PDRP-5

Regulatory control of the use of contractors by operating organizations

Peer discussions on regulatory practices

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FOREWORD

This report arises from the eighth series of peer discussions on regulatory practices entitled 'Regulatory control of the use of contractors by operating organizations'. Senior regulators from 19 Member States participated in two peer group discussions in March 2000 and May 2000. This report gives an account of the outcomes of these meetings and of practical suggestions put forward by senior regulators. These suggestions do not necessarily reflect the views of the governments of the nominating Member States, the organizations they belong to, or the International Atomic Energy Agency.

EDITORIAL NOTE

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1. INTRODUCTION

1.1. BACKGROUND

In 1986, at a Special Session of the IAEA General Conference, it was suggested that the IAEA could play a role in assisting Member States in the enhancement of regulatory practices with the objective of increasing the confidence of the public in the safety of nuclear power. The IAEA subsequently sent out questionnaires on regulatory practices and on inspection and enforcement. Summaries of the replies to these questionnaires were issued as TECDOCs.

In 1988 it was agreed that the most useful way to develop peer review of regulatory practices was for small groups of regulators to meet, together with an IAEA co-ordinator, to discuss selected topics. It was intended that Senior Regulators from different groups of Member States would discuss the same topic in a series of peer group discussion meetings, putting emphasis on identifying beneficial aspects of practices rather than on comparing regimes.

This objective was further enhanced when the Nuclear Safety Standards Advisory Group (NUSSAG) recommended in 1989 that "to promote the sharing of experience through increased professional contacts between nuclear safety regulators, a system should be provided for the identification of commonly accepted good practices and to disseminate them widely among Member States".

As a result of this recommendation, seven series of meetings were held. The first, in 1989–1990, discussed Regulatory Inspection and Enforcement Good Practices; the second, in 1991–1992, dealt with Regulatory Good Practices Relating to Monitoring and Assessment of Ageing of Nuclear Power Plants; and the third, in 1993–1994, addressed Policy for Setting and Assessing Regulatory Safety Goals. The third series culminated in the publication of the Policy for Setting and Assessing Regulatory Safety Goals (IAEA-TECDOC-831) in 1995.

Starting with the fourth series of meetings, the reports of the peer discussions were published in the PDRP reports series. They are: PDRP-1, Development of Measures to Assess the Safety of Existing NPPs and the Effectiveness of Regulations and Regulatory Actions (including 'Prescriptive' and 'Performance Based' Approaches); PDRP-2, Approaches Relating to Decommissioning of Nuclear Facilities; PDRP-3, Regulation of the Life Cycle of Nuclear Installations; and PDRP-4, Assessment of Regulatory Effectiveness.

The present report arises from the eighth series of meetings, held in March 2000 and May 2000, which addressed the subject recommended by the Advisory Commission on Safety Standards (ACSS): Regulatory Control of the Use of Contractors by Operating Organizations.

Many challenges have arisen in the evolution of nuclear technology, organizational behaviour, industrial financing and safety requirements. Allied to these challenges are the realities of competition from other forms of energy, budgetary constraints, deregulation of electricity markets and ageing effects on plant, equipment and people. These developments are potential threats to safety as they have already caused organizations to reduce resources and costs, curtail investment in improvements, and restrict internal reviews and activity in areas considered not directly related to production.

This reduction in resources in many areas has also been accompanied in some Member States by the demand for shorter refuelling outages, increased on-line maintenance and

proposed extensions to maintenance and fuel cycles. Consequently, many operating organizations have moved from a traditional in-house capability to deal with most aspects of the facility's day to day activities to a local organization supported by contractors hired for specific tasks and for specific periods. Whilst this situation may have certain financial and technical benefits for the facility, it brings with it a new set of challenges for the operating organization and the regulatory body in maintaining high levels of safety with a part of the work force who may not have a direct stake in the necessary aims and objectives of safety culture, technical excellence and the organizational values to support the safety requirements.

The use of contractors has long been a common practice in the nuclear industry, particularly in large facilities such as nuclear power plants (NPPs) during outages. Over recent years, the incidence and type of contractor use has increased substantially, including forms of partnering/alliances and the use of foreign companies. Therefore, there is a commensurate need for regulatory bodies and operating organizations to ensure that safety standards are maintained and that proper oversight and control is exercised over all activities.

Both regulatory bodies and operating organizations have had to adjust to this emerging increase in contractor use and ensure that systems are put in place to cover the requisite duties and responsibilities, procedures, rules and criteria for selection, acceptance, registration, authorization and control of local and foreign providers of services, supplies, components and expertise.

1.2. OBJECTIVE

The objective of this document is to share experience between regulatory bodies and provide practical suggestions for controlling the use of contractors and subcontractors by the operating organizations during all stages, especially operation, of a nuclear power plant, so as to ensure that the quality of work and services delivered is commensurate with the safety importance of the activities and that these are carried out in a manner that will not adversely affect the safe or reliable operation of the facility.

These documented practical suggestions and experiences are the result of a series of peer discussions at the IAEA in 2000. It is considered that the manner in which control is exercised, and the various challenges connected to this control, are highly dependent upon the legislative framework, maturity of the nuclear programme, the size of the national nuclear industry and the culture in each country.

1.3. STRUCTURE AND SCOPE

This report is structured so that it covers the subject matter under the main headings of:

— legal provisions, regulatory strategy and requirements
— regulatory approaches for controlling the use of contractors
— types of contracts
— practical suggestions.

2. LEGAL PROVISIONS, REGULATORY STRATEGY AND REQUIREMENTS

2.1. LEGAL PROVISIONS

There are different approaches in the provision and application of legislation pertaining to the control of contractors in Member States. Those Member States with current nuclear facility construction or major refurbishing/upgrading programmes have given ample attention to specific provision in their legislation regarding the control of contractors and suppliers. Conversely, some Member States with fairly static nuclear programmes and an established nuclear industry have not generally found it necessary to put emphasis on the particular requirements of contractor control in their legislation.

Some Member States do not license contractors through the regulatory body but allow the operating organization to use contractors and suppliers provided that they meet the agreed criteria. Some other regulatory bodies have a legal mandate to exercise direct control over contractors and subcontractors which may involve the application of licences, authorizations, accreditations or requalification for specific work over a specific duration. However, whether a Member State has defined contractor control in its legislation or not, it is apparent that all the Member States need to have established mechanisms through which both the operating organization and the regulatory body can and do supervise and control the use of contractors. Whichever process is applicable, Member States represented agreed that certain regulatory principles have to be adhered to, namely:

— Nuclear safety must not be compromised and the operating organization cannot delegate its prime responsibility for safety;

— The regulatory body has to have access to all relevant information held by contractors, irrespective of any confidentiality considerations and proprietary/commercial sensitivities.

Legal provisions may be contained in acts, decrees, ordinances or codes depending upon the legislative system of the Member State and these are in turn reflected in requirements, guides and procedures. Enforcement provisions such as: penalties, sanctions or restrictions for non-compliance with legal provisions vary between Member States. Sometimes the same regulatory body inspects industrial as well as nuclear safety, but where this is not the case then the relevant regulatory bodies need to co-operate and liaise to ensure there is continuity of regulatory control.

2.2. REGULATORY STRATEGY

In this context regulatory strategies encompass a wide variety of approaches from regulatory bodies depending on their legislative framework. There may be very detailed requirements and rules or in some cases general expectations are made available to the operating organization through less formal channels which may include published guidance material. Some Member States employ goal setting in their requirements whilst others prefer to specify codes, standards and guides which must be adhered to by the contractor.

Regulatory strategy may vary between Member States with regard to the degree of regulatory body involvement in the contractor’s authorization process. However, all Member States represented agreed that their regulatory strategy is based on the requirement that competence, quality standards and safety expectations are never to be compromised, whether

work is carried out by contractors or permanent staff. In some Member States it is left to the operating organization to decide whether contractors will be used and if so the criteria for their use. However, in some instances the regulatory body may set or approve these criteria. Some Member States have a strategy of licensing the use of contractors for each activity important to safety.

A regulatory body may have a strategy concerning its expectation regarding the staffing, structure and organization of an operating organization, for example one Member State has coined the phrase 'intelligent customer' referring to the attributes the operating organization needs to display in meeting its responsibilities. It needs to have, and take steps to retain, adequate capability within its own organization to understand the nuclear safety requirements of all its activities, and also those of its contractors. This means that it needs sufficient technical expertise as well as managerial and supervisory resources to control contractors and also to establish and ensure implementation of the technical standards and the safety culture at the site.

Specific areas which could be included in strategy approaches may cover the scope of contract work, application and approval of a quality system for a contractor, contractor training and accreditation, vendor approvals, inspection regimes and the management of contractor activities. It was pointed out that regulatory strategy needs to be national and consistently applied to avoid the possibility of differences in the application of controls at local level. In the absence of national or general strategy on issues such as fitness for duty or control of overtime, a confusing or inappropriate approach may be taken at site level. Where the strategy is to license contractors the operating organization needs also to be involved at each stage to ensure that the appropriate responsibility level and understanding are maintained.

The regulatory regime determines the degree of regulatory involvement. Regulatory requirements can be very detailed in some Member States, where the regulatory body checks most of the documentation pertaining to the contractor. This can result in a huge workload for the regulatory body.

In many Member States the regulatory requirements or licensing conditions place the responsibility for control of contractors on the operating organization, with the regulatory body increasing its normal surveillance role substantially when sensitive work such as, manufacturing, testing and inspection of pressure retaining equipment or specific safety systems is involved.

Mere compliance with regulatory requirements and rules is not sufficient. Most Member States now expect contractors and operating organization staff to take positive steps to improve their safety culture and to enhance the contractor's attitude to safety. Regulatory requirements should reflect the need to foster and support a strong safety culture through the development and reinforcement of good safety attitudes and behaviour in contractor staff.

Requirements often need guidance as an explanatory aid and many Member States produce guidance documents to set out the reasoning behind requirements and to define the regulatory expectation or deliverable. This can be extremely useful for the contractor and the operating organization in their understanding of regulatory requirements and of what is required to meet them.

The requirements of the Member States' regulatory bodies need to cover all aspects of the use of contractors by the operating organization. This is usually done through the establishment and implementation of approved procedures developed within the framework of a quality and safety management system of the operating organization, with close attention being given to contractor training in technical and site specific areas. In some countries these activities are performed also by the regulatory body according to the regulatory system applicable to that Member State, as shown in Fig. 1, which is based on the Annex of IAEA Safety Series No. 50-C/SG-Q6, Quality Assurance in Procurement of Items and Services, and has been adapted for this specific purpose.

The support and assistance of third party organizations in relation to regulatory activities may have to be considered in cases where regulatory resources or expertise are limited. This must not result in a delegation or diminution of the regulatory body's responsibility or authority.

3. REGULATORY APPROACHES FOR CONTROLLING THE USE OF CONTRACTORS

3.1. QUALITY AND SAFETY MANAGEMENT

All participating Member States agreed that the most important elements in effectively controlling contractors are the assurance mechanisms, including the preparation, agreement and implementation of a comprehensive quality and safety management programme based on either specific provisions in the nuclear legislation or suitable arrangements entrenched in licence conditions and regulations.

In accordance with the report INSAG-13, Management of Operational Safety in Nuclear Power Plants, the term 'safety management system' is not to be taken to suggest that safety is managed separately from other activities. Neither should it be seen as an optional extra. Safety is an integral component of the way a whole organization is managed and must have the involvement and active participation of all staff. Consequently, an organization's safety management system is generally considered to be an integral part of its quality management system. Figure 2 illustrates the components of safety management as summarized for this report.

The contractor's quality and safety management programme needs to be acceptable to the regulatory body and the operating organization and be evaluated prior to contract commencement. The training arrangements for contractor staff, in particular, need to be clearly specified and documented within the quality and safety management programme. This needs to define the scope, depth and duration of the training, together with an acceptable audit programme to verify the effectiveness of training. Training needs to be regarded as a key component in the improvement of contractor performance.

The quality and safety management programme also needs to cover all the licensing, authorization or registration requirements for contractors and the evaluation arrangements for monitoring contract status, feedback and details of contractor performance (including the chain of subcontractors).

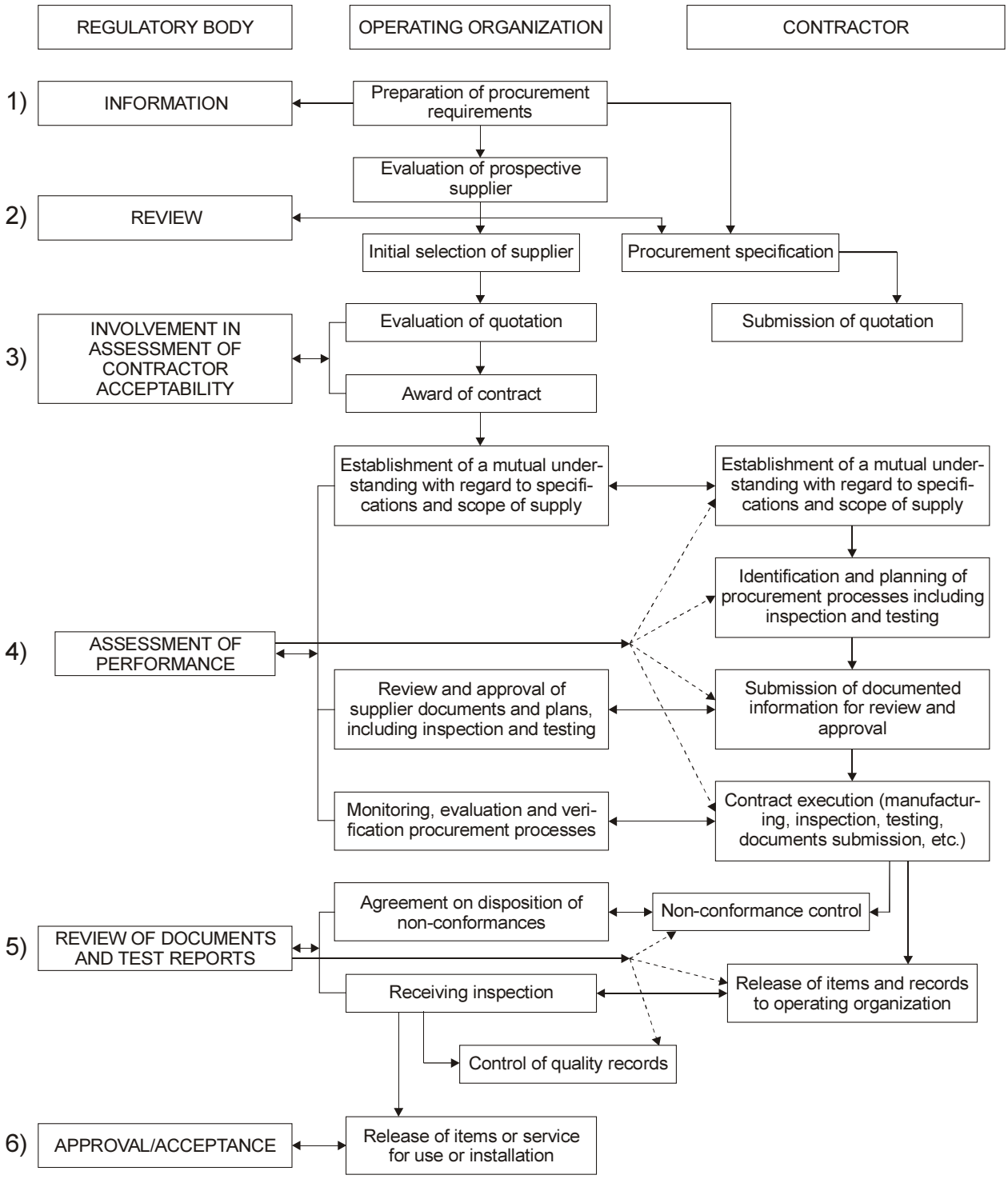

FIG.1. Example of a typical process directed at the use of contractors by operating organizations.

Note: Depending on the importance to safety, national culture and the complexity of the item/services programme, the regulatory body's role can be described in the sequence of steps shown in Fig. 1.

Note: This process may not apply to pressure retaining components since in general they follow a specific path in each country.

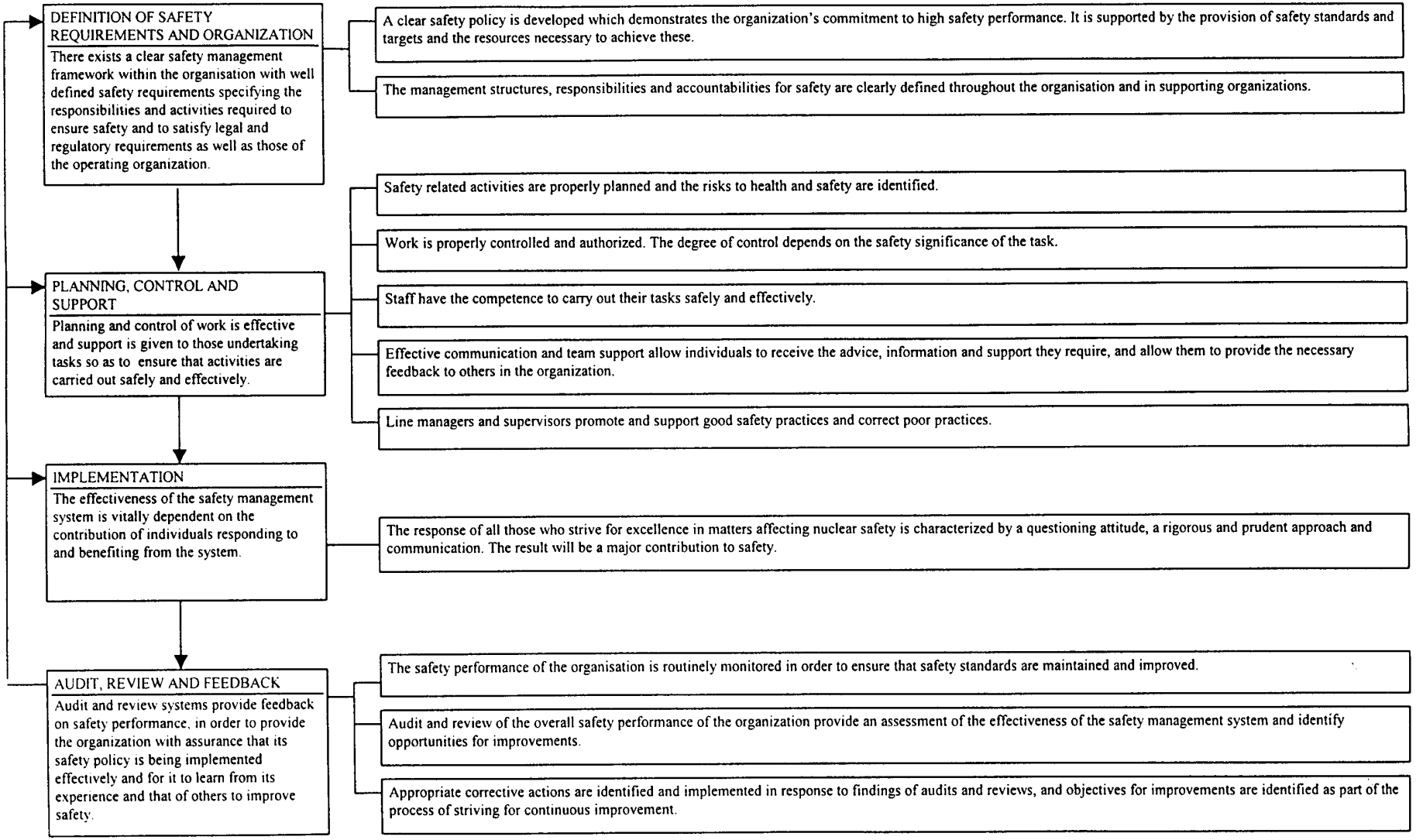

FIG. 2. The safety management system comprises those arrangements made by the organization for the management of safety in order to promote a strong safety culture and achieve good safety performance (based on the INSAG Report INSAG-13).

The operating organization is required to establish clear requirements for contractors to demonstrate that the quality level they will achieve is equal to or higher than the national regulatory requirements. These requirements would also be part of a system to incorporate the areas of negotiation, planning, execution, reporting, listing of qualified contractors and subcontractors, and enforcement arrangements put in place by the operating organization to control contractors.

Situations where the regulatory body and the operating organization use the same contractor are to be avoided, but this is not always possible or practical. Where there may be a possibility of conflicting interest, steps need to be taken to ensure maximum separation of work and personnel within the contracting organization. This may require additional controls to be put in place to facilitate practical independence. Some Member States have licence conditions which preclude a contractor from conducting peer reviews or evaluations of work with which they have undertaken. Similarly, contractors are not allowed to inspect any work or item which they were involved.

3.2. METHODS FOR ASSESSING AND CONTROLLING CONTRACTORS

The evaluation of contractors by the regulatory body or operating organization, and their licensing, authorization or registration of approval may consist of a series of audits before and during the execution of the contract. Each stage of a facility's life requires control of contractors through a well documented and recognized quality system based on acceptable standards. Manufacturing usually carries with it specific requirements and standards for testing and acceptance which are more easily verified than on-site contractor work. There seems to be little difference between the approaches taken for the handling of contractors at the various facility life stages but whatever the type or stage of contractor activity it should follow the same rigorous and proceduralized process of audit, supervision and assessment of performance. Where the regulatory body or the operating organization do not have the in-house capability or require additional support, then the use of individual experts may be necessary to provide specialist assessment and advice on contractor performance.

In some Member States the regulatory body investigates the legal standing and work record of the contractor company, its list of subcontractors, its resource capability (financial, staff, equipment, etc.), and the staff training proposals for both on and off-site work. These checks are usually followed by independent, external audits and inspections to verify the contractor's claims. In some Member States the period for which a license or authorization to a contractor is granted is dependent upon the known history of the contractor. Therefore, well known and established companies usually get longer license periods than relative newcomers. One of the means used by operating organizations to ensure that the contractor maintain an acceptable standard of work is to demand delivery of a fully documented account of the contractor's activities, results and performance at the end of the contracted work. This needs to be a pre-contract condition which will enable the regulatory body, operating organization and the contractor to monitor progress and compare the performance to the requirements. Every contractor needs to be held accountable for meeting the agreed contract conditions and a good contractor will not object to showing what has been done. This is particularly appropriate when penalty clauses or dispute conditions are specified in the contract and it may assist the contractor or the operating organization in any resulting legal dispute.

It was considered that it is often impractical and unproductive to apply the rules of acceptance for local contractor to foreign contractors, and some Member States reported that they usually choose foreign contractors according to their quality performance, reputation and

track record as acknowledged in their own country or worldwide. This is usually supplemented by external audits on the contractor. In some cases, opinion of third party on a contractor's suitability is utilized by the regulatory body or operating organization.

Methodologies for the evaluation of contractors depend upon the regulatory system of the Member States. As previously stated, there are two main regulatory strategies used by the Member States, direct control by the regulatory body or direct control by the operating organization, or a combination of these two. Where the regulatory body takes direct control, often in areas of high safety significance, and it licenses or authorizes contractors, a great deal of effort is required.

Typical tasks will include:

— analysing the information in the contractor's licence application
— assessing the work content
— evaluating the contractor's resources and capabilities
— evaluating the quality system
— deciding on which codes, regulations, etc. will apply to the work
— determining the long term availability of skilled/specialist staff
— incorporating recommendations from the operating organization
— auditing and inspection of contractors.

Those Member States which adopt the approach where contractor control is achieved mainly through the operating organization may appear to have a lighter workload. However, the regulatory body has still to be sure that the operating organization has implemented proper and comprehensive procedures in its assessment and appointment of contractors. These assurances are usually provided to the regulatory body by the operating organization and would include:

— detailing the type of contractor
— specifying the work to be undertaken
— explaining the selection criteria and process adopted
— defining the codes, practices and regulations to be used
— classifying the safety significance of the work
— setting out the contingency arrangements: for instance, how to keep the facility safe if the contractor leaves or is found to be unsuitable
— defining the control and supervision procedures
— evaluating performance, feedback and sanction processes
— ensuring contractors are suitably qualified and experienced
— describing the provisions established to ensure the maintenance of a site-wide safety culture.

The extent to which the regulatory body pursues the assessment phase for contractors is largely dependent on the contractor's track record and previous experience. New or less experienced contractors would usually be subjected to a more rigorous evaluation process than those who are well known to both regulatory body and operating organization. Some regulatory bodies rely more on the operating organization's systems for appointing contractors and carry out their own QA checks, random inspections, sampling and site or factory visits to validate the operator's choice of contractor or supplier.

These assessments would focus on the training, competence and experience of contractor staff and may sometimes extend to the financial stability or long term prospects of

the contractor where necessary. Throughout the duration of the contract the regulatory body needs to supplement the regular audits/inspections of the operating organization with periodic regulatory audits and inspections to monitor compliance and performance. It was stressed by all the Member States represented that whatever system of control is applied, the regulatory body needs to ensure that the operating organization does not surrender its authority and responsibility to the contractor.

Technical competence and organizational ability are key attributes for the regulatory body and operating organization. Whilst it is not expected that the operating organization maintains a 'world expert' capability, it is essential that intelligent dialogue is established with contractors to test the acceptability of contract work against the safety case or licence conditions. It is therefore necessary for adequate resources to be available to enable proper oversight, dialogue and follow-up of contractor activities. The regulatory body may need to inspect the operating organization's corporate functions as well as the site activities to determine the total organizational capability of the operating organization to control the contractor. Also, in some instances, it may be necessary for the regulatory body to verify through third parties that contractors meet the standards and utilize the correct methods and equipment.

In addition to the assessment of contractors for suitability, the regulatory body needs also to establish any applicable inspection and enforcement arrangements for contractors. Direct control of contractors requires extensive inspection and audit programmes to ensure that systems of compliance evaluation are in place for site, office and, where applicable, external manufacturing and test facilities. Provision has also to be made for follow-up inspections and audits on either an individual or a team basis.

To ensure standard methods of inspection and audit are used for all contract work the regulatory body needs to develop adequate procedures with clear hold and witness points or regulatory approval stages.

Where direct regulatory control is the chosen strategy, the regulatory body needs to ensure that the operating organization is kept fully informed of the assessment, inspection and surveillance process and where possible the operating organization needs to be involved in each approval phase.

3.3. REGULATORY SURVEILLANCE OF THE CONTROL OF CONTRACTORS

The objective of all this attention to contractors and their work is to ensure that the safety of the facility, staff and public is not compromised. To this end the regulatory body needs to determine which measures will provide adequate assurance that the safety objective has been achieved. Where the regulatory body has direct control and contact with the contractors the process of assurance would appear to be more straightforward. The attainment of milestones, hold points and criteria stages can assist in determining the contractor's performance; however, this has to be assessed in conjunction with evidence of safety attitude, incident history and records of deviations, deficiencies and quality related non-conformances.

Where safety related equipment, systems and activities are involved, such as in I&C, certain radiation monitoring equipment, in-service inspection and non-destructive testing, the regulatory body usually takes a more detailed and extensive interest in contractor preparations, work procedures and results.

Some regulatory bodies carry out random and periodic interviews with contractor and operating organization staff to gauge the level of worker satisfaction or performance, particularly in respect of attitudinal problems or latent issues which may not be apparent through more conventional auditing. This process is best undertaken by site inspection staff who usually have a closer relationship with contractor staff and who can also obtain additional information during their normal inspections. Analysis of operational feedback coupled with evaluation of audit, inspection and test results will enable a factual and supportable picture of contractor performance to be constructed upon which remedial action or even sanctions can be based if warranted.

The regulatory body should ensure that the operating organization recognizes that work that may appear to be not directly related to nuclear safety may have an adverse impact if it is improperly executed, for example, work on electrical systems or excavations for cables, drains, civil works, etc.

The regulatory body needs to ensure that the operating organization gives sufficient attention to surveillance of contractor training, particularly in the areas of safety culture reinforcement, industrial and radiological safety including emergency situations and housekeeping. It was also stressed that the reporting and investigation of incidents involving contractors, no matter what the cause, needs to be given additional attention as this can highlight areas of weakness requiring urgent corrective action. Some Member States have experienced problems related to substance and alcohol abuse amongst contractor staff and the relevant site specific fitness for duty provisions need to be clear and strictly enforced. A related aspect is the security checking and access control of contractors on site, this requires close monitoring to not only ensure the integrity of the site's physical security but to avoid contaminated or sensitive items being removed from their proper areas and perhaps being taken off-site without authorization.

Quality control checks on contractor activities prior to sign off of completed work and the need to enhance supervision of contractor staff were cited as desirable goals for the operating organization to pursue. The objective of all the above is to minimize the risk of contractor staff introducing undesirable actions resulting in decreased safety levels in the facility. The combined efforts of the regulatory body and the operating organization through proper, agreed and documented policies and procedures can be successful in achieving meaningful control of contractor staff who may not be familiar with the rules, culture or expectations of the regulatory body and operating organization. This requires an open and collaborative approach by the regulatory body and operating organization to produce guidance material for contractor staff covering all aspects of the requirements. Some regulatory bodies require the operating organization to produce contractor aide memoires and guides to assist contractor staff to understand and follow the site rules.

The regulatory body and the operating organization need to improve the awareness of contractors regarding their responsibility for safe working and control of their staff at all times. This is difficult to specify quantitatively to contractors, particularly, in contract terms, however, focused training and information sessions on-site given at frequent periods based on incident/event information and known problem areas can yield positive results. Increased supervision may assist in monitoring contractors and in providing on-job guidance of an immediate nature. The provision and availability of sufficient managerial manpower, however, is difficult for many Member States particularly those with active construction

programmes. There is always a shortage of competent management persons and these have sometimes to be hired from outside the Member State usually at a high cost.

Control over contractor staff is usually, in principle, no different to that exercised over the permanent staff, the same methods are used e.g. procedures, planning, assessment, audits, etc. but more attention has usually to be given to contractor activities because of the contractor's unfamiliarity with site procedures, layout, culture and rules. The implications for failure, mistakes or rework associated with contractors usually warrant the extra supervision and attention.

4. TYPES OF CONTRACTS

4.1. TURNKEY AND MIXED PROJECTS

There are many different situations where contractors are used and where their work can affect safety. In a turnkey project the contractor designs, constructs and commissions a nuclear facility and hands it over to the operating organization as an operating entity. Contracts and projects may be large or small and also be undertaken by several contractors as in a mixed project, each having responsibility for specific parts of a project.

Individual consultants may be hired from time to time and increasingly contractors are spanning international boundaries and they may not be familiar with the language, culture and regulatory systems of the operating organization. Many Member States are preparing to use or are currently engaged in turnkey and mixed projects both large and small with the attendant challenges of contractor control and maintaining safety at an acceptable level.

In a turnkey project a contractor undertakes to complete the specified contract from start to hand over and is responsible for all aspects of the project. Whilst this may have certain advantages for the operating organization with limited resources and expertise it also carries challenges in terms of control and responsibility and the gaining of experience and information in the commissioning of the project.

In a turnkey project the safety criteria requirements are relatively consistent and there is one main contractor to deal with. This reduces the number of interfaces and usually improves communication lines. However, it is still necessary to address many issues at the pre-contract stage to ensure that adequate measures are in place and understood prior to commencement of the contract. These issues may include:

— addressing quality and safety management provisions
— defining who does what, programmes of work and processes
— prescribing contractor training and technical exchange programmes for the operating organization's staff
— providing information to the operator's staff to enable safe operation and maintenance of the facility
— establishment and implementation of combined safety oversight committees
— resolution of which national legislation is to be used for contracts
— codes, standards, guides to be used
— hand over arrangements, joint commissioning teams
— control points such as: hold and witness

— close out of non-conformances prior to continuation of work
— stop work policy
— access to other relevant information
— cultural and language policy.

Although the turnkey project usually means that a standard design is followed it is important for the regulatory body to liaise with and gain clarity from the regulatory body of the contractor's country. This can assist in the analysis of safety information, design bases and applicable or equivalent codes, standards and test criteria and the operational philosophies of the contractor. It may be necessary for the regulatory body to establish a clear licensing/regulatory control process with defined approval points to reinforce control, particularly, where the operating organizations may not be fully capable of exercising strong control over the contractor.

The contractor builds the facility and hands it over to the operating organization, therefore, it is the operating organization's responsibility to ensure it has the capability and possesses sufficient knowledge, competence and resources to operate the facility safely before the contractor finishes his contracted work and leaves the site. If this has not been achieved by the end of the contract an extension to the contract may be warranted.

Mixed projects refers to the situation where a mix of contractors is used and this may present a different set of problems and advantages. Having more than one main contractor means the choice is wider and the project is more flexible. However, more time is needed by the regulatory body and the operating organization to analyse contracts and submissions. The operating organization is involved in all phases of the work and usually the project is divided into manageable phases allowing more opportunity for regulatory inspection and hold points. Similarly, the regulatory body has to perform an in-depth review of the project prior to work commencing. Problems can arise with this type of project because of the number of contractors involved which may make the overall management and communication more difficult. This can also challenge the establishment of a uniform safety culture at the site.

In certain projects the issue of international exchanges between regulatory bodies may become important where foreign contractors and technologies are utilized. No matter which type of project is undertaken the operating organization has the ultimate responsibility for the contracted work and any safety matters arising from it.

4.2. SERVICE CONTRACTS

The operating organization needs to consider a number of specific aspects if it makes extensive use of service contracts. Service contracts may include services for radiological protection (health physics), maintenance services, technical support, etc. These contracts may be employed during normal operation, during annual shutdown or refuelling outages of an NPP, for routine or specific works, e.g. housekeeping, maintenance, technical supports, in-service inspections, special inspections (of pressure vessel, etc.), overhauling of components or systems. These contracts may be re-tendered at regular intervals and the hand over must be properly managed. Provisions which need to be covered in the contract may include:

— hand over arrangements and transfer of documents to the new contractor or to the operating organization;
— training the new contractor's staff or the operating organization and passing on operational experience.

The operating organization needs to ensure that the quality of work can be maintained at the required standard, if the contractor is changed during the service contract period.

4.3. PARTNERING AND ALLIANCE ARRANGEMENTS

Operating organizations are increasingly making use of partnering/alliance arrangements in order to set up long term relationships with contractors. This can have a number of advantages in developing the skills and experience of contractors; in enabling smaller operating organizations to benefit from best practices learned by contractors; giving more ready access to specialist technical expertise in centres of excellence; enabling contractors to make longer term financial and management plans; reducing the use of temporary workers; involving contractors in early discussion concerning the contracted work so they can contribute to finding the best option; and improvements in performance through co-operative working. However, in the nuclear industry it is very important that the operating organization retains its full responsibility for the safety of the facility as well as sufficient technical, managerial and supervisory resources. These must not be weakened by any long term partnering and alliance forming arrangements.

4.4. CONSIDERATIONS ASSOCIATED WITH THE USE OF FOREIGN AND LOCAL CONTRACTORS

In many Member States the use of foreign contractors, suppliers and consultants is necessary and widespread. This has several benefits but also introduces new challenges not normally associated with local contractors.

In many cases the employment of contractors and suppliers from foreign sources constitutes a large portion of the workload undertaken at the nuclear facility. This is usually on items important to safety and the consensus of the Member States was that this requires a different system of contractor assessment to be applied.

Foreign contractors may introduce additional problems associated with language, interpretation and possible misunderstanding of codes, terms and instructions. Some Member States have already encountered communication problems which have required measures to be put in place to allow local staff to understand and query foreign contractor submissions and documentation. This aspect may also extend to the provision by the contractor of design bases, standards, technical information and access to proprietary data important for the regulatory body and the operating organization in the preparation, evaluation and discussion of safety reviews and operational aspects of the facility and its equipment.

It was emphasized by some Member States that these problems need to be resolved during the pre-contract award phase as they can be difficult to resolve once work has commenced.

Where foreign contractors are involved it has been found by some Member States that these contractors are often less aware of the local culture when selecting local subcontractors. It may require attention from the regulatory body to monitor how the operating organization controls this aspect of the main contractor’s work. Similarly, the selection of local contractors may be preferential for various local reasons, but the choice needs to be made objectively by carefully reviewing the quality system and competence of the local contractor. Sometimes the local contractor has difficulty complying with the quality requirements. However, if the regulatory body agrees then the main contractor or the operating organization makes available

its own quality system and provides advice and support to the local contractor. In this case the regulatory body needs to increase its surveillance activities to monitor the adequacy of this situation.

An additional point to consider in contractor control is the need to clearly stipulate in the contracts and in the chain of procurement which legislation shall be valid in all cases of dispute and application. This can assist in resolving any legal differences with foreign contractors and suppliers, similarly it is often advantageous to involve those who will supervise and manage the contract in the initial contract negotiations. They are then fully aware of the intent, scope and requirements of the contractors work and they can also influence positively the more practical aspects of contractor performance. The availability of and access to confidential or proprietary information from the contractor needs to be resolved at the contract evaluation stage.

The advantages of utilizing well known foreign contractors may include:

— wider selection of contractors to choose from
— choice of standards according to requirements
— increased co-ordination between the operating organization and contractor
— international assistance from peer groups can assist decision making
— contractor's previous performance can be checked
— benefits from worldwide resources and experience
— joint information exchange on common components, systems, etc.

The challenges or points to be addressed when using foreign contractors may include:

— language/translation/interpretation difficulties
— cultural and organizational differences
— wide span of control across national boundaries
— construction practices/standards may differ
— codes and standards equivalencies
— components from various sources introduce many standards/codes
— intellectual property rights
— understanding of national standards by the contractor staff
— long distances between contractor and site
— increased need for financial resources for the regulatory body
— guaranteed continuity of service and supply
— adequate transfer of design and technology to the operating organization
— operating organization may be too reliant on contractors.

Control over a single contractor whether by direct or indirect regulatory means is relatively uncomplicated, however, if there is a chain of contractors, subcontractors and suppliers then it is necessary that in-depth assessments, inspections and audits cover all the layers. Particular attention needs to be paid to the quality system and working procedures of the subcontractors to ensure they are acceptable and implemented correctly.

5. PRACTICAL SUGGESTIONS

At the conclusion of each of the meetings the groups extracted from their reports practical suggestions for operating organizations, contractors and regulatory bodies. The suggestions made for the operating organizations and contractors are based on the expectations of the regulatory body. Although the meetings were held separately and independently, it was evident from the meeting reports that these suggestions were more or less common to all of the groups. Therefore, it is reasonable to assume that these practical suggestions are worthy of consideration because of their potential to enhance arrangements for control of the use of contractors and to ensure effective regulation. However, they are offered as suggestions only and Member States are free to adopt them depending upon their regulatory regime and practices.

5.1. MANAGEMENT AND ORGANIZATION

Regulatory body

1. The regulatory body has sufficient expertise on quality and safety management systems as the basis.

2. The regulatory body has sufficient expertise on contract management arrangements.

3. If the legislative system requires the regulatory body to approve, accredit or licence contractors, sufficient suitable staff are available for this work.

4. If the legislative system requires the regulatory body to qualify or accredit individual contractor's staff, then the regulatory body has sufficient resources and skills to do this work.

5. The regulatory body may utilize a third party to assess a contractor's suitability.

Operating organization

6. The operating organization has an appropriate quality and safety management system as the basis.

7. The operating organization is fully responsible for the safety of the facility no matter which contractors are being used.

8. The operating organization sets working methods, quality and safety programmes, and emphasizes safety culture for contracted work on or off the site whether done by its own staff or contractors.

9. The operating organization has and retains sufficient human, financial and technical resources to specify, assess and monitor the contractor's work and qualifications to ensure it conforms to the standards required.

10. The operating organization has and retains sufficient human, financial and technical resources to understand the nuclear safety features of the facility and how this is affected by the contractors' work.

11. The operating organization has and retains sufficient managerial and supervisory staff to properly control the work of contractors.

12. The operating organization has the capability to maintain the facility in a safe state if the contractor leaves or is found to be unsuitable.

Contractor

13. The contractor's organization has an appropriate quality and safety management system.

14. The contractor's organization has the capability to implement the operating organization's and regulatory body's requirements.

15. The contractor recognizes that the operating organization has full responsibility for safety.

16. The contractor is responsible for delivering safe and quality products and services.

5.2. PROCESS FOR CONTROL/SUPERVISION/INSPECTION

Regulatory body

17. The regulatory body develops a strategy on the control of the use of contractors by the operating organization, which may take the form of rules/standards/guidance or other requirements depending on the legislative regime, applies it consistently and makes this known to the operating organization.

18. Depending on the system in place in the Member State, the regulatory body consults/discusses its regulatory strategy with stakeholders.

19. The regulatory body explains the regulatory system and strategy to meetings/workshops/ conferences which are attended by operating organization and contractor staff.

20. The regulatory body uses its usual regulatory tools of inspections, audits and assessment of safety documentation in the regulation of the use of contractors.

21. The regulatory body has access to all information and all places of work, including those of contractors, where this is relevant to safety.

22. The regulatory body inspects the contractors on site and, as appropriate, at corporate offices and factories away from the site in conjunction with the operating organization.

23. The regulatory body inspects/assesses the operating organization's corporate offices to establish that it has sufficient human, financial and technical resources to control the work of contractors.

24. The nuclear regulatory body co-ordinates its activities with other national regulatory bodies, as necessary, with regard to controlling contractors.

25. The regulatory body pays particular attention when the operating organization is undergoing a change such as downsizing, which is likely to involve more use of contractors.

26. If a relatively inexperienced operating organization is using a large experienced contractor, the regulatory body is particularly vigilant to ensure that the operating organization retains full responsibility for safety and that it obtains all the design information, drawings, etc.

27. The regulatory body reviews the trend of the contractor's non-conformance reports in order to evaluate the impact on nuclear safety.

28. The regulatory body imposes appropriate hold points in the contract process.

29. The regulatory body develops techniques for the evaluation of the performance of both the operating organization's and the contractor's management of safety.

30. The regulatory body assesses the safety culture on the site and is particularly alert to indicators of declining safety culture when contractors are used.

31. The regulatory body exerts a positive influence on the operating organization's and contractor's safety culture.

32. If the legislative system requires the regulatory body to approve, accredit or licence contractors to do certain work, it also identifies the work that should **not** be done by contractors. If, on the other hand, contractor control is through the operating organization, this should be specified in the regulations or licensing conditions.

33. If the legislative system requires the regulatory body to approve, accredit or licence contractors, then measures are taken to ensure that safety responsibility is **not** removed from the operating organization. If, on the other hand, contractor control is through the operating organization, this should be specified in the regulations or licensing conditions.

34. The regulatory body authorizes or verifies that the operating organization authorizes staff to undertake certain key jobs for supervising the work of contractors such as non-destructive testing, welding, pressure vessel inspection, radiological protection. The regulatory body pays special attention to this work and checks for consistent standards.

35. Regular senior level meetings are held in an open and constructive manner between the regulatory body and operating organization to discuss any organizational changes in the operating organization, including use of contractors.

36. The regulatory body verifies that the contractors' employees know how to contact them to raise any safety concerns.

37. The regulatory body verifies that the contractor's staff understand the special features of the nuclear regulatory regime either through the operating organization's training or by offering working level talks to the contractor's staff.

38. The regulatory body collects relevant information and data on the effects of use of contractors and their working conditions, ensures that this is circulated to its staff, as appropriate, and uses it in developing its regulatory strategy and in focusing inspections.

39. The regulatory body sets up mechanisms within its own organization to discuss issues relating to the use of contractors by circulating reports, setting up focus groups, meetings, etc. The aim is to further develop its regulatory strategy and ensure consistency of regulatory approach across operating organizations.

40. The regulatory body interacts with other Member States' regulatory bodies to gain information and experience, particularly when their operating organizations are using the same contractors.

41. The regulatory body monitors the actions of the operating organization on improving the awareness of contractors regarding their responsibility for safe working and control of their staff at all times.

Operating organization

42. The operating organization has procedures to implement, monitor and review the policy/strategy and makes improvements to its own performance as the basis.

43. The operating organization has a policy/strategy for the use and control of contractors and for defining which jobs are **not** suitable for contractors.

44. The operating organization ensures that safety and regulatory matters are properly covered in the contract.

45. Those who will supervise and manage the contract are involved in the initial contract negotiations.

46. It is clearly stipulated in the contracts and the chain of procurement which law is valid for contracts.

47. If foreign contractors are used, the operating organization ensures that the contractor understands national regulatory requirements.

48. The contract has mechanisms to cater for additions or changes to regulatory requirements during the period of the contract.

49. The operating organization has arrangements for contractor selection and keeps records which take account of the contractor's previous safety performance.

50. Contract arrangements are clear for control of subcontractors and suppliers.

51. The contract stipulates adequate arrangements for handover of facility/system to operating organization including the training of staff and resolution of commissioning problems.

52. The contract stipulates that the operating organization has access to all design information, drawings, data, etc., and that the regulatory body is also granted access to this information.

53. The contract includes provisions for hold points in construction/commissioning at which non-conformances will be cleared.

54. The operating organization ascertains that the contractor has sufficient resources to fulfil the contract.

55. The operating organization considers the financial soundness of the contractor as one of the criteria for selection.

56. The contract requires a fully documented account of the contractors activities, results and performance at the end of contracted work.

57. Interfaces between operating organization and contractor's staff are clearly defined for all contracts.

58. The operating organization ensures that the contractor's staff are and remain suitably qualified and experienced for the nuclear safety related work that they undertake.

59. The operating organization applies management of change process to changes in contractor or new types of use of a contractor.

60. The operating organization sets up a system of control and supervision for the contractor's work with clear lines of authority and clearly defined responsibilities.

61. The operating organization involves the contractor sufficiently in its planning and risk analysis.

62. The operating organization appoints supervisors who will be available for and will monitor the performance of each contractor or group of contractors.

63. The operating organization is aware of possible safety implications on the rest of the facility or installation from the contractor's work.

64. The operating organization reviews safety cases and other documents produced by contractors.

65. Good housekeeping standards are applied by the contractor's as well as the operating organization's staff.

66. The contractor's staff are issued with a passbook giving details of the individual, photograph, company, dose record, training record, etc.

67. The operating organization sets up long term arrangements with contractors without prejudicing its responsibility for safety.

68. The operating organization establishes a system for reporting and investigating incidents involving contractors and uses it to highlight areas of weakness.

69. Safety significant documentation is in the languages used by the operating organization's and contractor's staff.

70. The operating organization has early discussions with potential contractors so there is sufficient time to ensure that the requirements of the work are understood, and the influence of different cultures is recognized and accommodated.

71. Regular meetings and ongoing communication are maintained between the operating organization and contractor to ensure that problems/issues are quickly identified and resolved.

72. Daily working level meetings, between supervisors in the operating organization and the contractor, are held and contribute positively to the improvement of safety performance.

73. The operating organization provides the contractor with sufficient information on the relevant parts of the facility or installation to produce and implement a safe and quality product.

74. Each job performed by a contractor is preceded by the signing of a pre-job summary agreement by both parties which includes safety consideration and expectations.

75. The operating organization ensures that working conditions of the contractor's staff are equal to those of its own staff.

76. Implementation of ALARA principles covers contractor staff.

77. The contractor's staff are made familiar with the operating organization's safety culture and encouraged to work to it.

78. The operating organization ensures that the contractor's staff attend appropriate employee training and are tested on their understanding prior to commencing work. Attendance at training is recorded and includes:

    — general health and safety
    — safety culture reinforcement
    — work permit control systems
    — safety performance indicators
    — radiological protection
    — hazards on the installation or facility
    — accident prevention
    — what to do in an emergency
    — operating organization's policy, culture, standards, procedures, ways of working, access control, etc.
    — site layout
    — housekeeping
    — lines of communication and interfaces
    — special technical training for certain tasks
    — refresher training.

79. Training is offered in several languages, if necessary.

80. The contractor's staff are supplied with appropriate protective clothing and equipment and the wearing of it is enforced.

81. The operating organization has a system of warnings and sanctions for the contractor's staff who do not conform to its requirements.

82. Booklets and other promotional material covering health, safety and work practices are produced for contractor as well as operating organization staff.

83. The operating organization provides staff to coach the contractor's staff.

84. The contractor's staff participate fully in emergency exercises/drills.

85. The contractor's staff participate in management/workforce safety committees or other means are available to ensure safety concerns are heard and dealt with.

86. Dose records/passport schemes are used for itinerant workers.

87. The site specific fitness for duty provisions are clearly explained to contractor staff and are properly enforced throughout the contract period.

88. The operating organization trains supervisors to identify symptoms of stress and other fitness for duty issues in its own and the contractor's staff.

89. The operating organization sets up systems to periodically monitor and review the performance of the contractors to ensure that the product or service is of the right quality and to impose sanctions as appropriate.

90. The contractor's staff are involved in relevant incident investigation, reporting and feedback so that they learn the lessons, come forward with reports of anomalies/events and improve their performance.

91. Safety performance indicators for the operating organization contain data from contractors work.

92. Long term relationships between the contractors and the operating organization do not prejudice the responsibility of the operating organization.

Contractors

93. If the legislative system requires that contractors are approved, accredited or licensed by the regulatory body, the contractor has an appropriate management system and sufficient resources to prepare the required submissions.

94. The contractor nominates a specific person to communicate with the operating organization for specific work/projects.

95. The contractor has joint training with other contractors doing similar work.

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