensure that it is properly planned and completed in a safe and efficient manner. The supplier's work planning should, for example:

- Identify the work necessary on the relevant plant items,

- Describe the performance of work by referencing clear, concise and unambiguous work instructions,
- Identify if the work is safety related or non-safety related,
- Identify any potential safety hazards,
- Identify any special requirements that are part of the work process, such as radiation protection, fire protection, isolation and tagging requirements and inspection and testing requirements,
- Identify the status of work,
- Ensure the work is authorized,
- Estimate personnel requirements and any special training needs,
- Identify the production and management of wastes,
- Identify the required records, such as work completion and spare parts used,
- Specify any reviews required upon completion.

Where specified a work request system should be used to facilitate and control work to ensure that the work is systematically planned in accordance with the requirements of the plan. The adequacy of the system should be monitored by the nuclear installation supervisor.

Typically, the supplier's work planning system should list and be able to sort all work on the basis of work description, programme requirements, date initiated and plant conditions required to perform the work. The system should be able to track the status of all work, in particular those on hold due to any constraints. The system should be capable of tracking completion of testing prior to return to service.

8.4.4. Inspection and test plans

The preparation and use of inspection and test plans to control activities should be monitored. These plans should be supported by the use of individual task allocation documents, given to supplier's personnel as an instruction to perform a task. For further guidance on inspection and test plans see Safety Guide 50-SG-Q4.

8.4.5. Work permit system

Where specified by the contract, a system may be used in which a permit to work is completed and authorized by a suitably qualified and experienced supervisor for each work package or task. Its use should be monitored by an appropriate nuclear installation person.

The permit to work should be in the form of a check-list that indicates the precautions to be taken and the protective equipment to be used by persons doing the work. It should be signed by those persons, indicating that the conditions are understood and accepted. The permit to work should also be used to record the isolation of components or systems and the handover of components or systems on completion of the work.

8.4.6. Specific activities during performance of the work

Nuclear installation personnel assigned to supervise or direct the work of the supplier should ensure that the supplier has adequate arrangements in place to cover the topics listed below. In addition

the supplier continued performance should be monitored to ensure that it remains adequate and conforms with all necessary requirements.

8.4.6.1. Training and experience

The expertise required to control and correctly carry out the work should be considered and appropriate training and experience necessary for the work identified. The training, qualification and experience of individuals should be assessed, recorded and any necessary additional training provided by the supplier.

Examples of training and experience might include:

(a) Trade or craft skills (e.g. electrician; mechanical fitter; I and C craftsman)
(b) Special process skills (e.g. radiography; welding; ultrasonic testing).

Consideration should be given to any requirements to prove that training has been completed, or to demonstrate competence.

Proof of training might be obtained by:

- Inspection of certificates,
- Following up references.

Competence can be demonstrated by setting up an appropriate test, relevant to the actual work environment or conditions.

Performance should be monitored during the course of the work, to ensure that adequate standards are maintained.

8.4.6.2. General employee training

Requirements for general employee training or induction training should be provided at the earliest practical time to explain local nuclear installation rules and regulations to staff not already familiar with them.

Topics that might be included are:

(a) Security and access control.

(b) Hazards that might be encountered on site, and in their specific work area.

(c) Emergency arrangements and the actions they must take, e.g.:
  - Nuclear emergency,
  - Fire,
  - Chemical spillage/gas leakage;
  - Accident response,
  - Personal injury.

(d) Site contacts for assistance, provision of services, release of plant for work, witnessing of testing, acceptance and their levels of authority.

(e) Familiarization with the work area, access to it, and routine and emergency exits.

(f) Nuclear installation controls such as equipment tagging and work authorization practices.

Continued compliance with requirements should be monitored as work progresses.

8.4.6.3. Additional training

The need for specific additional training should be reviewed with the supplier and provided as necessary to inform the workforce about requirements that are specific to their work. Topics might include:

(a) Special protective clothing e.g. for radiological contamination and its correct use.

(b) The correct use of additional dosimetry for work in specified active areas.

(c) Special features of the item being worked on e.g.:

- Assembly sequences,
- Special tools,
- Nuclear specific materials (e.g. zirconium, high alloy stainless steel), their properties and care.

(d) Use of instructions and the need for witnessing of significant activities.

Compliance with the requirements should be monitored as work progresses.

8.4.6.4. Conformance to standards

The need to conform to the same standards as nuclear installation staff should be emphasized to the supplier, their staff and any subcontractors. Their understanding should be confirmed and their continued compliance monitored. Typical areas where conformance is needed might include:

- Security,
- Emergency responses,
- Plant procedures and rules,
- Industrial and personal safety,
- Limits on disposal of waste,
- Radiological control,
- Housekeeping or cleanliness,
- Use of local controls for safety (e.g. nuclear installation safety rules, permits for work, etc.).

Any exceptions to this should be clearly identified and advised to the supplier.

8.4.6.5. Planning and co-ordination

The planning or co-ordination requirements for work should be reviewed with the supplier, their understanding confirmed and continued adequate co-ordination monitored. Safety Guide 50-SG-Q13 Quality Assurance in Operation describes aspects of planning for which arrangements should be in place. Briefly:

(a) Work is identified.
(b) Its relative importance is identified.
(c) Performance standards are defined in appropriate instructions.
(d) Special requirements are stated.
(e) Record requirements are defined.
(f) The status of work is identified.
(g) Hazards are identified.
(h) Work is authorized to start.
(i) Review on completion should be done if necessary.

In addition other aspects to be considered include:

(i) Co-ordination of different work groups to ensure compatibility of work on the same item, e.g. the following should not be permitted:

- Welding and application of solvent based coatings because of the fire hazard,
- Grinding work adjacent to open bearings due to the risk of material damage,
- Petrol engined welding sets running adjacent to inlets for compressors supplying breathing air because of asphyxiation risks.

(ii) The format and content of information that is needed to describe proposed work in adequate detail for assessment of its effects and subsequent granting of permission to do work.

(iii) The period of notice required by nuclear installation staff to process proposals.

(iv) Restrictions on availability of nuclear installation plant items or personnel that may affect the work.

(v) The effects or restrictions caused by adjacent operational plant or processes, e.g.

- Radiological considerations,
- Noise,
- Heat,
- Electrical hazards.

(vi) Any contingency arrangements necessary to cope with unavailability of key items or persons.

(vii) The importance of following agreed plans and the need to obtain approval for any significant changes to agreed plans.

8.4.6.6. Monitoring requirements

The detailed monitoring requirements for all stages of work should be reviewed and confirmed with the supplier. This should address the monitoring to be provided by the supplier, any additional nuclear installation involvement and programme as well as conformance monitoring. The continued adequacy of monitoring should be considered throughout the work.

(a) Monitoring arrangements contained in the specification should be reviewed with the supplier and confirmation obtained from them that the requirement will be met. This might include:

- A specified ratio of inspectors to workforce for certain activities,
- Provision of specialists such as radiographers or ultrasonic operators,
- Reports on progress with activities,
- Reports on status of plant,
- Participation in nuclear installation meetings,
- Control of procurement documents.

(b) Additional involvement by nuclear installation staff might be necessary for:

- Witnessing of certain activities depending on their safety significance (e.g. tests, initial running of new plant),

- Direct supervision of supplier's staff depending on the novelty of the work, or difficulty in predicting exact circumstances (e.g. radiation dose measurement, problems with isolating systems);

(c) Programme monitoring might involve the supplier in:

- Submitting progress statements and status reports,
- Participation in nuclear installation meetings,
- Preparation of remedial plans to recover any shortfall in performance.

(d) Conformance monitoring should compare results achieved against the specified requirements, such as:

- Reporting percentage success or failure rates against acceptance standards,
- Identifying specific non-conformances,
- Analysis of results to detect any trends that might become apparent (e.g. defective calibration equipment, operator vigilance, etc.), together with plans for any remedial action.

8.4.6.7. Health and safety monitoring

The health and safety monitoring requirements should be reviewed with the supplier, its understanding confirmed, and its performance monitored for adequacy. The monitoring shares many of the features described in subsection 8.4.6.6, but in addition might include:

(a) Specified monitoring such as:

- Medical examination before starting work to provide baseline data for subsequent assessment of exposure to harmful substances,
- Regular monitoring for exposure to harmful substances, e.g. urine sampling for exposure to tritium, blood sampling for exposure to toxic metals such as lead or vanadium,
- Medical examination on completion of work to identify effects from total exposure,
- Provision of radiological monitoring services,
- Provision of monitoring for mineral fibres in air in the work area.

(b) The nuclear installation might provide or supplement any of the monitoring listed above, but in addition might choose to sample the arrangements provided by the supplier to ensure compliance.

8.4.6.8. Plant configuration and status

The control of plant configuration and status should be reviewed to ensure that the supplier is aware of the nuclear installation requirements and any limitations on its actions. The supplier's understanding of the importance of this aspect should be confirmed and its continued adequate control should be monitored. These might include:

(a) The need to keep a minimum amount of plant or systems available to meet operational or emergency preparedness needs.

(b) The limits on the amount of material that may be accumulated in any one area because of:

- Radiation control and criticality considerations,
- Access requirements and emergency exits,

- Flammability hazards,
- Overloading.

(c) The clear identification of the system isolated from the plant and which is still connected, to provide safe working areas.

(d) Monitoring the state of plant in service following release from the suppliers to ensure that nuclear installation operating staff are performing correct actions.

(e) The handover of work from one shift or working party to another.

8.4.6.9. Progress monitoring and reporting

Progress monitoring and reporting requirements should be reviewed, the supplier's understanding confirmed and compliance reviewed as work progresses. It should take account of the features described in sub-section 8.4.6.6, but also ensure that adequate time is allowed, or remains available, for activities such as: final reviews; processing of test data; obtaining regulatory approval for operation or start up; preparation of revised documents; drawings; provision of training, etc.

Nuclear installation personnel monitoring the work of the supplier should themselves keep records of progress and other factors affecting the quality and progress of the work. Annex 12 gives an example describing site contract logs.

8.4.6.10. Radiation dose control

Radiation dose control practices and limits should be reviewed with the supplier, to ensure that requirements are understood and that adequate provisions have been made. The supplier continued compliance with the requirements should be monitored.

Features that should be reviewed include:

- Limits,
- Reporting – both routine and exceptional,
- Nuclear installation involvement and provision of any services,
- Detailed planning of activities known to involve highly radioactive items, the need for practice and the provision of simulated training with plans for any anticipated contingencies.

8.4.6.11. Use of instructions

The use of instructions should be reviewed with the supplier and the requirements confirmed as being understood. Features to be reviewed can include (depending on the significance of activities):

- Provision of instructions before starting work, to enable staff to carry out work correctly;
- Assignment of tasks by issue of instructions,
- The use of vendor-supplied instructions or operating information,
- The reporting of non-conformances, or the inability to follow the specified sequence and any remedial action necessary to leave the item in a safe state while advice is sought,

- The reporting of the final state of the work or item ready for the next working party to continue, handover between shift teams. etc.,

- The availability of information into maintenance and operation instructions.

For specific tasks that are expected to be difficult, or carry significant risks, consideration should be given to the need for detailed method statements. See Annex 13 for more guidance on their use and preparation.

The supplier continued compliance with the requirements for the use of instructions should be monitored.

8.4.6.12. Handling and storage

The requirements for handling and storage should be reviewed with the supplier to confirm that any specific and general requirements, restrictions or limits are understood. The supplier continued compliance should be monitored. Examples of general requirements might include:

(a) Protection during shipment, mitigation of accident damage.

(b) Storage of flammable materials, solvents, lubricating oils, paints, coatings, etc.

(c) Storage of compressed gases and ventilation needs.

(d) Protection of materials from contamination, e.g.

- Capping of open pipes,
- Storage of stainless steels on insulating material to avoid ferrous contamination,
- Separate work benches for ferritic and stainless materials,
- Weld filler rods for prevention of water absorption.

(e) Protection from degradation in storage by daylight for polymer and rubber materials, radiography films, etc.

Restrictions or limits might include:

(i) The amount of materials in an area, e.g.:

- Fuel oil,
- Radioactive material and waste due to criticality and dose rate considerations,
- Liquefied petroleum gas (LPG) due to explosion risks.

(ii) The arrangement of radioactive material in an area due to criticality considerations.

(iii) Weight limits for machine access; "strong points" in floors for location of trestles or packing to support heavy loads.

(iv) Limits on the attachment of lifting gear to structural steel due to potential collapse of the structure by overloading.

8.4.6.13. Verification

Verification activities identified in the specification should be reviewed and confirmed with the supplier together with arrangements for monitoring implementation of their verifications. (See also subsection 8.4.6.15 below).

Verification can be conducted by:

(a) Supplier's personnel.
(b) Independent inspection personnel.
(c) Nuclear installation personnel.

The need for inspection or verification and its extent may be influenced by:

(i) The difficulty of later access for in-service inspection.
(ii) The significance to safety or quality, novelty or complexity of the item.
(iii) The use of special process (e.g. welding; concrete pouring; solvent welding, etc.), and later difficulty of inspection).
(iv) Any limits on the ability to demonstrate adequate performance by later testing.

The verification activities should be defined and properly described to ensure that they address features important to the adequacy of the finished installation. They should be co-ordinated into an inspection plan to aid tracking of the completion of inspections and to ensure that both installation personnel and inspectors are aware of the need to carry out an inspection.

Arrangements should be confirmed which allow for any additional inspections that may be necessary due to:

- Changed plans,
- Remedial work following a non-conformance,
- Deteriorating trends in the quality of work.

8.4.6.14. Non-conformance control

Non-conformance controls and their implementation by the supplier should be reviewed and confirmed with the supplier to ensure that the supplier understands what is expected. Safety Guide 50-SG-Q2, Non-conformance Control and Corrective Actions, contains extensive guidance on this topic and it is recommended that this is used as the basis for any controls associated with this topic.

The need to report non-conformances and proposed corrective action to the nuclear installation responsible person for consideration should be emphasized. The need for review by the nuclear installation to avoid inadvertent changes which might compromise safety justifications prepared for the work should also be explained.

Contingency plans to cope with delays that non-conformances might cause should be established within the terms of the contracts, agreed with the supplier and implemented as necessary. The supplier continued compliance with requirements for non-conformance control should be monitored.

8.4.6.15. Test programmes and instructions

The requirements for the preparation, review, approval and use of test programmes (or plans) and instructions should be reviewed with the supplier and understanding of the requirements confirmed. Monitoring of the supplier's compliance should be done during the work. Safety Guide 50-SG-Q4 Inspection and Testing for Acceptance contains extensive guidance on this topic and it is recommended that this is used as the basis for any controls associated with this topic.

Testing can take place at any or all of three stages:

- Prior to starting work (on receiving),
- During the performance of the work (in-process),
- On completion of work (final inspection and acceptance).

Inspection activities should be drawn together to form a test and inspection plan to control the activities and provide records of their completion (See Safety Guide 50-SG-Q4, para. 313 for the information to be included in the plan).

8.4.6.16. Transfer of responsibility

The specified requirements for commissioning, the preparation, approval and implementation of commissioning controls and the transfer of responsibility for operation should be reviewed with the supplier to confirm understanding and to monitor compliance.

The following Safety Guides published by the IAEA contain extensive guidance on the management and performance of commissioning: 50-SG-Q12, Quality Assurance in Commissioning, 50-SG-Q13, Quality Assurance in Operation, paras 219–222, 50-SG-Q11 Quality Assurance in Construction, para. 211. It is recommended that these are used to form the basis of commissioning controls.

The commissioning instructions should include: descriptions of the tests or inspections that will take place; representation of the participating groups (e.g. supplier; nuclear installation; inspectorate; regulator, etc.); any special training that might be needed; the extent of the system being tested and the purpose of the commissioning; and acceptance criteria.

Additionally suitable management arrangements need to be established to: control the transfer of responsibilities; component or system identification and status control; control and approval of any temporary modifications; the responsibility for maintenance; and the provision of training for nuclear installation operating staff.

8.4.6.17. Updating of documents

The requirements for updating nuclear installation documents, instructions and drawings should be reviewed with the supplier, its understanding confirmed and its continued compliance monitored as work progresses.

Any document affected, revised or developed for the work should be formally controlled to ensure that its status is known at all times and that it is reviewed by nuclear installation staff as necessary.

Documents should be provided or changed in accordance with an agreed programme to ensure they are available for use at specified times and against key stages of work (e.g. before verification of correct installation, before test and commissioning, and before acceptance for operation).

Existing documents affected by the work should be marked or segregated when work commences to indicate that they may not represent the current state or configuration and that their validity should be checked before use. Changes should be made as soon as possible to reflect the new state of the item. The correctness of the changes to the document should be confirmed by direct comparison wherever possible. An adequately detailed description of the changes that have been made should be recorded to allow the nature of the changes to be understood at a later date. The changes should carry a description or identifier (e.g. contract or order numbers) to allow it to be linked back to the work.

New documents should be provided in a format suitable for direct inclusion in nuclear installation systems wherever possible, to avoid the possibility of errors being introduced in transcription. Where transcription is necessary adequate checking or verification should be provided to give confidence of correct transcription.

Adequate resources should be allowed for processing of changed and new documents to ensure their availability at the earliest opportunity.

8.4.6.18. Records

The provision of records, and specified baseline data should be reviewed with the supplier, its understanding confirmed and its continued compliance monitored as work progresses.

The nuclear installation should ensure that it has adequate capability to receive and correctly process all records to meet any identified key dates, such as updating of records before return to service, etc. Some examples of records, their control and content are given in Safety Guides 50-SG-Q3, Document Control and Records, 50-SG-Q2, Non-conformance Control and Corrective Actions, and 50-SG-Q4, Inspection and Testing for Acceptance, para. 410.

Records submission to the nuclear installation should be detailed in a time based schedule if it is important to have certain records available or confirmed as satisfactory to progress through key stages of work, e.g.:

- To be confident that a defined package of work is complete and satisfactory before progressing to the next package of work,
- Confirming that compliance with specification can be demonstrated,
- Demonstrating compliance to regulators.

The nuclear installation should identify records that will be superseded by the work, and arrange for their removal from storage, deposit in an embargoed storage area, or for their destruction once the new records have been received and confirmed as adequate.

8.4.6.19. Spare parts

The provision of any spare parts, or replacements for wearing, or consumable items should be reviewed with the supplier and its understanding of the requirements confirmed.

9. ACCEPTANCE BY THE NUCLEAR INSTALLATION

9.1. GENERAL

Prior to accepting any item or service for use in the nuclear installation, there must be adequate objective evidence to confirm that the status of the item, or the performance of the service, is adequate for the needs of the installation and that it meets the defined acceptance criteria.

The objective evidence will be reviewed prior to acceptance to gain adequate assurance that the item or service can be accepted. The extent of this review will depend on the safety and quality significance of the item or service and also on the adequacy of the quality management system which controlled its development. In some cases review of a quality plan may be adequate to provide this assurance.

Problems that may be encountered during the acceptance phase include typically:

- Plant connected to energized systems is not identified as "live",

- Items controlled by the nuclear installation's safety rules or systems are worked on by the supplier without correct permission,

- Demands to accept items or services are not properly phased by the supplier and overload the installation's staff responsible for acceptance,

- Suppliers submit items or services for acceptance without conducting their review of adequacy, wasting the time of installation staff in reviewing incomplete item,

- Plant item status being incorrect for acceptance, for example: valves still locked off under the control of the supplier; blanks not removed; electrical earths still in place, etc.,

- Performance testing is still incomplete or performance does not meet specification,

- The nuclear installation operations staff are inadequately informed of the actions they are expected to take on the new items, especially emergency actions.

9.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies that will guide the way that acceptance of new or modified items will be managed by the nuclear installation, both in the specification of the way that suppliers will manage their activities and in the way that nuclear installations will control the transfer of responsibilities.

In setting policy the senior management should set out their commitment and hence that of the nuclear installation to:

(a) Clear definition of the nuclear installation requirements to be met prior to acceptance of any new or modified item.

(b) Adequate planning of the handover and acceptance phase of work to provide control of concurrent activities (construction/commissioning/handover).

(c) Demonstrating acceptability before accepting new items.

(d) Controlled transfer of responsibilities from the supplier to the nuclear installation.

Strategic considerations could include:

(i) Early involvement of nuclear installation staff in plant inspections, tests and commissioning to ease the process of acceptance

(ii) The phasing of acceptance (e.g. system by system) also including transfer of documentation to avoid overloading key personnel by having to process large volumes of reports or data in a short time.

(iii) Confirmation of acceptability from the supplier before offering it to the nuclear installation for acceptance to avoid the supplier substituting inspection by nuclear installation personnel for diligent inspection (and rectification) by supplier's personnel.

(iv) The imposition of nuclear installation work and safety control procedures on items connected to operational systems before putting them into service and the need for supplier's staff to comply with nuclear installation procedures.

9.3. LINE MANAGEMENT

Line management should define procedures and establish systems that implement policy and take account of strategy.

The system should contain adequate controls to ensure that the nuclear installation follows guidance set out in Safety Guide 50-SG-Q4, Inspection and Testing for Acceptance, e.g.:

(a) Pre-operational inspection and testing should be systematically conducted.

(b) Acceptance takes place when adequate confirmation of performance has been received.

(c) Any necessary integrated system testing takes place as sub-systems are released.

(d) Acceptance requirements are met and compliance is recorded.

(e) Performance testing is carried out to demonstrate adequate functioning, the testing is programmed and authorized, and operating instructions are validated where possible.

(f) The adequacy and completion of the test programme is reviewed.

(g) The results of testing are adequately recorded and evaluated.

(h) Remaining erection material, spare and replacements for wearing parts are handed over.

Procedures for the control of acceptance should:

- Clearly define interfaces between the groups involved,
- Define how the transfer of responsibilities will be planned, controlled and recorded,
- Define how information will be reviewed and any non-conformances resolved,
- Clearly designate the people responsible for accepting items or services and arrange for this information to be made known to the staff of the nuclear installation and the supplier,
- Define how the as-built documentation will be handed over.

9.4. LINE SUPERVISORS

Line supervisors, or those people assigned to control the acceptance of items and services, should ensure that appropriate actions are implemented regarding:

9.4.1. Control of concurrent activities

The control of concurrent activities should be defined, so that if necessary construction, commissioning, handover and operation by suppliers or nuclear installation can proceed on discrete systems or sub-systems at the same time. If it is not possible to allow concurrent activities, then the programme of work may have to be significantly extended.

Aspects that should be considered in setting the controls include:

(a) Assessment of the hazards the work or the system will pose to the workforce, or surrounding systems e.g. commissioning with working fluids such as carbon dioxide could in the event of leakage result in a hazard to people installing adjacent systems.

(b) Communication of hazards or details of work to all relevant people, e.g.:

- Informing people of the presence of hazardous chemicals in operational plant,

- Identifying and segregating plant systems that are already in service from those still under construction.

(c) Clear identification of the status of plant items, e.g.:

- Still under the control of suppliers,
- Under test (hydraulic, radiographic, etc.),
- Awaiting acceptance by nuclear installation,
- Filled with working fluids,
- Under the operational control of the nuclear installation.

(d) Access limits due to presence of hazards, e.g.:

- Radiological,
- Chemical,
- Stored pressure, etc.

(e) Radiological control requirements due to:

- Adjacent operational plant,
- Radiographic testing,
- Presence of radioactive working fluids in systems.

(f) Imposition of a control system that requires formal permits to be obtained before undertaking work on systems that have been accepted for operation. Any system should:

- Identify the work to be done,
- The plant item that can be worked on,
- Describe limits on action,
- Identify any necessary contingency or emergency action,
- Require authorization by a suitably qualified and experienced nuclear installation person.

9.4.2. Handover activities

Handover activities are planned: to ensure a progressive transfer of responsibilities; to permit the deployment of adequate nuclear installation resources; to avoid overloading key people; to meet key dates and to satisfy operational requirements for plant availability.

Planning requirements to be undertaken by suppliers must be specified in procurement documents. Late imposition of requirements will probably result in delays. (See Section 3).

The benefits of involving nuclear installation staff at an early stage in acceptance and testing should be considered and balanced against the time commitment that will be necessary. Early involvement can ease acceptance by providing assurance that the supplier is diligently reviewing completion and conducting tests and hence reduce later checking.

The transfer of responsibilities should be planned to ensure that:

- The nuclear installation is adequately equipped to accept the responsibility,
- Suitably trained people are available,
- Documentation and spares are available.

Acceptance criteria for the transfer of responsibility should have been defined, reviewed to ensure that they are still valid and that they have not been rendered invalid by any modification or resolution of a non-conformance.

Contingency plans are provided to cope with any failure to accept a system on the scheduled date, both to allow for later rescheduling and to accommodate any adverse effects on operational requirements.

9.4.3. Supplier reviews

It is important to ensure that suppliers conduct their own reviews and checks for conformance to requirements before offering anything for handover to the nuclear installation.

If this is not done, the nuclear installation will undertake duties that properly belong to the supplier and will blur responsibility for provision of conforming items and services.

The supplier should be required to provide confirmation or demonstrate that:

(a) The installation is correct and has been reviewed against the original design including any agreed changes, e.g.:

- Components and sub-systems have been checked against the design,
- Any outstanding inadequacies are identified, clearly marked and corrective action proposals documented ready for final acceptance or rejection by the nuclear installation.

(b) All non-conformances have been resolved and appropriate corrective action completed. Any outstanding non-conformances are clearly identified, and adequate justification for acceptance presented to nuclear installation personnel, ready for their review and their acceptance or rejection.

(c) Commissioning documentation have been reviewed by the supplier for completeness and adequacy. Any documents (e.g. records, check-lists, quality plans, etc.) necessary to demonstrate this are provided to the nuclear installation for their own review.

(d) The as-built condition is confirmed and the specified updated documents or drawings provided to the nuclear installation for their review, acceptance and retention as appropriate.

(e) Training material has been up dated and provided to the nuclear installation for acceptance and usage.

(f) Specified training of nuclear installation operating or maintenance personnel has been provided, its content reviewed and accepted by nuclear installation staff and the necessary numbers of nuclear installation personnel trained.

9.4.4. Status of items

The supplier should show that the status of the item being offered for acceptance is correct with respect to the conditions specified. This can be done by the provision of records, check-lists, quality plans, etc. for review and acceptance by the nuclear installation, or by formal joint inspections involving both the supplier and the nuclear installation, against approved check-lists. It is important to ensure that for example:

- Any temporary connections, blanks, jumper-leads, etc. have been removed or altered as necessary,
- Limits of the item are clearly marked,
- Suitable identification is provided and construction markings removed,

- Any tags, construction locks, supplier applied isolations, etc. are removed,
- Suitable guards, covers, insulation or shielding is in place,
- Valves, handles, indicators and so on are aligned as necessary,
- Material condition is satisfactory.

9.4.5. Integrated tests

It should be confirmed or demonstrated that all necessary integrated or full-functional tests have been carried out satisfactorily. This could be by review of documents, or by witnessing of tests. These tests may be necessary at this stage, because of the difficulty of adequately demonstrating that the various sub-systems function correctly when connected, or that a system works correctly under normal operating conditions before connecting it to existing operational items.

For example:

(a) Pipework systems may need the full system capacity before it is possible to pump at full flow rates.

(b) Software systems may need connection to their peripheral sensors or devices before it can be shown that they perform as expected.

(c) Radiological monitoring equipment may need connection to the operating system before being exercised across their full functional range.

9.4.6. Performance tests

Performance tests are completed to show that the installation meets the specified performance criteria, is capable of its full load and functions correctly at part load, under its expected range of operating conditions.

Results of performance tests should: be recorded and evaluated against the design data; any short fall investigated; corrective action implemented and treated as a design change if necessary; performance re-evaluated and finally accepted as being adequate.

The opportunity should be taken to validate operating instructions across the full range of operating conditions.

9.4.7. Transfer of responsibilities

The transfer of responsibilities should be documented and recorded as handover and acceptance proceeds. It is important that:

- Records are kept and agreed by both supplier and nuclear installation,
- The item is clearly marked to show that it is under nuclear installation operational control,
- A suitable system of permits is implemented to control any future work on the accepted systems,
- Information about the changed responsibilities and the need to obtain nuclear installation approval before doing work on accepted systems, is communicated clearly to the staff of both the supplier and the nuclear installation,

- Any necessary notification to regulators or other external bodies is provided when the responsibility is transferred, including formal transfer of operating licenses.

Annex 14 contains an example of a system of records/certificates that might be used to record the transfer of responsibilities.

9.4.8. Remaining material and equipment

The remaining erection material, special handling equipment, spare parts and replacements for wearing or consumable items should be handed to the nuclear installation. Instructions on their proper storage and any risks or hazards they might cause should be identified.

10. CLOSURE OF THE SUPPLY CONTRACT AND PERFORMANCE ASSESSMENT

10.1. GENERAL

Closure of the contract is often a poorly defined stage and this leads to confusion over:

- Final payments,
- Operational status of plant,
- Extent of any extra work.

In addition performance assessment is sometimes not completed, valuable information that could be used to help in the selection of future prospective suppliers is lost and the nuclear installation loses an opportunity to identify improvements that could help during future supply contracts.

Typical problems that occur during this phase of the procurement process include:

- Difficulty in identifying that all necessary handover activities are complete and that all necessary documentation has been received,

- Non-conformances remain to be resolved and could delay plant being returned to service,

- Responsibility for damage to surrounding structures, systems or components cannot be established and the customer pays for this,

- Scrap or surplus materials are left behind to be removed at the customer's expense,

- Radiological monitoring services are overloaded,

- Key supplier personnel are no longer available and are committed to other work,

- Equipment or information belonging to the nuclear installation leaves site with the supplier.

10.2. SENIOR MANAGEMENT

Senior management should define the policies and strategies relating to closure of the contract and assessment of performance.

Nuclear installation requirements for the closure of contracts and assessment of performance might include:

(a) Retention of some final payment until adequate performance of the supplied item has been proven over an extended period. Possible penalty provisions might also be considered, if adequate performance is not achieved.

(b) Requirements for confidentiality regarding the work done.

(c) The transfer of the ownership to the nuclear installation of designs, copyrights, intellectual properties and the right to exploit future business opportunities resulting from the contract (e.g. future joint venture with the supplier to sell expertise in the field of activity).

(d) Final health surveillance of personnel.

(e) Possible arrangements to share future profits (or losses) resulting from the work with the supplier.

(f) The need to demonstrate compliance with regulatory requirements concerning accounting for certain materials (e.g. fissile) of national strategic importance.

(g) Performance assessment of both the supplier and the nuclear installation conduct during the preparation and conduct of the supply contract.

(h) Conformance with environmental policies and standards.

Strategic considerations might include:

(i) Intentions for long-term partnership with key suppliers with strategically important capabilities.

(ii) The desire to improve the performance and expertise of both suppliers and the nuclear installation personnel for future procurement activity.

(iii) The need to share experience on performance with other parts of the nuclear installation organization, or other nuclear installations in the same utility.

(iv) Commercial and confidentiality considerations affecting the distribution of data on the supplier's performance.

(v) Legal restrictions on the holding and disseminating of information.

10.3. LINE MANAGEMENT

Line management should define procedures and establish systems that implement policy and take account of strategy. Annex 15 includes an example of a procedure for analyzing the performance of suppliers and contractors in use by an operating nuclear installation, and Safety Guide 50-SG-Q5 gives guidance on assessment techniques for use by nuclear installation management.

Procedures and systems might be established to cover:

- Responsibilities for waste material,
- Management of waste disposal to meet environmental requirements, minimise the costs of waste handling and disposal and to exploit any commercial opportunities for the sale of scrap materials,
- Resolution of any remaining non-conformances against the design and specified requirements,

- Final documentation reviews for completeness of new documents and updating of existing documents,

- The provision of records,

- Confirmation of any on-going service arrangements,

- Withdrawal of passes and security clearance,

- The programming of material removal,

- Access to decontamination facilities and the provision of decontamination services.

10.4. LINE SUPERVISORS

Line supervisors or those people controlling the closure of contracts, and assessing performance should ensure that appropriate actions are implemented regarding:

10.4.1. Handover activities

A review should be carried out to ensure that all handover activities are complete and are satisfactory. These activities might include those described in Section 9, e.g.:

- Reviews, checks and inspections for conformance;
- Identification of the status of items,
- Integrated or full-functional testing,
- Performance testing,
- Provision of training,
- Transfer of responsibilities.

Any necessary remedial work to complete an activity should be determined and agreed with the supplier. A programme of remedial work should be prepared by the supplier and approved by the nuclear installation person who is responsible for the supply contract. The same person (possibly in consultation with senior management, or specialist advisers, such as procurement staff) should decide if the outstanding work is significant enough to delay closing the contract. Any decision to delay closure should be reported to the supplier.

10.4.2. Handover documentation

A review should be carried out to ensure that handover documentation is complete. The review could include documentation such as:

- Design documents and calculations,
- As built drawings,
- System configuration documents,
- Software coding listings,
- Reports, records and certificates,
- Inspection reports,
- Test results (testing, commissioning, and integrated testing),
- Performance data,
- Instructions and data,

to ensure that all data specified has been received and is adequate to permit closure of the contract.

As for subsection 10.4.1 any inadequacy should: be identified; notified to the supplier; a remedial work programme prepared by the supplier and accepted by the nuclear installation; and a decision reached on whether or not to proceed with closing the contract.

10.4.3. Non-conformances

Any outstanding non-conformances still existing at this stage of the contract should be reviewed, and as for subsection 10.4.1 they should: be identified; notified to the supplier; a remedial work programme prepared by the supplier and approved by the nuclear installation; and a decision reached on whether or not to proceed with closing the contract.

10.4.4. Material condition

Inspections with representatives of the supplier should be arranged to check the material condition of surrounding items to check for any adverse effects or damage caused by the work done by the supplier.

The results should be compared with any baseline data recorded at the start of work and any effects or damage identified.

As for subsection 10.4.1 any damage caused by the supplier should: be identified; notified to the supplier; a remedial work programme prepared by the supplier and approved by the nuclear installation; and a decision reached on whether or not to proceed with closing the contract.

10.4.5. Removal of materials from site

The removal of materials from site should be arranged to suit any restrictions that might exist, e.g.:

(a) Availability of installed cranage to move heavy items and any associated weight limits.

(b) Size limitations due to the primary containment air lock, or similar access hatches.

(c) Availability of special transporters for large loads.

(d) The need to clear certain areas before return to service due to access limits when operating (e.g. because of radiological dose considerations).

(e) Security checks and examinations.

(f) Hazards posed by lifting loads over operating plant due to the risk of dropping the load.

Any necessary checks to account for quantities of materials should be imposed. These may be necessary for certain strategic materials, those that affect core reactivity or as specified in legislation. Examples of such materials might include:

- Fissile materials, spent fuel, etc.,
- Radiography sources,
- Isotopic composition of radioactive waste materials,
- Zirconium or similar metals,
- Boron in any form.

Reports should be prepared which demonstrate adequate control and submitted to any regulatory body that might require them.

10.4.6. Monitoring materials

Adequate resources should be provided to monitor materials leaving the nuclear installation for radioactivity, together with any necessary controlling documents/clearances permitting removal from site. This may be graded, e.g.:

- Materials leaving the reactor island or containment – 100% monitoring,
- Materials leaving the "conventional" plant areas – sample monitoring,
- Materials leaving the suppliers' administrative offices on site – no monitoring.

The resources might be provided by the nuclear installation, or by specialist contractors engaged by the supplier.

10.4.7. Health examination

Health examinations of suppliers' staff who have been exposed to known hazards should be arranged to provide data for comparison with the results of baseline examinations conducted earlier.

Hazards might include:

- Tritium,
- Toxic metals, e.g. lead, vanadium.

Radiological and other exposure records should be completed.

10.4.8. Disposal of wastes

Disposal of waste materials should be properly controlled to ensure that it meets:

- Legislation,
- Environmental policies,
- Codes of practice published by specialist advisory bodies,
- Consent or limits set for discharges from the nuclear installation.

It may be advisable to audit or otherwise check the supplier's compliance with identified requirements.

10.4.9. Security

As supplier's staff finish their work and prepare to leave site, security clearance and passes should be retrieved or revoked to ensure that only authorized persons continue to have access to the nuclear installation.

This may be done in stages, for example by cancelling permission to enter the primary containment, but continuing to allow access to a segregated supplier's work area.

10.4.10. Retrieval

Any nuclear installation equipment, material or information supplied by the nuclear installation for use during the supply contract should be retrieved from the supplier together with any copies. The use of a checklist of the items supplied will aid confirmation that all items have been retrieved.

10.4.11. Reports

Performance reviews leading to performance reports could address the following typical areas:

- Contract management,
- Standards of work,
- Adherence to programme,
- Site management and supervision,
- Adequacy of resources,
- Conformance to requirements,
- Control of interfaces and subsuppliers,
- Adequacy of specification.

Annex 15 contains an example of a procedure for analyzing the performance of suppliers and contractors from an operating nuclear installation. Annex 16 lists some topics that might be appropriate for performance reporting. Annex 17 provides an example of questions that might help to provide an assessment of a suppliers safety performance.

Annex 1

RISKS THAT MAY BE ENCOUNTERED BY PERSONS INVOLVED WITH SUPPLIERS

Persons involved with suppliers can encounter risks during:

Fabrication:

(i) Physical injury – lifting, handling, crushing, fall, etc.
(ii) Exposure to chemicals – fumes, solvents, etc.
(iii) Entrapment in machinery
(iv) Heat – burning, scalds, etc.
(v) Radiation – electric arc welding, radiography, lasers, etc.

Installation:

(i) Physical injury – as above
(ii) Exposure to chemicals – adhesives, cleaners, etc.
(iii) Crushing – plant items, lifting, mobile machinery
(iv) Falling objects
(v) Fire – welding, heat treatment
(vi) Confined spaces – accumulation of asphyxiating gases or fumes
(vii) Radiation – ionising from adjacent plant items
(viii) Interface with adjacent systems and failures of the boundaries (e.g. electrical or mechanical).

Testing/Commissioning:

As above and including

(i) Stored energy – compressed gas, springs, electrical
(ii) Unexpected occurrences by plant under test – overspeeding of machinery, failure to stop
(iii) Operation outside normal limits – high levels in tanks, demonstration of plant trip functions.

Operation:

(i) Operating new equipment – unfamiliarity, no knowledge of emergency actions, lack of instructions

Decommissioning and disposal:

See Fabrication and Installation above

(i) Stored energy
(ii) Isolation from adjacent systems

Annex 2

PREPARATION OF TECHNICAL SPECIFICATIONS

I. OBJECTIVE

This procedure provides the guidelines for the editing of Technical Specifications to be used in purchasing components and materials.

II. DURATION

This procedure shall be valid as of its implementation by the NPP Manager.

III. AREAS COVERED

All the Departments, Divisions and Sectors reporting to the NPP Plant Manager involved in the editing, approval and release of Technical Specifications.

IV. SCOPE

All purchase of materials and components or service contracts shall be performed through a Technical Specification, which shall be issued following the guidelines in this procedure and shall be applied to all the administrative methods applied in handling such supplies.

V. REFERENCES

- IAEA Guide 50-SG-Q6
- IAEA Guide 50-SG-Q7
- PG-01 - "Procedure for the preparation and control of procedures".
- PGC-11- "Assignment of Quality Requirements for the Supply of Goods and Contracted Services for the NPP".
- PI-09- "Procedure for the purchase of components affecting the plant's safety and/or availability".

VI. RESPONSIBILITIES

VI.1. On publication and modification

The NPP Manager or whoever is appointed shall be responsible for the publication and modification of this procedure.

VI.2. On execution

The editor of the specification shall apply the guidelines herewith in order to generate an appropiate technical specification clearly defining the features of the supply.

The head of the Department or Division generating the purchase shall verify the proper execution of the task.

The Engineering and Planning Division shall verify the safety-related technical issues.

When the elements to be purchased are related with the plant's safety or availability, and when the supplies must comply with the quality requirements in Procedure PGC-11, the technical specifications shall be verified by the Quality Assurance Division.

VII. DESCRIPTION

VII.1. Technical contents

The characteristics of the supply shall be defined as clearly and accurately as possible.

For this purpose, below is a description of the various topics to be taken into account by the editor of the specification, who must include them, disregard them or add other on the basis of this experience and best technical criterion:

- Description of the supply, purpose, required usage and identification of the material or component according to the plant's standards and codes.
- Physical and geometrical features: sizes, capacity, weight, dimensions, shape, etc.
- Characteristics of the material.
- Chemical, mechanical, metallurgic and/or other properties.
- Presentation of the supply: boxes, bottles, drums, containers. Retail packaging (if required). Packaging materials, design and special conditions.
- Basic elements of the supply: additionals, optionals. Spare parts or fittings to be supplied with the main supply. Special tools for repair work and maintenance.
- Codes, standards, regulations, laws or dispositions with which the supply must comply.
- Qualifications, licenses, permits to be held by the supplier, its personnel or its facilities.
- Experiments and tests to be performed during the fabrication, at reception time and during operation.
- Place and conditions of the delivery.
- Participation of the customer in the fabrication, checking and tests. Sites where this will take place. Time during the process at which checks and tests are to be performed.
- Assistance in start-up.
- Post-sale service. Technical assistance and supply of spare parts.
- Radiological conditions in the fabrication: repair work, storage, transport and delivery.
- Safety measures to be taken concerning contamination by aggressive agents.
- Health care measures: cleanliness, sterilization, etc.
- Assembly, semi-assembly and disassembling conditions.
- Surface conditions: sanding, filing, cleaning and surface finishing.

- Coatings, paints and surface protection to be applied.

- Packaging: type, materials, watertightness, biological shielding, required humidity, required temperature, size, hoisting points, opening instructions.

- Safety conditions: fire, explosion, chemical attack, radioactive exposure, cutting and punching edges, toxic releases, excessive weight.

- Handling: Hoisting positions, points and methods, types of hoists, eyebolts, temporary storage, additional protection, mobility conditions.

- Transportation: covered, uncovered, temperature, cargo positioning, safety conditions, qualifications, etc.

- Storage conditions: recommended by the manufacturer for short, medium and long terms, correspondingly. Due dates.

- Materials and elements to be supplied by the customer.

- Plant personnel's training or qualifications related to the use of the supply.

- Transportation, storage, start-up and operational guarantees. Terms, responsibilities and scopes.

- Supplier's experience in suppliers similar to the one supplied.

When services are contracted or when other than utility personnel must perform work at the NPP site, the following requirements shall be applied correspondingly:

(a) Personnel's pre-occupational exams.
(b) Insurance policy.
(c) Medical centre to be used in case of accidents.

VII.2. Quality requirements

The Technical Specification shall specify the quality requirements applicable to the equipment or service to be supplied. These requirements shall result from the application of Procedure PGC-11.

VII.3. Access to the supplier's premises and records

When applicable, generally in the case of fabrication, the conditions under which the NPP representative(s) will be allowed to have access to the supplier's premises and record shall be specified.

VII.4. Requirements concerning documentation

In many cases, there will be documentation related to the items or services being supplied.

In such cases, the following items shall be identified:

(a) The documentation to be provided by the NPP for the supplier to be able to comply with the contract;

(b) The documentation to be prepared and delivered by the supplier to the NPP.

The types of documentation to be taken into account shall be:

- Instructions regarding storage, handling, erection, assembly, maintenance (corrective, preventive and predictive), operation.
- Packing list.
- Protocols, reports, checks and test graphs.
- Calibration curves and instructions.
- Certificates of analysis and test performed.
- List of required spare parts.
- Drawings, sheets, material listings, calculation report, calculation codes.
- Basic or detailed engineering.
- Work plans, graphed timetable.
- Quality Manual; procedures; instructions; certificates; fabrication; inspection and testing programs; reports.
- Working drawings.

Whenever this is required, the instructions shall be included for controlling the distribution, conservation,maintenance, storage and disposal of record. This item shall be performed taken into account the contents in Procedure PI-04.

VII.5. Application of the requirements in this procedure to secondary supplies.

The required conditions must be foreseen for extending the above requirements to secondary suppliers. The NPP may be considered as a secondary supplier should it supply materials.

VII.6. Acceptance

The acceptance method and criteria shall be specified for the various elements, equipment or services provided by the supplier.

VII.7. Administrative requirements

Both the delivery date or dates and the penalties shall be included, as well as the guarantees, their scopes and validity, and the delivery place.

The Specifications contemplating the provision of documentation before or during the material delivery should include a clause indicating that the acceptance and the corresponding payment are submitted to the reception of the documentation in good time and shape.

VII.8. Ordering of the contents

In order to establish an order in the Technical Specification, requirements shall be integrated, depending on their contents, under the subtitles shown in Appendix VIII.3.

VII.9. Verification sheets

In order to ensure that all the technical contents and documentation requirements are contemplated in the Purchase Order, the sheets shown as Appendices VIII.1 and VIII.2 shall be filled and attached to the Order.

Thus, omissions in the editing of the Specification shall be avoided and the work to be performed by other sectors concerned with the supply shall be facilitated.

VII.10. Filing

Technical Specifications shall be filed at the Supplies Division with the corresponding purchasing documents in such a way that it may be identified by the component's or system's code number or by the Purchase Order number.

Copies shall be delivered to the sectors involved.

VIII. APPENDICES

VIII.1. Checklist for technical contents of purchasing specifications.

VIII.2. Checklist for documents required on purchasing specifications.

VIII.3. Guide for ordering the contents in a Technical Specification.

Appendix VIII.1

CHECKLIST FOR TECHNICAL CONTENTS OF PURCHASING SPECIFICATIONS

ITEM	DESCRIPTION	YES	NO	N.A.*	REMARKS
1	Description, purpose, required application and identification of the material or component based on the plant's standards or codes.				
2	Physical and geometrical features				
3	Chemical, mechanical, electrical and other properties				
4	Presentation: packaging, break up				
5	Additional and optional features				
6	Spare parts				
7	Codes, standards, regulations				
8	Qualifications, licenses				
9	Testing				
10	Witness or hold points				
11	Assistance in commissioning				
12	Post-Sale service and guarantees				
13	Radiological conditions				
14	Contamination precautions				
15	Health precautions				
16	Assembly, sub-assembly and disassembling conditions				
17	Surface condition				
18	Coatings				
19	Packaging				
20	Safety conditions				
21	Moving and handling conditions				
22	Transport conditions				
23	Storage conditions				
24	Delivery site and conditions				
25	Materials to be supplied by client				
26	Personnel training				
27	Supplier's background information				
28	Personnel's pre-occupational tests, insurances and health care				
29	Quality level and records				

* Not applicable.

Appendix VIII.2

CHECKLIST FOR DOCUMENTS REQUIRED ON PURCHASING SPECIFICATIONS

ITEM	DOCUMENT	SUPPLIED BY CLIENT	SUPPLIED BY CUSTOMER	N.A.*	REMARKS
1	Handling instructions				
2	Storage instructions				
3	Erection instructions				
4	Assembly instructions				
5	Maintenance instructions				
6	Operation instructions				
7	Testing protocols				
8	Calibration curves or instructions				
9	Analysis and test certificates				
10	Listing of spare parts				
11	Drawings				
12	Listings of materials				
13	Charts (flow, elementary)				
14	Calculation records				
15	Reports				
16					
17	Tracking sheets				
18	Procedures				
19	Manufacturing, inspection and testing program				
20	Quality manual				

* Not applicable.

Appendix VIII.3

GUIDE FOR ORDERING THE CONTENTS IN A TECHNICAL SPECIFICATION

(1) Description and identification of the supply

(2) Scope of the supply

(3) Basic design features

(4) Applicable reference documentation

(5) General conditions

(6) Materials and consumables

(7) Fabrication requirements

(8) Inspections, verifications and controls

(9) Checks and tests

(10) Required documentation

Annex 3

NUCLEAR QA PURCHASE SPECIFICATION

(special condition: quality assurance)

The contractor shall establish and implement an acceptable quality assurance program in accordance with this specification's requirements.

1.0 General Requirements

1.1 The contractor shall perform quality assurance activities in accordance with the following criteria, and if domestic and foreign requirements are in conflict, the domestic requirement shall prevail.

1) Enforcement regulation of OOOOO Atomic Energy act. Article 000
2) Quality assurance requirements described in technical specification

1.2 Upon contract award, the contractor shall submit to the buyer the following documents(3 copies) for the buyer's review, within four (4) months after award. When contractor needs to change or revise the documents, he shall submit to the buyer revisied documents for the buyer's review, and incorporate the buyer's comments if any.

1) Quality Assurance Program manual & procedures
2) Quality inspection and test plan and/or Quality Plan

1.3 The contractor shall review, approve, and verify implementation of the sub-contractor's QA program, and shall transmit the provisions of this specification to its subcontractors and shall require conformity with its provisions in the scopes for which they are responsible.

1.4 In the event that significant defects or deficiencies are found while contractor's performing quality related activities, the buyer has a right to request a stop in work for appropriate corrective actions as necessary. When the contractor receives a stop-work request from the buyer, he shall stop the work, take any necessary action, and then report the results to the buyer. The contractor shall not forfeit the responsibility for the supply of a good quality product in accordance with the purchase specification.

1.5 Upon completion of work, the contractor shall submit to the buyer all quality assurance records, which is to be filed, indexed, and collected in accordance with procedures approved by the buyer. Control measures for QA records shall be established at the outset to provide for traceability of work processes, structures, systems, and equipment.

1.6 The contractor shall assure that his persons or organizations performing quality assurance functions have sufficient authority and organizational freedom, and quality control/inspection activities shall be performed by qualified personnel who have sufficient experience and competence in the field in which they perform.

1.7 The contractor shall assign a quality control manager who is competent and has the necessary knowledge and experience to execute his responsibility, and whose position level shall be equal to or above any other department manager.

2.0 Quality Assurance Audit, Surveillance, Inspection Requirements

2.1 The buyer or his representative (including the regulatory body) shall have the right to perform periodic audits, surveys, and inspections to verify that the contractor or his sub-contractor implement their QA program adequatly.

2.2 The buyer or his representative shall be allowed free access to the contractor's or sub-contractor's facilities, work site, quality records, etc., for the buyer's audit, surveillance and inspection. The contractor shall provide the buyer with help (office, telephone, etc.) without any extra charge.

2.3 The contractor's procedures, including the QA program manual, shall be made available to the buyer in order that the buyer may consult them at any time to verify the contractor's QA program implementation capability and status.
The audit, surveillance, and inspection by the buyer or his representative shall not relieve the contractor of his responsibility to implement his QA program.

2.4 The contractor shall submit to the buyer a quality plan, or an inspection and test plan before the predetermined date specified in the contract document for the buyer's selection of the witness point and hold point.
The contractor shall request the buyer to witness the process within five (5) days prior to commencement of the work.

2.5 Regarding implementation of these spec. requirements, the contractor shall perform the necessary inspection and tests required by the technical specification, design criteria, manufacturing, construction, and contract documents at his own expense.

2.6 In the event that the contractor can't afford to perform tests on his own facilities, he may delegate the test to any authorized agency or special experimental agency deemed acceptable by the buyer.

2.7 If the contractor determines a need for repair, maintenance, or any correction based on the buyer's completed inspection, the contractor shall take corrective action before the buyer's re-inspection without any extra charge.

2.8 The contractor shall submit to the buyer the result of corrective action , or a plan in the event that corrective action cannot be taken immediately, within thirty (30) days after receiving finding reports from the buyer's audit, surveillance, or inspection results.

2.9 The contractor shall submit to the buyer an annual audit plan for internal/external organization, and report the audit results to the buyer every year.

3.0 Site Inspection and Test

If the site inspection and test requirements are specified in contract documents, the following requirements shall be observed.

3.1 The contractor shall submit to the buyer a site inspection and test plan within the the dates specified in the contract documents for the buyer's approval, and shall perform site test and inspection with responsible technical engineer dispached to verify the performance of the contractor's supplied facilitues after completion of installation, or shall provide necessary technical support for performance.

3.2 Site inspection shall be performed after both the buyer and the contractor verify that all prerequisities have been satisfactorily met, and may be postponed at the buyer's request if necessary.

3.3 The contractor shall perform necessary adjustments and pre-operational modulation, etc., required for equipment, instruments, the system, and circuits during preventive maintenance and the start-up test.

3.4 The buyer will provide the contractor with the electricity, fuel, and water necessary for site inspection and test of equipment supplied by the contractor.

4.0 Notification of Significant Deficiency

Upon recognizing the following significant deficiencies, the contractor shall immediately notify the buyer verbally, and within seven (7) working days, shall submit to the buyer documents describing the type and nature of the deficiencies, technical review results, and a disposition plan for the buyer's review and approval.

1) Significant deficiencies in the QA manual (not include usual nonconformance)
2) Conditions adverse to quality against PSAR, as significient deficiencies for final design admitted for construction.
3) Significant deficiencies in structure, system, and/or construction which require comprehensive evaluation, design change, and repair.

Annex 4

PLANT INSTRUCTION FOR TECHNICAL REPRESENTATIVE

For the information of:

Maintenance Co-ordinator
Engineering Co-ordinator
Head of Administrative Dept.
Head of Electrical Maintenance Dept.
Head of Instrumentation & Control Dept.
Head of Engineering and Planning Dept.
Head of Radiological Protection & Safety Dept.
Head of Operation Dept.
Head of the Quality Assurance Div.
Head of the Training Division
Production Assistant
Head of the Inspection and Robotics Team
Head of Projects and Civil Works
Head of General Services
PSA Co-ordinator
Head of the SPC Delegation

Issued by:

Date:

Ref.: NPP's Technical Representative for activities contracted with third parties.

It it customary in this NPP to contract work and services provided by suppliers in different areas and disciplines.

In such cases, the Plant Manager shall appoint a NPP's Technical Representative to perform such role before the contractor, who shall be entrusted with the goals and obligations described below.

1) GOALS

Acting on behalf of the NPP in any activities concerned with a contractor or purchase order placed with third parties.

2) OBLIGATIONS

- Shall have a thorough knowledge of the contract concerning both administrative and technical issues.

- Shall have a sufficient knowledge of the reference documentation (codes, standards, laws, specifications, etc.) either mentioned in the contract or enclosed to it.

- Shall be the only person in communication with the suppliers, not allowing for other ways of communication without his/her consent. For such purpose, a clearly defined communication method shall be created, including requests, service orders, minutes of meetings, fax. telex, etc.

- Whenever required, he/she shall co-ordinate meetings with the participation of representatives from different areas of the supplier company or of the NPP and shall put sectors in touch for dealing with specific topics.

- Shall have a clear picture of the scope of the supply, as well as of the various sub-contracts that may derive from the original contract and related to such supply.

- Shall perform a thorough follow up of the contract's timetable, as well as of the timely compliance with the various stages, milestones, critical activities, etc.

- Shall have a sound knowledge of the methods used in measuring progress and certification, and on their relation with the features of the supply, costs and timing.

- Shall have an advanced view of the work performance, so as to detect potential problems affecting such performance in time and shape and affecting the NPP's interest due to higher costs or additional charges. For this purpose, he/she shall have an authorisation from the Head of the Sector involved for the approval of invoices or payments additional to those set forth in the contract.

- During follow up, shall verify that the tasks are performed in compliance with the specifications in the contract.

- Shall convey the analysis and the issue of documents, the definition of parameters and technical matters as a whole to the Engineering Department.

- Shall convey to the Quality Assurance Division the establishment of work stages at which the presence or the approval of the work performed by its inspectors are required, as well as the performance of quality control, audits, surveillance and approval of the corresponding documents.

- Shall be responsible for signing the progress reports that allow for partial certifications established in the contracts and, thus, his/her authorisation shall be required before invoices from contractors and suppliers are processed for payment.

- Shall be responsible before the NPP authorities for developing the activities underway and shall be liable to report, as early as possible, on any foreseen inconveniences that may affect contract conditions.

- Shall be acquainted with any modifications made or foreseen concerning the contract conditions and shall be authorised to approve changes, as far as they are made in written form, on the basis of internal consultation as deemed necessary.

- When referred to specific subjects, (Engineering, Quality Assurance, etc.), the approval of the corresponding sectors shall be required.

- Shall perform internal co-ordination with the various NPP sectors when plant activities are performed, thus minimising interference and idle time.

- Shall co-ordinate all the services and tasks to be performed by the NPP in accordance to the contract and verify in advance the availability.

- Shall verify very especially that safety requirements are fulfilled on the basis of the internal procedures and regulations in force.

- Shall co-ordinate all internal activities related to the contract, such as the analysis of documentation, approvals, inspections, tests, etc., resorting to the specific sectors for such purpose.

- On the basis of the delays or advancements occurred during the development of the activities, he/she shall apply bonuses or fines correspondingly.

- Shall convey the definition of safety requirements to the Radiological Protection and Safety Department, so as to comply with the standards and procedures in force and, thus, eliminate, prevent and control the existing risks.

- Shall be responsible for collecting all the technical documents related to a contract and for sending it for its processing.

Each one of the sectors shall diffuse the above concepts and shall strictly comply with the same, looking forward to an improvement in the management of contracts and supplies and, consequently, for the benefit of the plant's activities as a whole.

Undersigned:

Annex 5

EVALUATION OF SUPPLIERS OF EQUIPMENT AND MATERIALS

1. SCOPE

This procedure governs the evaluation of suppliers of equipment and materials to for nuclear power plants.

2. EVALUATION - POLICY

All suppliers of materials and equipment to be installed in a nuclear plant shall be evaluated prior to award of order, to determine their capability to deliver the product requested. The evaluation shall consist of an assessment of the supplier's financial, technical, and quality assurance capabilities as they relate to the product in question. The assessment need only proceed to the point that adequate confidence in a decision on the supplier's ability has been attained.

Ordinarily, tenders from unqualified bidders will not be accepted. Where special circumstances apply, as governed by client contract or to avoid an undesired situation, suppliers may be conditionally qualified as set out in Section 6.

The Procurement Manager may authorize solicitation of bids from an unqualified supplier.

3. SUPPLIER INFORMATION

The procurement quality assurance group shall maintain appropriate supplier qualification records which provide a record of the acceptability and development status of suppliers' quality assurance programs and of other evaluation aspects.

4. PROCESS AND CRITERIA

a) Evaluation shall be documented in Engineering, Quality Assurance and Commercial Evaluation reports or a combined "Supplier Survey Report" form which shall address the following areas, as appropriate:

- Quality Assurance
- Design/Engineering
- Manufacturing
- Commercial
- Production/Inventory Control (Delivery)
- Service/After Sales Support

b) Evaluation may be conducted by any or all of the following means:

- Review of previous contract performance with . NPP
- Review of financial stability

- Review of general product capability
- Review of information supplied by the supplier
- On-site survey of supplier's facilities and capabilities, as required
- Review of references from other clients, as required
- Review of Quality Program certification/registrations held by the suppliers.

c) The criteria used shall include:
- Past experience in conforming to NPP requirements (if applicable)
- Future ability to meet the NPP requirements
- Quality criteria in Procedure 933.4.1.

5. RESPONSIBILITIES

The assigned Buyer shall:

a) Assess the supplier's commercial capability, with assistance if required from Contracts, Legal and Finance;

b) Arrange for engineering staff to assess the supplier's technical capability;

c) Arrange for procurement quality assurance staff to assess the supplier's quality assurance program and capability, and

d) Record the acceptable suppliers on the final bidders lists, include the result of the assessment in the Purchase Recommendation (Procedure 854.1) and forward a copy of the evaluations to Records Management System (RMS).

6. CONDITIONAL QUALIFICATION

a) The special circumstances justifying the exceptional approach shall be documented in a note to the applicable Contractors History File (CHF) of RMS.

b) The supplier assessment shall be carried out to identify all deficiencies which must be remedied to satisfy the bid qualification requirements. The supplier's understanding of the requirements and its ability to upgrade its capabilities and facilities within the requisite time frame shall also be assessed.

c) The supplier shall provide a documented plan to achieve conformance, which shall include key milestones, commit the bidder to advising NPP of the achievement of each milestone and permit NPP access to the supplier's facilities to monitor the plan's implementation.

d) NPP shall notify the supplier that failure to achieve any milestone may result

i) in its disqualification as a bidder, or

ii) in NPP applying an evaluation penalty equal to NPP estimate of the cost of the additional surveillance program which NPP would need to implement to compensate the deficiencies in the supplier's program, or

iii) in cancellation of the order.

7. REFERENCE DOCUMENTS

Procedure 854.1 Tender Evaluation and Purchase Recommendation

Procedure 933.4.1 Supplier Qualification Criteria

Annex 6

EVALUATION OF DESIGN CONSULTANTS QUALITY ASSURANCE DOCUMENTS

1. SCOPE

This procedure outlines the method by which Operating Unit Quality Assurance evaluates the quality assurance documents submitted by a Design Consultant to define the design quality assurance program.

2. PURPOSE

a) To establish a method which provides for consistency in the evaluation of these documents.

b) To determine whether or not the submitted documents reflect a planned and systematic pattern of operation that meets stated requirements

3. DOCUMENTS

The documents which describe a Consultant's Quality Assurance (Q.A.) program should consist of:

i) Quality Assurance Manual

ii) Procedures

4. INSTRUCTIONS – GENERAL

The Operating Unit's Senior Quality Representative has lead responsibility for conducting and reporting on evaluations. Such evaluations shall satisfy the following requirements:

a) the applicable quality assurance program standard or requirements shall be clearly defined

b) the documents shall be evaluated as described herein, using additional aids such as checklists, and additional checks that may be deemed necessary to ensure that the Consultant's Q.A. program satisfies the applicable QA Program requirements.

5. QUALITY ASSURANCE MANUAL

a) The manual shall be evaluated, relative to the applicable requirements, to determine that the following aspects are adequately defined:

- the standard it complies with
- Management policy statement of quality assurance
- Consultant's organization
- Consultant's Quality Assurance Representative
- responsibility and authority of Q.A. personnel
- qualification and training

- control of design activities
- documentation system
- control of computer programs used in design
- design verification and document approval
- change control
- auditing, monitoring and review of Q.A. program

b) The manual shall be checked for the following:

- signature of approval by a Senior Management official,
- revision number or revision date,
- method of periodic review and updating

Specific checklists shall be used to confirm a manual's compliance to a particular standard

6. PROCEDURES

Procedures which are contained in or referenced by the Q.A. Manual shall be evaluated for the following aspects:

- reference number and revision indicator
- procedure approval
- scope and applicability
- activity adequately and clearly defined
- control of the activity is adequate
- approvals
- records

7. REPORTS

a) Upon completion of an evaluation of the design consultants documents, a report shall be processed, showing method of evaluation, results obtained, and indicating acceptance or the reasons for non–acceptance.

b) The numbering of reports shall be in accordance with Records Management requirements.

c) Copies of the report shall be forwarded to:

- Design Consultant's Senior Management
- Operating Unit's Management
- Relevant Contracts Representative
- Records Management
- General Manager Quality

Annex 7

TOPICS INCLUDED IN A CONTRACT ENQUIRY

0.0 BID INSTRUCTIONS
- 0.1 General
- 0.2 Deviations and Proposed Alternatives
- 0.3 Price

1.0 GENERAL
- 1.1 Introduction
- 1.2 Purpose
- 1.3 Definitions
- 1.4 Abbreviations
- 1.5 Reference Documents

2.0 SCOPE OF WORK
- 2.1 Design & Licensing Basis
- 2.2 Contractor's Scope of Work
- 2.3 Deliverables
- 2.4 Scope Exclusions
- 2.5 Client's Scope of Work

3.0 PROJECT MANAGEMENT
- 3.1 Organization
- 3.2 Interfaces
- 3.3 Correspondence
- 3.4 Language
- 3.5 Planning and Progress
- 3.6 Cost Control
- 3.7 Project Meetings
- 3.8 Expediting
- 3.9 Deviations
- 3.10 Contract Changes

4.0 DOCUMENTATION
- 4.1 General
- 4.2 Language and Units of Measurement
- 4.3 Document Format
- 4.4 Document Identification and Release Status
- 4.5 Document Transmittals
- 4.6 Data Files
- 4.7 Records

5.0 QUALITY ASSURANCE
- 5.1 Specified Requirements
- 5.2 Quality System
- 5.3 Project Control Plan

6.0 VERIFICATION BY CLIENT
- 6.1 Audits
- 6.2 Rights of Access
- 6.3 Product Verification and Acceptance

7.0 SUBCONTRACTING
- 7.1 prior written approval of Client.
- 7.2 unpriced purchase order; Subcontractor's PCP.

8.0 DELIVERY
- 8.1 Delivery Schedule
- 8.2 Delivery Address

9.0 PRICE [Not applicable to inquiry]

10.0 INVOICING AND TERMS OF PAYMENT
- 10.1 Invoicing Instructions
- 10.2 Payment Milestones
- 10.3 Invoice Settlement

11.0 PENALTIES

12.0 GUARANTEES

Annex 8

EXAMPLE OF INSTRUCTIONS TO BIDDERS

It is essential and it is a requirement of this enquiry that Bidders comply with the instructions as specified in any referred enclosure. Quotations that fail to comply may not receive full consideration during evaluation or ultimately may be disqualified.

REQUIRED DETAILS TO BE QUOTED BY BIDDER AS A MINIMUM

Bidder's quotation, in the english language, shall include among others (but not limited to) following information:

1) The enquiry number and requisition number.

2) A detailed description of the Material offered.

3) Shortest realistic delivery time per item.

4) Validity period. (Quotations must be valid for a period of 120 days minimum)

5) Place of manufacture.

6) Estimated shipping weights and dimensions.

7) Acceptance of payment 100%, 45 days after receipt of correct invoices, provided all agreed contractual, including documentation requirements of the Purchase Order have been fulfilled.

8) All specific information asked for in the enquiry and accompanying enclosures, including data sheets, completed with all requested information and filled in commercial questionnaire.

9) Bidder is to state clearly Material involved will be supplied/manufactured in strict accordance with the requirements stipulated in this enquiry plus all enclosures and with any international, national and/or local codes, rules and/or regulations which are applicable to the Material being enquired, for use in the country as mentioned on the front sheet of this enquiry.

10) **Where specifications cannot be adhered to, deviations must be stated and specifically brought to Purchaser's attention in a separate section headed "Exceptions"**

11) Bidder may offer as an alternative to the base case any other design which can be acceptable from a technical viewpoint and will result in a lower price or in lower operation costs.

12) Spare parts quotation in accordance with instructions.

ACCEPTANCE/REJECTION

Purchaser and/or Owner reserve the right to accept other than the lowest quotation and to accept or reject any quotation in whole or in part for any reason whatsoever.

QUOTATION COSTS

All costs associated with the preparation of a quotation on this Enquiry are for Bidder's account and will not be reimbursed by Purchaser and/or Owner.

SEALED BID PROCEDURE

Bidder to ensure the quotation, in the requested number of copies, is in Purchaser's possession on or before 12.00 o'clock noon on the date as indicated in the enquiry.

The quotation shall be forwarded to the address indicated in the enquiry for which purpose 'address labels' are enclosed. THE USE OF THESE 'ADDRESS LABELS' IS MANDATORY.

Purchaser strongly recommends hand delivery to Purchaser's office.

BIDS NOT COMPLYING WITH THESE SEALED BID INSTRUCTIONS AND NOT RECEIVED BY 12.00 O'CLOCK NOON ON THE CLOSING DATE INDICATED IN THE ENQUIRY WILL BE EXCLUDED FROM PURCHASER'S EVALUATION.

COMMERCIAL QUESTIONNAIRE

SELLER IS REQUESTED TO COMPLETE AND RETURN THIS QUESTIONNAIRE WITH HIS QUOTATION - FAILURE TO INDICATE YES OR NO MAY SUBJECT YOUR BID TO AUTOMATIC DISQUALIFICATION.

NUCLEAR TECHNOLOGY ENQUIRY NUMBER:

	YES	NO
1. Does SELLER without exception accept the Terms and Conditions of Purchase for this project, issue 12/94? Note: it is unlikely that sufficient time will be available to develop non-compliant quotations	___	___
2. Are the offered goods strictly in accordance with the requirements stipulated in enquiry? Deviations are given in section ..... of SELLER's quotation.	___	___
3. Is all specific information asked for in the enquiry and accompanying documents, including data sheets to be filled in, included in SELLER's quotation?	___	___
4. Has SELLER read carefully, and fully understood the requirements of all technical and commercial attachments applicable to this enquiry?	___	___
5. Does SELLER confirm that the Quality assurance requirements as specified in the requisition will be met?	___	___
6. Has SELLER a Quality Assurance Certificate in accordance with	___	___
7. Does SELLER undertake to provide sufficient materials, equipment and labour to ensure completion within the delivery time offered?	___	___
8. Provided an order is placed within the validity period of SELLER's quotation, is SELLER's pricing fixed for the duration of the Purchase Order - without escalation of any kind?	___	_

COMMERCIAL QUESTIONNAIRE

	YES	NO
9. Does SELLER accept the preferred terms of payment for this project? If not, SELLER is to propose terms of payment.	___	___
10. Does SELLER confirm receipt, acceptance and inclusion of contents within SELLER's quotation of the following Enquiry attachments? - Request for quotation. - Package Specification No. 7719-7031, issue 1 and noted attachments - Terms and Conditions of Purchase, issue 12/94. - All enclosures (as stated on enquiry cover sheet).	___	___

Place and date: ..... Signature:

SELLER'S Company stamp :

Annex 9

EXAMPLE OF TENDER OPENING CONTROLS

Category	Controls
Low value	Opened by a person from the procurement group. Recording the following details: - Date of arrival. - Price. - Programme duration. - Any alternatives offered to the specified requirements.
Medium Value	Opened by a person from the procurement group, and another independent person (eg. junior staff). Recording the details as above.
High value	Opened by a person from the procurement group, and an independent senior staff member Recording: - all suppliers who tendered. - submitted prices. - whether the tender was received on time or late. - any suppliers who did not tender (and reasons, if possible, for addition to the supplier database). - comments on omissions, or non-conformance with the procurement requirements.

Annex 10

CONTRACT INAUGURAL MEETING

1. Introductions.

2. Objectives of meeting.

3. Client Team Identification and Responsibilities.

4. Contractor's Team Identification and Responsibilities.

5. Matters arising from Contract Letter.

   - Acknowledgement.
   - Parent Company Financial Guarantee.
   - Performance Bond.
   - Reiterate contents of Contract Letter as appropriate (e.g. optional work, programme, questionnaires, etc).

6. Correspondence Procedure.

   - Address to be used for document/letter submission (commercial, technical etc).
   - Copies of documents/letters/required.
   - Letter and transmittal reference/numbering system.

7. Contract Administration.

   - Issue of purchaser-supplied materials.
   - Commissioning responsibilities and procedure.
   - Commissioning documentation. Documentation required to be in place before issue of Taking Over Certificate.
   - Operating and Maintenance Manuals.
   - Training.
   - Method of instructing work to commence.
   - Procedure for approval of contract, documentation submission.
   - Requirement that any verbal and/or meeting minute instructions to be confirmed in writing by Client.
   - Procedures for Variations, to contract Additional/Optional work commitment
   - Procedure for commitment of Provisional monies.
   - Procedure for Time and materials work.
   - Procedure for waiting time/delays (not automatically the subject of additional payment).
   - Procedure for requesting and obtaining contractual Certificates (Payment, Taking Over etc).
   - Procedure for notification, by contractor, of additional work/claim.

8. Technical Information.

   - Review of contract scope.
   - Submission of outstanding technical detail (from both parties).

- Contractor's design submissions.
- Precautions against computer viruses.
- Contractor's method statements.
- Approval of subcontractors and suppliers.
- Submission of CV's for contractors and sub-contractors staff.
- Non-conformance/concession arrangements.
- Site fault reports.
- Drawing control.

9. Quality Assurance.

   - Contract Quality Requirements.
   - Contractor's Quality Systems arrangements.
   - Contract-specific Quality Plan.
   - Responsibilities of Inspection Agency (if any).
   - Records requirements.

10. Planning and Programme.

    - Contract Programme. Submission for Client approval. Contract Key Dates. (design/manufacture/site/documentation).
    - Client requirements for progress reporting. Contract Programme marked up with actual progress. Sub-programmes. Look-ahead programmes. Reporting of labour and plant. Method and frequency of preparation and submission.
    - Start dates. Access, and client provided material requirements.

11. Site Work (where applicable).

    - Refer to requirements specific to the NPP, and any documents describing their requirements.

12. Safety and Environmental Issues.

    - Risk Assessment.
    - Radiological Requirements and Radiological control arrangements.
    - Requirements for compliance with environmental requirements of site.
    - Maintenance of the Health and Safety Plan.

13. Invoicing Procedure.

    - Issue copy of Client's invoicing requirements and procedure.
    - Anticipated payment schedule submission from Contractor.

14. Any Other Business.

15. Dates and Locations of Future Meetings.

Annex 11

START ON- SITE MEETING

1. Introduction.

2. Objectives of the meeting.

3. Review Inaugural Contract Meeting Minutes.

   - Communication routes.
   - Contract administration.

4. Management.

   - Give the names of Client representatives who will monitor/manage the contractors on site, including Operating staff.

   - Obtain the names of the Contractors Site Management Supervision and key personnel and how supervision of the Works will be carried out to safety standards acceptable to the Client and Operating organisation.

   - Ensure that the contractor describes how he intends to meet his obligations and responsibilities specified in his Company's Safety Policy Statement and Local Safety Statement.

   - Draw the Contractor's attention to the safety requirements of the tender specification.

   - Issue the Contractor with a description of local safety requirements and arrangements. Explain its significance to the Contract and any other appropriate location documentation.

   - Explain the need for the Contractor to ensure all his Sub-Contractors conform to all safety requirements.

   - Identify the area allocated to the Contractor for his Site Accommodation and Storage.

   - Identify the provision, where reasonably practicable, of segregated Contractor controlled work areas which are suitably barriered and sign posted.

   - Identify the locations arrangements and standards for the provision and location of first aid, fire fighting, canteen facilities, toilets/showers and amenities and their application to the Contractor's employees.

     Note: For large contracts and those involving major hazards it should be a requirement that the Contractor carries out a Self Safety Audit Programme and that the Client has access to the findings.

- Identify the procedures for written reporting of fires, injuries, diseases, dangerous occurrences and near misses of significant consequence. Copies of all reports to the statutory Health and Safety Authority to be sent immediately to the senior Client representative.

5. Scope of Site Works and Contractual Liabilities.

   - Defined in Contract Specification
   - Amendments
   - Outstanding Issues
   - Technical Queries
   - Operating and Maintenance Manuals
   - Training Requirements

6. Programmes and Planning.

   - Contract Programme
   - Construction/Commissioning Programme
   - Programme Updates and Review
   - Progress Meetings

7. Quality Assurance.

   - Client Site Quality Plan and QA Philosophy
   - Contractors Site QA Plan and Responsibilities
   - Sub-Contractor QA Control by Contractors
   - Method Statements
   - Approval of Contractors QA Plans, Procedures and Method Statements
   - Drawing Control

8. Test and Commissioning.

   - Responsibilities

   - Documentation

     - Manufacturers Test Results
     - Standard Test Procedures
     - Plant Completion Documents
     - System Commissioning Documents
     - Test Reports and Results

   - Document Submission and Approval

9. Administration.

   - Identify the arrangements for all Contractors and Sub-Contractors Employees to attend the Site Induction Training

   - Ensure the Contractor provides details of working hours on site.

- Identify the provisions for issuing of Contractors passes and the recording of Contractors staff on the location. Local security arrangements and vehicle parking.

- Ensure the Contractor provides a categorised list of employees authorised to drive vehicles on site or operate plant and machinery in mixed occupancy areas.

10. Documentation.

- Issue the relevant standard safety documents describing client systems.

- Make arrangements for the examination by the Client's representative of all documentation required by statute.

11. Method Statements.

- Discuss the provision of Method Statements as required by the Contract.
- Discuss the reviewing and change (if necessary) of any Method Statements already provided.

- Identify the need for the workforce to work to the methods stated in the Method Statement and to have a copy for reference at the workplace.

12 System Safety and Safety Rules.

- Identify the potential location hazards, including System hazards, to which the Contractors Employees may be exposed.

- Identify the precautions they are to take to safeguard against these hazards.

- Obtain the names of Contractor's employees he requires to be nominated Supervisors in accordance with the Safety requirements of the Client.

- Identify the facilities for the safe retention of Safety Documents and associated control of keys.

- Identify the need for the Contractor to take precautions to safeguard other persons or equipment that may be affected by his activities.

13. Radiological Control.

The NPP radiological control specialist should be present at the meeting to ensure that:

- Any site specific information is provided to the Contractor.

- Any training requirements for the Contractor's employees are arranged.

- The Contractor is fully conversant with his obligations under the radiological safety rules, radiological safety instructions, local management instructions and

- All the required forms and documents are completed and forwarded to the NPP.

Specific agreement must be obtained on:

- Dose levels.

- Contractor's Employees as competent Persons.

- Contractor using Radioactive Substances or Radiation Generators;

- Protective clothing and equipment for work in contamination controlled areas.

- Tools and equipment for use in contamination controlled areas.

- Arrangements with Dosimetry Service providers.

- Radiation Protection Advisers; Radiation Protection Supervisors and suitable staff for the working environment.

14. Control of Substances Harmful to Health and Noise.

- Identify the Procedures necessary to meet the locations requirements when substances subject to the Control of Substances Harmful to Health Regulations are to be used.

- Identify the requirement that the Contractor informs the Principal Contractor when he intends using plant or equipment which will generate noise in excess of 85dB(A).

15. General Safety.

- Review of the Health and Safety Plan

- Identify the safety requirements at his accommodation (e.g. Fire Precautions, Housekeeping, routine safety inspections etc).

- Identify the specified Site Access and Exit routes for Contractors employees to the place of work.

- Identify the location of scrap and waste disposal points with particular reference to the special requirements for the safe disposal of dangerous or noxious substances.

- Explain the location's emergency communication systems for reporting immediately fires, serious injuries and dangerous occurrences.

- Identify the requirements for the Contractor's Site Safety Supervisor to accompany the Client's Nominee when routine Safety Inspections are being carried out.

- Identify the need for the Contractor to be able to show that all Lifting Equipment, Lifting Tackle and Access Equipment meets all statutory requirements.

- Identify the need to provide his employees with adequate protective clothing and equipment for the work or area in which they operate.

- Ensure that the Contractor understands that the wearing of Safety Helmets on the site is a mandatory requirement.

- Identify the arrangements and requirements controlling the use of vehicles by the contractor at the location.

Annex 12

SITE CONTRACT LOGS

1. Purpose of Log

The purpose of the Contract Log is to allow the formation of a concise, succinct and easily retrievable record of Site Activities to facilitate the resolution in a fair and equitable manner of any claims or other Contractual Disputes which may arise in the future, possibly years after the events to which they relate.

2. Setting up a New Log

Preferably the standard pre-printed Log Book (Ref should be utilised but a blank A4 hardback record book can be used in the event of non-availability. Alternatively pre-printed individual log sheets can be used if it is more economical to do so but these must be kept in a file or binder to form a log. The following should be recorded at the front of the book or file: -

Location where work carried out
Contract Title
Contract No.
Type of Contract
Scheme Title
Log Volume No.
Log Start Date
Log kept By (Site Engineer)
Supervising Officers Name
Engineer Responsible Name
Design Engineer Name
Supervising Officers Nominee Name (if not Site Engineer)

3. Maintaining the Log

Depending on the size and complexity of the contract, approximately one A4 page per day should be sufficient.

The following should be recorded daily:

Weather
Labour on site
Plant on site
Delays (with reasons)
Action taken to resolve delays
Visitors
Meetings held
Information required/given
Work Instruction issued
Safety problems
Actions taken to resolve safety problems
Tests performed (with results)
Inspections performed (with results)
Any verbal agreement made with the contractor and their confirmation
Deviations from specification and action taken
Verbal instructions from HQ
Contact with Station
Contact with external Authority
Anything thought likely to lead to a claim or affect the magnitude of a claim

The level of detail and legibility should be such that any staff who may be reading the log several years after the event should be able to understand the log and assimilate from it sufficient information to resolve the claim or dispute at issue.

Annex 13

METHOD STATEMENT

A Method Statement should be produced for each job that has inherent difficulties or significant risks in its execution, either for those carrying out the work or those near the work location. An integrated method statement should be produced covering quality, engineering and other aspects as well as personnel safety.

These statements are often required by clients or regulatory authorities seeking assurance that the contractor intends tackling the work in a safe and professional manner and they should be produced automatically by contractors committed to the management of safety.

Generalised method statements are sometimes submitted during the bid stage of a contract. These often prove to be of little use when it comes to carrying out the work and job specific method statements should always be provided where the hazards warrant a statement being produced at all. Frequently encountered jobs which usually justify method statements include, for example, structural steel erection, roof work and demolition. These are all jobs for which there is often no obvious safe means of access.

The date and origin of all method statements should be clearly shown.

Competent method statements will include the following key Safety, Health and Environmental features.

- Identification of the individual(s) who are responsible for ensuring compliance with the method statement, including deputising arrangements, e.g. named site agent and named supervisor as deputy.

- The qualifications/training/experience of those permitted to carry out the type of work and any special training for the specific job, e.g. labourer trained as dumper driver.

- Definition of the safe means of access to and from the work location, including permanent platforms, scaffolds (hand rails, toe boards, etc.) mobile towers. Requirements for barriers and notices to limit access to safe areas also needs to be spelt out.

- Identification of the safe access routes for plant and equipment, especially in congested areas and taking into account the need to maintain emergency access routes.

- Specification of the personal protective equipment and safety equipment to be used, e.g. safety harnesses (not belts) to be worn while aloft secured to pre-drilled anchor holes.

- Locations for off-job equipment and material storage and on-job lay-down, handling and security arrangements.

- Equipment required to carry out the work, how it will be provided and what inspections need to be carried out, including cranes, slings, etc.

- Definitions of the sequence by which the work will be carried out with the aim of avoiding hazards and limiting any residual risk. Limitations to part-complete work, e.g. need for temporary supports, should be identified.

- The need for any temporary works to be provided and the responsibility for their competent design.

- Consideration of the impact weather and limitations to working in adverse conditions.

- The method statement should generally indicate how risks are to be avoided, including those to other workers and the public at large, and to this end it is useful if it prohibits bad practices which are known to exist in the industry or can be anticipated on a particular job.

Annex 14

HANDOVER OF A PROCESS/PRODUCTION PLANT

The method of plant handover from the final erection through the initial checking and testing to takeover by the operator can be recorded by a system of certificates. The sequence of documents shown below is based on the Main Contractor or Contractor installing and commissioning the item, system, or structure with a final handover to the NPP. The stage of handover can change according to the conditions of the contract but the principles or recording and controlling the commissioning procedures remain the same.

Issue Receipt	Certificate	Comments
By - Contractors To - Main Contractor	Plant Erection Completion Certificate	Issued when plant is built and to include the defects and omissions list
By - Commissioning Team To - Commissioning Manager	Static Test Sheet	Issued when plant is manually operated
By - Commissioning Team To - Commissioning Manager	Safety Rule Implementation Certificate	Issued when plant is to be made live and used to control work or testing on or adjacent to the plant
By - Commissioning Manager To - NPP Site Manager or Agent	Record of initial operation certificate	Issued after an initial operation and to include the defects and omissions list
By - NPP Site Manager or Agent To - Operational Manager	Clearance for operation certificate	The operational Manager accepts responsibility for the plant subject to any defects and omissions
By - NPP Project Manager To - NPP	Internal taking over certificate	The notifies the NPP of the contractual take over date and the start of the maintenance period
By - NPP Project Manager To - NPP	Final Clearance certificate	Issued one month before the expiry of the maintenance period and to list the outstanding defects and omissions

Annex 15

PROCEDURE FOR ANALYZING THE PERFORMANCE OF SUPPLIERS AND CONTRACTORS

I. OBJECTIVE

Defining and applying a methodology for the analysis of the performance by suppliers and contractors who have performed activities for this NPP so as to fix uniform evaluation criteria and create a data base in this area.

II. DURATION

This procedure shall be valid as of its implementation by the NPP's Manager.

However, it may be applied, as of such date, to contracts or supplies performed beforehand.

III. AREAS COVERED

All the sectors including personnel acting as "Technical Representatives" (as established in the Plant Instruction dated April 7, 1994), as far as technical matters in such work are concerned.

The Quality Assurance Division, in quality-related issues.

The Supplies Division, concerning administrative and contractual issues.

IV. SCOPE

This procedure shall be applied to:

- All contractors performing work related to systems, components and installations related to plant processes.

- Contractors performing work within the NPP premises that, to the judgement of the Management, require performance analysis.

- Any supplier performing repair work, modifications or manufacturing equipment, components or devices requested by the NPP that are related to systems or process facilities, as far as they are not manufactured in series or out-of-the-shelf.

- Any NPP . suppliers whose performance needs evaluation to the Manager's judgement.

V. REFERENCES

- PG-01 - Procedure for the preparation of procedures.

- Plant Instruction dated April 7, 1994 · NPP · Technical Representative on activities contracted with third parties.

VI RESPONSIBILITIES

VI.1 On publication and modification

The NPP Manager or whoever he appoints shall be responsible for the publication and modification of this procedure.

VI.2 On execution

- The Technical Representative, regarding "Technical Issues of the Work".

- The Head of the Quality Assurance Division, regarding "Quality-related issues".

- The Head of the Supplies Division, regarding administrative-contractual issues.

VII DESCRIPTION

VII 1 Initiation

As soon as a contract or purchase order is awarded, either through a bid, a direct purchase or petty cash, for goods or services included within the scope defined under item IV above, the Supplies Division shall report the Quality Assurance Division by means of a memorandum, where the name of the Technical Representative appointed by the Manager shall be indicated.

The Quality Assurance Division shall send the corresponding forms (Appendices VIII.1, VIII.2 and VIII.3) duly filled (and numbered) to both the Technical Representative and the Supplies Division. Internally, the forms shall be distributed among the participating inspectors or auditors.

VII.2 Evaluation method

On the basis of the requirements, inspections, surveillances or audits, the evaluator shall qualify all the items numbered 1 through 10 in the forms shown in Annex VIII.

Non applicable items shall be marked as N/A.

The total number of points (TP) shall be added as if all the items evaluated were qualified as 10 (excluding N/As).

The points obtained (PO) in the evaluated items shall also be added.

The evaluation (E) shall be obtained as follows:

$$E = \frac{PO}{PT} \times 10$$

VII.3 Agents responsible and signatures

a) Sheet 1: Technical and work issues

Shall be signed by the Technical Representative under "evaluated by" and by the Head of the corresponding sector under "approved by".

b) Sheet 2: Quality-related issues

Shall be signed by the participating inspector under "evaluated by" and by the Head of Quality Assurance under "approved by".

c) Sheet 3: Administrative-contractual issues

Shall be signed by the Head of Supplies or by the Production Assistant under "evaluated by" and by the Administration Head under "approved by".

d) The synthesis of the evaluation shall be completed by Quality Assurance and approved by the Manager.

VII.4 Secrecy

The information contained in the sheets shall be considered as confidential.

The original shall be kept in the Quality Assurance Division and a confidential copy shall be sent to the Supplies Division.

In every case, a copy shall be sent to the Technical Representative, who shall report the result of the evaluation to the Contractor, following his own criterion.

The supply of copies to the Contractor is forbidden.

VII.5 Use of the information

a) The Supplies Division shall use this information for:

- Defining contracts or direct purchases.

- Defining invitations to calls for bids.

- Defining a program of External Surveillance and Audits.

VII.6 Records, filing and follow up

The Quality Assurance Division shall be responsible for filing the originals, their recording and numbering.

It shall also take care of a follow up, so as to verify that all the sectors involved comply with the tasks assigned to them in this procedure.

VIII APPENDICES

Sheets for the Analysis of Suppliers' and Contractors' Performance.

VIII.1 A) Technical and work issues

VIII.2 B) Quality-related issues

VIII.3 C) Administrative-contractual issues

Appendix VIII.1

ANALYSIS OF SUPPLIERS' AND CONTRACTORS' PERFORMANCE

A) TECHNICAL AND WORK ISSUES

1. Knowledge on the contract
2. Specialised personnel
3. Workers
4. Supervision
5. Clothing
6. Individual protection
7. Sufficient tools/equipment
8. State of tools and equipment
9. Calibrated instruments and equipment
10. Infrastructure
11. Order and housekeeping in the working area
12. Equipment/area/environment protection
13. Compliance with safety regulations
14. Materials supplied
15. Logistic support
16. Planning
17. Presentation of documentation
18. Compliance with timetables
19. Compliance with the rules of the art
20. Compliance with NPP documents
21. Compliance with NPP instructions
22. Time of response (when faced with critical situations)
23. Early problem detection
24. Problem solving - co-operation
25. Final quality of the product or service

TOTAL POINTS: ..... POINTS OBTAINED: ..... (POINTS ARE 1 THROUGH 10)	EVALUATION	EVALUATED BY:	APPROVED BY:

ANALYSIS OF SUPPLIERS' AND CONTRACTORS' PERFORMANCE

B) QUALITY-RELATED ISSUES

1. Organisation: responsibility, authority, communications
2. Documentation control: preparation, review, approval, distribution and conservation.
3. Design control: use of standards, independent verifications, modifications.
4. Control of supplies: management of specifications, evaluation and selection of suppliers, plant controls and reception.
5. Control of items supplied by the customer.
6. Control of stored and transported items: identification, handling, conservation, packaging and delivery.
7. Process control: manuals, procedures, check lists.
8. Control of special processes: same as above.
9. Inspections and tests: inspection program (before, during and after the process). Inspection status.
10. Check-up and calibration of instruments.
11. Clean and tidy working areas.
12. Control of non-conformities / Corrective actions
13. Process statistical control.
14. Records: issue, distribution and conservation of certificates, reports and protocols.
15. Internal and external audits program.
16. Quality Assurance Manual: identification with the system implementation.
17. Managerial commitment with the quality assurance program. Methodical review of the program.
18. Quality Assurance/Control independent from production.

TOTAL POINTS: ..... POINTS OBTAINED: ..... (POINTS ARE 1 THROUGH 10)	EVALUATION	EVALUATED BY:	APPROVED BY:

Appendix VIII.3

ANALYSIS OF SUPPLIERS' AND CONTRACTORS' PERFORMANCE

C) ADMINISTRATIVE-CONTRACTUAL ISSUES

1. Non-justified claims or additional charges.
2. Presentation of minutes, invoices and other documents on time.
3. Accuracy in invoices and remittance notes.
4. Technical-commercial representation.
5. Competitive prices.
6. Commercial flexibility.
7. Presentation of the offer.
8. Attitude during the bidding process.

TOTAL POINTS: ..... POINTS OBTAINED: ..... (POINTS ARE 1 THROUGH 10)	EVALUATION	EVALUATED BY:	APPROVED BY:

D) SUMMARY OF THE EVALUATION

A) TECHNICAL AND WORKING ISSUES .....

B) QUALITY-RELATED ISSUES .....

C) ADMINISTRATIVE CONTRACTUAL ISSUES .....

TOPICS TO BE TAKEN INTO ACCOUNT IN THE FUTURE

PREPARED BY:	PREPARED BY	PREPARED BY:	APPROVED BY:

Annex 16

TYPICAL TOPICS FOR PERFORMANCE REPORTING

Supplier and Client

• Contract management	-	interface with client
	-	interface with sub-suppliers
	-	adequate pre-planning - procurement - resources
	-	contract review
	-	capability review
• Standard of work	-	non-conformances reported
	-	concessions given
	-	defects/omissions identified by Client
	-	conformance to material and performance requirements
• Adherence to programme	-	slippage (days)
	-	reasons for slippage
	-	flexibility in redeploying resources and reprogramming
	-	interface with Client's planning personnel.
• Site management and supervision	-	Capability of management team
	-	adequacy of supervision
	-	coordination with operations and activities and work of other people in the same area.
	-	control of radiation exposure
	-	conformance to specific local requirements/ conditions
	-	safety performance
	-	control of sub-suppliers
	-	materials management
• Adequacy of resources	-	availability of suitable people when needed.
	-	demonstration of the capability of operatives - e.g. welder certificates
	-	levels of activity observed.
• General performance	-	cleanliness and tidiness of work area.

Client

• Adequacy of interface arrangements	-	timely provision of documents/drawings.
	-	responses made on time to submissions needing approval.
	-	time lost due to non-availability of client resources
	-	changes to specification
	-	variations introduced by Operators.
• Adequacy of specification	-	changes introduced due to unexpected conditions
	-	extra costs incurred due to ambiguous requirements
	-	clarifications needed by supplier.
• Provision of access	-	delays incurred in entering the sites.
	-	delays incurred due to operational restrictions.

Annex 17

ASSESSMENT OF SUPPLIERS SAFETY PERFORMANCE

Suggested questions to be used for the Safety Assessment of a Contractor upon the completion of the Contract.

1. Which Senior Person in the Company responsible for Safety has been involved in our Contract?

2. Was the Contractor's Local Safety Statement provided to all his Employees?

3. What Safety Surveillance of our Contract by the Contractor's Company Safety Organisation was carried out during the period of the Contract? Did we receive any copies of reports generated?

4. How many persons on average were employed by the Contractor on our site?

   What was the Contractors Accident Frequency Rate during the period of the contract -

   eg $\frac{\text{Accidents of 3 days or more absence x 100,000}}{\text{Man hours worked}}$

   How many minor i.e. No lost-time Accidents occurred during the Contract?

5. Did any major injuries or fatal accidents occur to the Contractor's Personnel during the period of the Contract. If so, how many ?

6. Did the Contractor carry out any specific safety training of his personnel other than our "Induction to Site Training"?

7. Did you receive any Safety Publications issued by the Contractor to his personnel ?

8. Were his vehicles and plant in good, well maintained condition throughout the Contract ?

9. How well did the Contractor comply with the assessment of substances harmful to health requirements?

   (a) Did you receive information on all hazardous materials he brought onto site ?

   (b) Did you have copies of his assessments of the effects of potentially hazardous substances and the necessary precautions ?

   (c) Did he comply with his own assessments and any additional requirements we required to ensure safety of his own and other personnel ?

10. Did he employ any Sub-Contractors, if so, how well did he ensure that they worked in a safe manner ?

11. Did we carry out any Safety Monitoring/Audits of the Contractor to see how well he complied with:

    (a) The Law
    (b) The requirements of our Contract
    (c) The requirements of any required Health and Safety Plan
    (d) His own Company and Local Safety Statements

    Give a Brief summary of the results.

12. Were there any visits from enforcing authorities during the period of the Contract ?

    (a) Did any Improvement or Prohibition Notices arise from these visits ?

    (b) Did the enforcing authority Inspector comment favourably/ unfavourably on the Contractors working methods ?

13. What was the Contractors General attitude to safety ? eg.

    (a) Did he require constant prompting or did he work in a safe manner ?

    (b) Did he respond quickly to any safety requirements we brought to his knowledge ?

14. In general have you formed the opinion that he gives safety the right priority when working on our sites ?

    Having considered the information and the answers to the questions the client representative responsible for safety should now be in a position to complete a performance report.

    If the contractor performance is deemed to be unsatisfactory it should be established whether this is due to inadequate Site/Contract management or is inherent in the contractors company attitude to health and safety.

    The completed performance report should be returned to Central Procurement for inclusion in the Vendor Database.

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