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**TACIS NUCLEAR SAFETY**



**TACIS PROJECT R8.01/97**

TRANSLATION, EDITING AND DIFFUSION OF DOCUMENTS  
(Results Dissemination)

**TACIS R3.2/91 & R2.10/93N Projects**  
**Quality Assurance Programme Development**  
**EXECUTIVE SUMMARY**

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## **Summary**

This Project is destined for developing the set of the documents of the second level of Quality Program for the Russian NPPs.

Contractor – Nuclear Electric plc. (UK), Beneficiary – Rosenergoatom Utility (Russia), subcontractor – Mocht Otjig (Russia).

The Project 3.2/91 demanded to be extended after its completion to develop more documents, so the new project R2 10/93N was started for this purpose as an extension.

The main result of these projects is creation of the basis for the QA documentation system at the Rosenergoatom utility and at the Russian NPPs. The procedures developed under the Projects were widely distributed amongst the Russian NPPs (including Leningrad NPP) and then would tailored to the plant specifics.

## **Forewords**

In late 80-ies – early 90-ies the countries with advanced nuclear programs started efforts to improve NPP operational quality assurance programs. These efforts were being taken with IAEA involvement and coordination. In the former USSR and later in the Russian Federation high importance was attached to this activity. In the regulatory documents of federal level there appeared a number of new provisions that contained requirements for the improvement of Russian NPP quality systems as one of the key aspects of safety improvement activity. In 1989 the Regulatory Body of the former USSR put into force the new «General Guidelines for Nuclear Plant Safety Assurance» (OPB-88) which contained the following requirement: *‘a quality assurance program shall be developed and implemented at every NPP’*. In 1992 the Russian Regulatory Body (GAN RF) put into force the following document: «Requirements to the Quality Assurance Program for Nuclear Plants» PNAE G 1-028-91. In view of these documents’ requirements and taking account of the importance of this problem, the ‘Rosenergoatom’ utility (operating organization) approached the Commission of European Communities (CEC) with a request to give technical assistance in the development of ‘NPP Operational Quality Assurance Program’. This assistance was rendered in the frame of the TACIS program.

## **1. Introduction**

In November 1993 efforts were started under the program TACIS-91, Project 3.2 «All Reactor Quality Assurance Program Development» (3.2/91). Information given in this executive summary is based on the items of the Final Report (TQR11).

Specialists from European countries involved in the project represented the following organizations: Nuclear Electric and AEA Technology (United Kingdom), Belgatom (Belgium) and Empresarios Agrupados (Spain), and the Russian side was represented by specialists of ‘Rosenergoatom’ utility, VNIIAES and Novovoronezh NPP later joined by experts from Balakovo NPP. Novovoronezh NPP was selected as a reference Russian plant. The duration of the project was 2 years.

The major tasks to be performed under the project were:

- promotion of quality assurance culture at Russian NPPs;
- transfer of expertise and experience from Western partners to Russian specialists during visits to UK NPPs, providing the needed information to produce documents at Russian NPPs;
- development of documents for the priority areas of activity;
- improvement of Russian NPP specialists’ awareness in the matters of quality assurance by giving training courses and providing training materials;
- definition of the scope of future activity needed to complete the development and introduction of the QA documents at Russian plants.

Major guidance documents adopted for quality system improvement were the IAEA 50-C-QA standard and the ISO-90001÷3 standard as well as the above mentioned Russian regulatory documents of the federal and industry levels.

## **2. Objectives**

The task of project 3.2/91 was to develop a complete quality assurance program for all the Russian NPPs. Taking account of the experience of Consortium member-countries (United Kingdom, Belgium, Spain) and international practice and applying the existing Russian QA guidance documents, the new QA documentation system should:

- represent a multi-level hierarchic system of documentation;
- establish staff responsibilities for various kinds of activity;

- identify quality categories and requirements to activities, spare parts, procured items and materials;
- produce all documents according to a single established format.

The documents developed represent typical Management Procedures (MPs) which, in the course of their introduction, will be adapted to each NPP with account for plant-specific features.

Novovoronezh NPP and Balakovo NPP were selected as reference plants under project 3.2/91. Project 3.2 was the first stage in the development and introduction of the NPP Operational Quality Assurance Program at Russian nuclear plants.

### **3. Implementation**

Each plant developed a schedule of the plant specific production of MPs according to the Rosenergoatom approved list. These schedules are monitored by Rosenergoatom QA Department via scheduled audits (3 to 5 plants per year).

### **4. Summary and activity**

#### **4.1. The Work Performed under the Project**

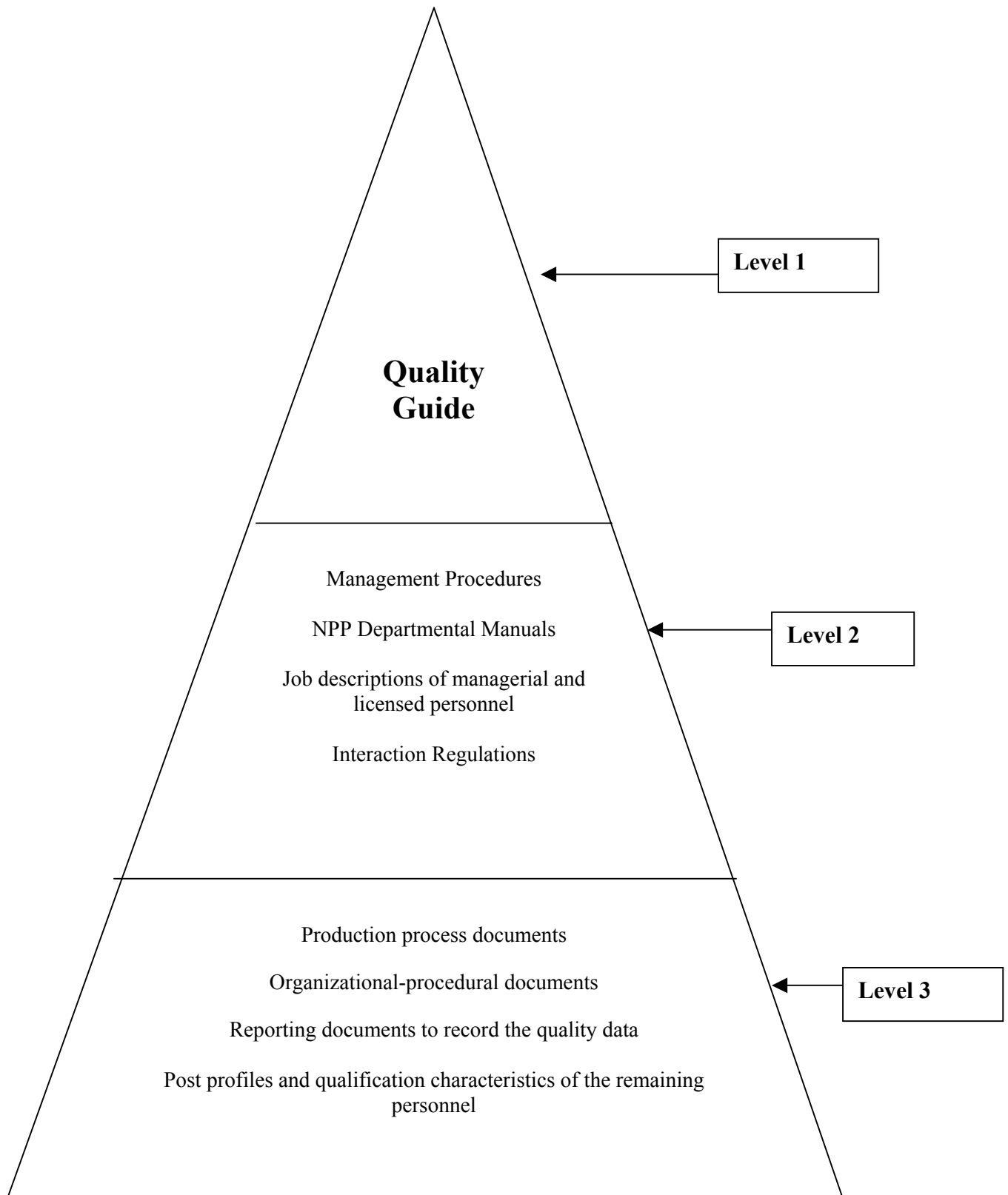
To make the work under Project 3.2/91 successful, the Russian specialists provided to their Western partners for review the basic regulatory documents (Codes & Standards) in the area of safety and quality valid in the nuclear industry. Besides, Western experts visited Novovoronezh NPP to collect information on quality system status. During this visit the Western experts also made a presentation of their quality system and discussed with plant personnel the sequence of performing the work under the project.

1994 saw a 6-week visit of the Russian specialists from 'Rosenergoatom' utility, VNIIAES and Novovoronezh NPP to Nuclear Electric (UK) to get familiar with experience in the area of QA. During the first 2 weeks of this visit the Western experts delivered training to the Russian specialists on QA aspects. In the course of this training the Russian specialists had an opportunity to evaluate the existing Nuclear Electric's quality system that was fully in line with the requirements of the IAEA quality documents (50-C-QA), made a visit to Sizewell B NPP (a PWR plant similar to Russian VVER plants) and got familiar with the above plant's quality system. The remaining 4 weeks were spent at Heysham-2 NPP where the Russian

specialists also got familiar with the existing QA system and started the work to produce the documents foreseen by the project.

Based on the knowledge obtained, it was decided to improve the quality system existing at Russian NPPs. As a result, a three-level QA documentation system was adopted at Russian NPPs (See Fig.1).

**Fig. 1 Structure of the ‘Rosenergoatom’ Utility’s Quality Assurance System**



The purpose of the first level document (Quality Guide) is to define Rosenergoatom's and NPPs' quality policy, its objectives and tasks, to describe general organization of management practice and planning tools, performance and review of organization's activity at the stage of NPP operation.

The second level documents establish the principles and rules of daily activity of NPP structural divisions, the order of their interaction and responsibilities of managerial staff, auditors and work performers, and also highlight the methods of planning, performance and assessment of each kind of activity.

The third level documents are the documents of practical activity (procedures, work programs etc.) which lay down the sequence of performing specific work.

Such documentation structure allows avoiding duplication of responsible personnel functions and of work performance and at the same time assures the required scope and detail of information on each area and activity kind. It also allows making the necessary changes to improve NPP management practice and specific work performance practices.

The Russian specialists identified the activity directions incorporated in the quality system and produced a listing of major management procedures (second level documents) needed to be developed for these activity directions. This listing is given in Annex 1.

During the visit to Heysham-2 NPP the Russian specialists started the development of management procedures for the following priority areas of activity:

- management of operations
- quality control
- maintenance and repair
- radiation safety
- radiological protection

Towards the end of the visit a schedule was agreed for the development and introduction of management procedures for priority directions of activity and discussions took place to identify a tentative list of auxiliary management procedures (part MPs) to be included in the scope of work under the project.

October 1994 saw a visit of Western experts to Balakovo NPP to get familiar with the plant's quality system and give presentations on the quality systems existing at UK plants. The management of Balakovo NPP showed great interest in the involvement of its specialists in the work under this project, and since that time the specialists of Balakovo NPP had been performing the assessment of the documents developed under the project and giving their comments and recommendations.



April 1995 saw a visit of a team of specialists from 'Rosenergoatom' utility, VNIIAES, Novovoronezh NPP and Balakovo NPP to UK plants with the purpose of detailed study of the use of quality system in NPP component maintenance and repair practices.

Before completing the work under the first phase of the project the Russian specialists made another visit to UK plants. In addition to these activities directly related to the performance of Phase 1 of the project there were other works also associated with the implementation of the project. For example, in accordance with the Terms of Reference a methodology was developed (TQR11, item 3.7) showing performance indicators, which demonstrated certain improvement in Russian NPP performance due to introduction of the quality assurance documents. These indicators are basically similar to the safety indicators and were defined for the Russian NPPs.

The project's Terms of Reference contained a requirement to give support to 'Rosenergoatom' utility by Western partners through a presentation to be made to the Russian Regulatory Body's experts describing the quality system existing at UK plants which was later adopted by the Russian plants (TQR11, item 3.8). 'Rosenergoatom' utility was convinced in the benefits of such a presentation following the development and introduction of the quality system at Novovoronezh NPP, but this was beyond the time scales of this phase of the project, and the Western experts agreed to give such a presentation. During the visit of two delegations of the Russian Regulatory Body (Gosatomnadzor) the Project Manager gave presentations of the quality systems to these delegations.

Throughout the work under the project continuous interaction was maintained with other TACIS projects (TQR11, item 3.9). For example, interaction was established with Project 1.9 «Operating Procedures» and with Project 3.5 «Maintenance and Repair Procedures». Documentation system created under Phase 1 of Project 3.2, is closely linked with procedures/instructions developed under Project 1.9. The participants of both projects made peer reviews of corresponding documents during joint meetings in Moscow and UK to assure their full compatibility.

The maintenance and repair experts involved in Project 3.2 maintained interaction with the experts of Project 3.5 «Maintenance and Repair Procedures». The draft of MP 21 «Management of Maintenance», developed under Project 3.2 was submitted to the experts of Project 3.5 for review.

The experts who had been working under Project 3.2 were invited to take part in the joint training seminar in the frame of Project 4.1 «Support to Personnel Training», which was also attended by representatives from all the Russian NPPs. The presentation took place in the

Novovoronezh Training Center. During this seminar the Western experts – participants of Project 3.2 – jointly with the Russian specialists made a presentation of the basic principles of the quality system and of main objectives of Project 3.2. Later, the training modules developed under Project 4.1 reflected the basic principles of the adopted quality system which was described during this seminar.

Besides the above mentioned interaction under the TACIS projects communication was also maintained with INPO experts working with the Russian specialists who developed procedures in the frame of the “Lisbon Initiative” (later called – International Nuclear Safety Initiative) to avoid duplication of work and provide consistent approach to the development of procedures.

High importance in the project activity was attached to the issue of equipment supply to perform the required tasks. This problem was successfully resolved (TQR11, item 3.10).

The work under Phase 1 of the project was completed by the end of November 1995.

On completion of the above phase a package of standard management procedures was developed for the following five activity directions:

- quality control
- operations
- maintenance and repair
- radiological protection
- radiation safety.

NOTE: A list of developed documents is given in the section entitled “Documentation Developed in the Frame of the Project” of this Executive Summary.

In the course of work under the project it was recognized that further improvement of the quality system at Russian NPPs was so important that the ‘Rosenergoatom’ utility took a decision to continue this work. The joint approach of the ‘Rosenergoatom’ utility and of Consortium №2 of the Western countries (UK, Spain, Belgium) to the Commission of European Communities received positive response.

The subcontract for the second phase of Project 3.2 (project R2.10/93N) was signed in December 1995 for 12 months (up to December) and was later extended by CEC till June 1997. Novovoronezh NPP and Balakovo NPP were chosen as reference plants under the project.

The major steps while performing the work under Phase 2 of the project were as follows:

- development of management procedures on the distribution of responsibilities for obtaining licenses, quality grading, maintenance and repair and of an Operations

Service Manual (the assessment of these documents was performed by the specialists of reference plants)

- training of different categories of Russian NPP personnel in quality aspects.

A list of Management Procedures (MPs) and a brief description of major MPs developed under Phase 2 of Project R2.10/93N is given in Section 4 of this Executive Summary.

For the purpose of holding quality seminars for managerial staff and NPP personnel the Western partners delivered training to VNIIAES specialists in methodologies of holding such seminars and in the preparation of demonstration materials.

On the basis of acquired knowledge visual aids (transparencies) and distribution materials for the trainees were prepared.

A quality seminar was organized for NPP managerial staff as well as seminars on aspects of quality assurance and on a package of typical OQAP documents for NPP personnel.

‘Rosenergoatom’ utility’s Order on the introduction of the OQAP documents was approved. The typical OQAP documents were agreed and forwarded to Novovoronezh, Balakovo, Kola, Kalinin, Kursk, Beloyarsk and Bilibino NPPs.

Remarks and comments on the package of typical OQAP documents were received from Kursk and Smolensk NPPs. These were analyzed and a reply was forwarded to the above plants and to ‘Rosenergoatom’ utility.

## **4.2. Documentation Developed in the Frame of the Project**

This section briefly describes the content of the documents developed under the Project 3.2 (3.2/91 and R2.10/93N).

For the first phase of the Project the standard management procedures of Rosenergoatom utility were developed for the 5 prioritized directions of activity as mentioned above.

4.2.1. The following documents were developed for the direction of activity “Quality Control”:

4.2.1.1. Management procedure “Form and Content of Nuclear Power Plant Documents” (MP02).

The purpose of this MP is to define the standard form and content of the basic documents applicable at the NPPs of Russian Federation, namely:

- management procedures
- parts of management procedures

- departmental manuals
- working procedures
- reports
- quality plans
- records

4.2.1.2. In addition to the basic MP02 the following auxiliary MPs were developed:

- MP02/01 “General Guidelines for the Development of Operational Procedures”.
- MP02/02 “General regulations for writing procedures”.
- MP02/03 “Guidelines. Form and Content for Normal Operating Procedures”.
- MP02/04 “Guidelines. Form and Content for Abnormal Operating Procedures”.
- MP02/06 “Guidelines. Form and Content of Alarm Response Procedures”.

4.2.1.3. Management procedure “Management and Control of Documentation” (MP03).

The purpose of this MP is to define the requirements to the order of the management and control of documents throughout their life cycle from the time they begin to be developed or received at NPP and up to their cancellation as well as the duties and responsibilities of the personnel involved in all the work to do with documentation given below:

- documents developed at an NPP;
- documents developed by contract organizations at the request of an NPP;
- regulatory documents;
- project and design documentation, as well as manufacturers’ documents.

4.2.1.4. In addition to MP03 the following auxiliary MPs were developed:

- MP03/02 “Guidelines for the Verification of Operational Procedures”.
- MP03/03 “Guidelines for the Validation of Operational Procedures”.

4.2.1.5. Management Procedure “Registration and Storage of Documentation at NPPs” (MP05).

The purpose of this MP is to define the main types of records at an NPP, and the administrative arrangements involved in the collection, storage, retrieval, control, and destruction of records. This MP covers all the documents developed at the NPP or on its behalf, and which can be regarded as permanent or non-permanent records.

4.2.2. For the direction of activity “Operations” MP20 “Management of Operations” was developed.

The purpose of this MP is to assure the safe and reliable operation of an NPP by establishing the procedures and defining the functions, responsibilities, and powers of the personnel on all kinds of operational activity.

4.2.2.1. In addition to the MP the following auxiliary MPs were developed:

- MP20/01 “Temporary Changes to Plant Status”;
- MP20/02 “Operational Communications”;
- MP20/03 “Tours of Premises and Equipment by Operational Management and Operating Staff”;
- MP20/04 “Shift Handover”;
- MP20/06 “User Guidelines”;
- MP20/07 “Keeping records in operational logs”.

4.2.3. For the direction of activity “Maintenance and Repair” (TOIR) the management procedure MP21 “Management of Maintenance” was developed.

The purpose of this MP is to describe the distribution of responsibilities and the procedure of carrying out the following kinds of work:

- monitoring the condition of system and equipment;
- planning the TOIR;
- preparation for TOIR;
- maintaining and improving staff qualifications;
- removal of systems and equipment from service for TOIR;
- carrying out planned TOIR work;
- organizing repair work in the event of component failure (unplanned repairs);
- monitoring the quality of work carried out and accepting systems and equipment after TOIR;
- recording the works on TOIR, developing measures to improve their effectiveness.

4.2.4. For the direction of activity “Radiation Protection” and “Radiological Safety” the management procedure MP27 “Radiation Monitoring at Nuclear Power Plants and Monitoring Environmental Contamination” was developed.

The purpose of this MP is to define requirements to organizing a system of radiation monitoring and for how that monitoring is to be implemented, in order for keeping the exposure dose to personnel and the public as low as reasonably achievable, and not exceeding permitted exposure limits. Requirements of this MP cover all kinds of activity relating to radiation monitoring at NPPs and monitoring of environmental contamination.

4.2.4.1. In addition to the MP27 the following auxiliary MPs were developed:

- MP27/01 “Radiation dosimetric monitoring and monitoring the non-proliferation of radioactivity”;
- MP27/02 “Access to and working in the strict regime area”;
- MP27/03 “Decontamination”;
- MP27/04 “Radiation monitoring of the environment”;
- MP27/05 “Monitoring gaseous releases and liquid discharges”.

4.2.5. In the frame of the presented directions of activity the auxiliary MP09/03 “Radiological Safety” was developed that establishes requirements regarding radiological safety to be more detailed and defines organizational measures needed for assuring radiation safety at an NPP in accordance with the requirements of regulatory documents in the area of Nuclear Energy that are currently in force in the Russian Federation.

4.2.6. Additionally the management procedure MP25 “Management of Radioactive Waste” was developed which is not part of the Project.

The purpose of this MP is to describe the organisation of the system for managing radioactive waste produced during the operation of an NPP, and this MP covers this system including keeping to a minimum the amount of waste produced, the collection, treatment, storage, transportation, and preparation for disposal of the radioactive waste.

4.2.7. At the second stage of the Project (R2.10/93N) the following documents were developed:

4.2.7.1. Basic management procedure “Distribution of responsibilities for meeting the license conditions for activities at NPPs” (MP01) and auxiliary MPs “Distribution of responsibilities to meet the conditions of a temporary operating permit for an NPP unit” (MP01/01) and “Distribution of responsibilities to comply with the conditions of a temporary permit to carry out work using equipment, instruments and apparatus containing radioactive substances and items based on them, and for carrying out monitoring of the radiation situation” (MP01/02) that describe distribution of responsibilities of officials for respective type of activity.

4.2.7.2. Management procedure MP04 “Application of Quality Assurance Grades” establishes the order of application of grading approach based on comparative importance of each component, service, or process for assuring NPP safety. The document requirements are applicable for all the NPP systems and components, as well as for works carried out on (or for) them, including works related to purchased items (equipment, spare parts, and materials), and they establish:

- the rules for determining the QA grade of NPP systems (components);

- the rules for determining the QA grade of activities carried out on (or for) NPP systems (components), including activities related to purchased items (equipment, spare parts, and materials);

- the level of proficiency required for those personnel appointed as responsible nominees for the development and control of procedures for carrying out the work (or to manage documentation connected with purchased items) related to the various QA grades;

- the QA requirements for each grade of activity.

4.2.7.3. For the direction of activity “Maintenance and Repair” (TOIR) two auxiliary management procedures were developed namely MP02/05 “Composition and Structure of Maintenance and Repair Documentation” and MP21/01 “Planning Maintenance and Repair of Systems and Equipment”.

MP02/05 describes the range of documents related to NPP TOIR, which are necessary to provide quality assurance in carrying out TOIR work on NPP equipment.

MP21/01 describes the procedures and responsibilities for all types of activity involved in the planning of TOIR work in order to ensure the safe and efficient operation of an NPP.

4.2.7.4. “NPP Operations Service Manual” contains the following sections:

- tasks of the Operations Service (OS);
- OS structure and Organization;
- equipment and components managed by the OS;
- functions of the OS;
- interfaces between OS and other NPP divisions;
- documentation control, examination and checking.

### **4.3. Implementation of the developed documentation at the Russian NPPs.**

As mentioned before, the documents developed under the first stage of the Project 3.2 (3.2/91) were distributed among all the Russian NPPs for consideration. After obtaining comments from NPPs, the 'Rosenergoatom' utility issued Directive #223 of 06.12.96 “Putting into Force the Standard OQAP Documents”. The copy of the Directive is given in Annex 2.

The same procedure was carried out with for the documents developed under Stage 2 of the Project (R2.10/93N).

### **4.4. Status of Documents Introduction at Russian NPPs**

This section describes the state of affairs with the introduction of the quality system documentation at Russian NPPs as of the end of 1999. The assessment was performed on completion of the work under Projects 3.2/91 and R2.10/93N to evaluate the status of introduction of the quality system at Russian NPPs.

### **Balakovo NPP**

At Balakovo NPP the whole suite of existing technical and administrative documentation is the QA documentation. During routine revision of existing documents the assessment of the applicability of typical MP guidelines is performed.

Using the guidelines stated in the typical MPs Balakovo NPP issued a number of new documents and also revised certain existing documents. These include the procedures for keeping operating logs, for communications, shift handover, NPP standard of document format and the component and room walk-down manual. Enforced for trial application were the standards of alarm response procedures, of procedures for cases of deviations from normal operation. Since such procedures had not been developed at Balakovo NPP, the action of these standards was terminated.

By the end of 1999, using the guidelines stated in the typical MPs, the following documents were developed and were being introduced: guidelines for assuring the quality of maintenance and repair, for document handling and control, for the organization and conduct of operations, for applying the quality grading categories, for radiation safety assurance. Besides, using the structural principles of typical MPs the guidelines for the organization of periodic tests, for assuring fire safety, for industrial safety and labor protection assurance, for the organization of engineering support were developed and in the process of introduction. In 2000 MPs for such activity directions as 'Fuel Cycle', 'Engineering Support' 'Industrial Safety Management' and 'Fire Safety' were put into trial operation.

Action plans for QA system improvement form a separate attachment to the Plan of Organizational-Technical Measures of the annual Order №1.

### **Beloyarsk NPP**

Implementation of the Utility's Order №223 of 06.12.96 is being performed in accordance with agreed decision of the meeting of March 1998 to take into account, if necessary, these MPs during the development and routine revision of NPP organizational and operational



documentation. In view of the above, Beloyarsk NPP does not develop separate QA work plans and lists of QA documentation.

### **Bilibino NPP**

The plant is developing the Annual Plans of Operation Quality Improvement. Following the Directive №223 the plant introduced the documents for such activity directions as 'Quality Control', 'Operations', 'Radiation Safety', 'Maintenance and Repair', 'Personnel Examinations', 'Radwaste Management'.

A complete suite of documents was prepared for the direction of activity "Operations". The tentative time of introduction is 1<sup>st</sup> Quarter of 2000.

### **Kalinin NPP**

The structure of QA documentation incorporates the following:

1. Level 1 documentation:
  - Kalinin NPP Operational Quality Assurance Program (OQAP) STP 1-59-97;
  - Particular programs in the number of 15 (6 were enacted).
2. Level 2 documentation:
  - Descriptions of activity directions totaling 58 (24 out of these were enacted);
3. Level 3 documentation:
  - Procedures, methodologies, manuals etc.

The requirements of all typical MPs put into force by the Directive №223 of 06.12.96 are reflected in the corresponding NPP documents. Quality assurance work plan forms an integral part of the Order №1 (which provided for the development of 12 QA documents in 1999).

### **Kola NPP**

Documentation system adopted at Kola NPP can be arbitrarily divided into three levels (each of these may incorporate the plant-level documents as well):

- Level 1 (the highest level). The documents of this level specify the requirements to practical activities;
- Level 2 documents define the organization of practical activities;
- Level 3 documents regulate the performance of practical activities.

The development schedule and a list of documents introduced as required by Directive №223 are stated in the Kola NPP Manager's Order №361 of 05.05.98. The list of Management Procedures of the Utility is applied while updating the existing and developing the new

administrative-technical documents of Kola NPP. By the end of 1999 the plant documents were revised in accordance with the provisions of typical management procedures of 'Rosenergoatom' utility to meet the requirements of Directive № 223.

### **Kursk NPP**

The schedule for the development of QA management procedures in the frame of OQAP was prepared by Kursk NPP in May 1997 and was forwarded to 'Rosenergoatom' utility for approval as required by Directive №223.

The development of the documents corresponding to the typical MPs is maintained in accordance with the plans for revising the existing (valid) documents. Some documents are developed and issued as MPs while others – as NPP standard documents. During the reported period the documents were issued for such activity directions as 'Quality Control', 'Audits and Reviews', 'Metrological Support', 'Operations', 'Planning of Production & Technical Activities', 'Personnel Staffing, Training and Refresher Training'.

### **Novovoronezh NPP**

A suite of documents included in the QA program represents a three-level system.

**Level 1** document is the 'General Quality Guidance'.

Documents of **Level 2** comprise the managing procedures (organizational-procedural documents) which serve as a tool for regular and systematic management of the quality assurance activity both in the plant and relations with external organizations and entities. These documents are mainly of administrative nature and incorporate the following:

- 1) Management procedures for quality assurance (13 MPs were introduced) including those for:
  - activity directions and kinds;
  - defining the order of development, agreeing, approval and introduction of documents for practical activity, their accounting, control, revision and storage;
  - work planning and control;
- 2) NV NPP structural division manuals;
- 3) Post profiles of NV NPP managerial staff and of personnel who must have permits for the conduct of work in the area of atomic energy uses.

**Level 3** documents comprise practical activity procedures which directly define the quality requirements and are the so-called direct action documents intended for the direct performance of the work and/or for the control of the quality of works performed.

These documents incorporate the following:

- 1) Departmental QA procedures;
- 2) Organizational-procedural documents such as work performance plans and schedules, actions, orders, instructions, decisions;
- 3) Production documents such as operation and maintenance procedures, work programs;
- 4) Processes, charts, schematics, drawings etc.;
- 5) Post profiles and qualification characteristics of the remaining personnel not covered by Level 2.

Development of documents as required by Directive №223 'Putting into Force the Standard OQAP Documents' of 06.12.96 is conducted in accordance with Section 14 of the 'List of Activities to Introduce NV NPP Operational Quality Assurance Program' of the comprehensive Plan of improving the efficiency and safety of production processes at NV NPP for 1999 (Order №1 of 05.01.99).

The list of activities for introducing NV NPP OQAP program for 1999 provides for the development of 31 management procedures and the revision of the following document: 'Novovoronezh NPP. Operational Quality Assurance program. Description'.

### **Smolensk NPP**

QA program documentation can be broken down into two categories:

1. Documents for QA program development and introduction;
2. Documents for technical activity.

The documents on QA program development and introduction refer to the principles of organizational structure and administrative management of the quality assurance activity.

These include:

- General Guidance (program description) – brief description of the whole program, the general order of its implementation and official commitment of NPP management to perform their intended functions regarding the QA program;
- Management procedures (auxiliary management procedures) – describe the principles and methods of managing NPP activity, the order of planning, preparation and control of practical activity documents. These mainly refer to the administrative aspects of activity and usually do not contain technical data. Management Procedures (MPs) are usually being developed on the basis of typical MPs of the Utility.

- Description of activity directions (activity direction descriptions) – represent extended and detailed descriptions of a part of the QA program regarding the appropriate activity direction and kind;
- Departmental Manuals, post profiles;
- Documents for practical activity concern the concrete instructions on the order and method of work performance. These include:
  - 1) Plans and Schedules of work – represent the documents specifying the sequence of work performance (operation, maintenance, emergency actions). The Plans indicate the responsible persons and also define the working documents used when taking specific actions;
  - 2) Work procedures, other working documents and drawings – these mainly refer to the technical aspects of activity and contain specific requirements to the order and method of work conduct and/or the order and method of verifying the quality of work performance. The description format (the structure) of these documents is defined by MP-02-PTO procedure.

The practical activity documents must contain the quality criteria (parameters and characteristics), ways of achieving them, methods of quality control.

According to ‘Rosenergoatom’ utility Directive №223 of 16.12.96 ‘Putting into Force the Standard OQAP Documents’ Smolensk NPP prepared a schedule of development of management procedures. The schedule was approved by NPP Chief Engineer Mr. Spirin A.N. on 24.10.97 and forwarded to the Utility. The development of the QA documents is conducted in accordance with the schedule. Due to putting into effect (starting from 01.06.99) of a new version of the ‘Smolensk NPP OQAP Program. General Guidance’ a new schedule for the development of management and auxiliary procedures was prepared. QA work plan for 1999 provides for the performance of OQAP coordination effort, personnel training and establishment of the quality data base.

The schedule of actions to introduce the QA documentation is being monitored by ‘Rosenergoatom’ utility by means of conducting annual audits at all Russian NPPs.

Description of the state of the art with the introduction of the QA documents **at Leningrad NPP** which is not part of the ‘Rosenergoatom’ structure is given as additional information.

The documentation structure of the QA program for Leningrad NPP is formed in accordance with IAEA recommendations stated in Safety Series document №50-C\SG-Q (Quality Assurance for Safety of Nuclear Plants and other Nuclear Installations. Code of practice and safety guides Q1-Q14).

OQAP consists of two parts:

Part 1 – ‘General Provisions’ – contains the following:

- Description of LNPP quality system;
- Basic guidelines and approaches to the establishment of the OQAP program.

Part 1 includes:

- Section 1.1. NPP Operational Quality Assurance System;
- Section 1.2. Leningrad NPP Operational Quality Assurance System.

Part 2 entitled ‘Activity Directions to Assure the Quality of Operation and Safety of LNPP’ consists of the sections, whose titles correspond to the names of activity directions.

These are:

1. Administrative & Economic Activity.
2. Material & Technical Support.
3. Engineering Support.
4. Personnel Relations.
5. Emergency Preparedness.
6. Management of Operations.
7. Radiation Safety and Environmental Protection.
8. Radioactive Waste.
9. Water Chemistry.
10. Fuel Cycle.
11. Modification and Back-fitting.
12. Quality System Inspections.
13. Maintenance and Repair.
14. Pre-commissioning activities.
15. Assuring the quality of calculations and software tools.
16. Reliability Assurance.
17. Control of Non-conformances.
18. Physical Protection and Entry Control.
19. NPP Fire Protection.
20. Metrological Support for Operations and Tests.
21. Document Control and Keeping.

As regards the directions of activities performed to assure the quality of plant operation and safety, LNPP is developing the QA subprograms (programs) in the frame of the OQAP program.

The OQAP typical documents put into effect as required by Directive №223 of 06.12.96 are used as the reference manuals (handbooks) during the development of the QA programs.

## 5. Conclusions

- Based on international experience and IAEA recommendations, and for the purpose of improving the existing quality system a three-level documentation system has been adopted (Fig. 1) that allows to avoid duplication of the functions of responsible personnel and of performed work and provides the required detailed information on each activity direction and kind.
- Within the scope of Level 2 documents a new type of documents has been distinguished – the so-called Management Procedures (Final Report for project 3.2/91, item3.2), which define the necessary administrative measures for performing each activity direction and kind as well as staff members responsible.
- Based on the chosen documentation system a list of management procedures has been defined and priority activity directions, for which the needed documents are developed have been identified.
- The result of work performed under project 3.2/91 is a package of typical management procedures of ‘Rosenergoatom’ utility, which have been put into force by Order №223 of 06.12.96, and on the basis of which the Russian NPPs are developing plant management procedures by adapting the developed documents to plant-specific conditions.
- The result of work performed under project R2.10/93N is a package of typical management procedures of ‘Rosenergoatom’ utility that are presently in the stage of implementation.
- In the course of performing the work under projects 3.2/91 and R2.10/93N certain interest and progress in the improvement of quality systems existing at NPPs have been observed: QA programs and schedules for introducing the QA management procedures have been

developed; an assessment has been made of existing plant documentation to check documents conformance to the requirements of 'Rosenergoatom' utility's typical procedures including the required updating of the plants' documents. Many plants have developed (or are developing) management procedures for activity directions that had not been adequately covered before or had been covered in a limited scope. Internal QA audits are being undertaken at the plants, and as a result of these audits corrective actions are being taken that contribute to the improvement of the existing QA system.

- Experience and expertise gained in the course of performing the work under projects 3.2/91 and R2.10/93N have a favorable impact on the formation of the safety and quality culture among the staff members of 'Rosenergoatom' utility and NPP personnel.

## **6. Recommendations**

These projects not covered the development of the procedure dedicated to attestation and assessment of suppliers. But taking in mind its importance for improving the existed Quality System of the Russian NPPs we recommend to develop it. Moreover Rosenergoatom Utility has already ordered its development to VNIIAES up to March 2002. As for the procedure of management structure examination there was the joint decision of Rosenergoatom and Regulatory Body of Russia to not develop it as an independent procedure, because it is fully included into the Guideline (Quality Assurance Program of each NPP). It is additionally confirmed by the requirements of the Regulatory Body document NP-011-99 "Requirements to the Quality Assurance Program of Nuclear Plants"

## **7. References**

These Projects were performed in close connection to the Tacis Project 1.9 "Operating Procedures", Project 3.5 "Maintenance and Repair Procedures" and Project 4.1 "Support to Personnel Training".

**Annex 1**  
**List of standard management Procedures of 'Rosenergoatom' Utility**

	Title
MP01	Distribution of responsibilities for meeting the license conditions for activities at NPPs
MP01/01	Distribution of responsibilities to meet the conditions of a temporary operating permit for an NPP unit
MP01/02	Distribution of responsibilities to comply with the conditions of a temporary permit to carry out work using equipment, instruments and apparatus containing radioactive substances and items based on them, and for carrying out monitoring of the radiation situation
MP02	Form and Content of Nuclear Power Plant Documents
MP02/01	<i>General Guidelines for the Development of Operational Procedures</i>
MP02/02	<i>General regulations for writing procedures</i>
MP02/03	<i>Guidelines. Form and Content for Normal Operating Procedures</i>
MP02/04	<i>Guidelines. Form and Content for Abnormal Operating Procedures</i>
MP02/05	Composition and Structure of Maintenance and Repair Documentation
MP02/06	<i>Guidelines. Form and Content of Alarm Response Procedures</i>
MP02/07	Guidelines. Form and Content of Emergency Operating Procedures
MP02/08	Guidelines for Creating the Technical Basis for EOPs
MP02/09	General Guidelines Concerning the Rules of Hierarchy, Contents and Statement of EOP Set
MP02/10	Guidelines. The Order of Development of Management Procedures
MP03	<i>Management and Control of Documentation</i>
MP03/01	Guidelines for the EOP implementation
MP03/02	<i>Guidelines for the Verification of Operational Procedures</i>
MP03/03	<i>Guidelines for the Validation of Operational Procedures</i>
MP03/04	Guidelines for the EOP system creation
MP04	Application of Quality Assurance Grades
MP05	<i>Registration and Storage of Documentation at NPPs (records)</i>
MP06	Selection, Qualification and Training of Personnel
MP06/01	The order of creating at the NPP work teams on EOP set development and control. Requirements to personnel



MP07	Audit and Review
MP07/01	Review of Quality Assurance System
MP07/02	Internal program of audit, schedule of preparation
MP08	Non-Conformance and Corrective Action
MP08/01	Non-Conformance of the Fuel and Components
MP09	Management of Safety
MP09/01	Management of Industrial Safety
MP09/02	Management of Fire Protection
MP09/03	<i>Radiological Safety</i>
MP10	Arrangements for Organizational Interfaces
MP10/01	Guidelines for Project Management
MP11	Plant and Building Inventory and Labeling
MP12	Planning and Work Control
MP13	Housekeeping
MP14	Operational Experience Feedback
MP20	<i>Management of Operations</i>
MP20/01	<i>Temporary Changes to Plant Status</i>
MP20/02	<i>Operational Communications</i>
MP20/03	<i>Tours of Premises and Equipment by Operational Management and Operating Staff</i>
MP20/04	<i>Shift Handover</i>
MP20/05	EOPs User Guidelines
MP20/06	<i>User Guidelines</i>
MP20/07	<i>Keeping records in operational logs</i>
MP21	<i>Management of Maintenance</i>
MP21/01	Planning Maintenance and Repair of Systems and Equipment
MP22	Engineering Support
MP22/01	Guidelines. Requirements to the Computer Codes for Calculating the Unstable Modes of Power Installations and to Composition of EOP analysis bases
MP22/02	Guidelines. Sequence of EOP development for VVER Type NPP
MP22/03	Guidelines for keeping the least number of the calculation modes for EOP analytical bases
MP23	Chemical Technology

MP24	Fuel Circle
<i>MP25</i>	<i>Management of Radioactive Waste</i>
MP26	Management of Waste (excluding Radwaste)
<i>MP27</i>	<i>Radiation Monitoring at Nuclear Power Plants and Monitoring Environmental Contamination</i>
<i>MP27/01</i>	<i>Radiation dosimetric monitoring and monitoring the non-proliferation of radioactivity</i>
<i>MP27/02</i>	<i>Access to and working in the strict regime area</i>
<i>MP27/03</i>	<i>Decontamination</i>
<i>MP27/04</i>	<i>Radiation monitoring of the environment</i>
<i>MP27/05</i>	<i>Monitoring gaseous releases and liquid discharges</i>
MP28	Contingency and Emergency Arrangements
MP28/01	Guidelines for Organizing the CSF Monitoring
MP29	Design Change Control
MP30	Metrological Support
MP30/01	Purchasing the Measure and Test Equipment
MP30/02	Measure and Test Equipment Labeling and Storage
MP30/03	Data Control and Charge
MP31	Purchasing the Materials, Spare Parts and Services
MP31/01	Purchasing the Spare Parts
MP31/02	Contract Works
MP31/03	Stock Management
MP31/04	Articles Receiving and Storage
MP31/05	Articles Delivery and Return
MP32	Control of Security and Access
MP33	Management of Computer Systems
MP33/01	Software Approving
MP33/02	Data Control and Charge

Note: The procedures that were approved by 'Rosenergoatom' utility Directive #223 of 06.12.96 are italicized (see Annex 2).

## **Annex 2**

### **Directive №223 of 06.12.1996**

#### **«Putting into Force the Standard OQAP Documents»**

In accordance with the requirements of the OPB-88 Code of Practice and with a view to promote the managerial documents under the Operational Quality Assurance Program (OQAP) of the plant level VNIIAES institute on assignment from the Utility has developed typical documents for 5 activity directions in the frame of OQAP including: management of operations, maintenance and repair, radiation protection, quality control and radioactive wastes. This package of documents has been subjected to verification process at Novovoronezh and Balakovo NPPs. To ensure a single approach to the improvement of the operational quality assurance system and to introduce the above package of typical documents of the Utility

I HEREBY ORDER:

1. To consider the improvement of the quality assurance system as a priority task of the Utility.
2. To approve the typical OQAP documents according to the list given in Attachment 1 to this Order.
3. To assign Novovoronezh NPP (Mr. Vikin V.A.) and Balakovo NPP (Mr. Ipatov P.L.) as reference plants for the introduction of OQAP's typical documents.
4. VNIIAES (Mr. Abagyan A.A.), before 15.12.96, shall disseminate the typical OQAP documents among Novovoronezh, Balakovo, Kola, Kalinin, Smolemsk, Kursk, Beloyarsk and Bilibino NPPs and revise the STP 90 001-93 document before 01.06.97.
5. VNIIAES (Mr. Abagyan A.A.), before 10.12.96, shall organize seminars (training) on the OQAP typical documents package for NPP personnel.
6. NPP managers (Messrs. Vikin V.A., Ipatov P.L., Kolomtsev Yu.V., Shchapov G.A., Safrygin Ye.M., Gusarov V.I. Tukhvetov F.T.) jointly with VNIIAES (Mr. Abagyan A.A.) and on the basis of the OQAP typical documents package shall develop plans-schedules for the development of the quality assurance (QA) documents of the plant level and shall

submit them to ‘Rosenergoatom’ utility for approval before 01.02.97. While developing the plant level documents it is necessary to be guided by the requirements of the OQAP typical documents. In doing so, some deviation is allowed from the above as regards the structure and format of the plant level documents taking account of each plant’s specific features but with no detriment to the requirements of the OQAP typical documents.

7. NPP Operations Division (Mr. Sorokin N.M.), before 10.03.97 shall agree the plans-schedules for the development of the QA documents of the plant level and shall organize review and approval of the documents for the five priority activity directions.
8. VNIIAES (Mr. Abagyan A.A.):
  - with involvement of the reference plants shall provide the coordination and methodological assistance in the development of the plant level QA documents on a continuous basis;
  - before 15.01.97 shall develop and approve in ‘Rosenergoatom’ utility the process of introduction of the QA documentation within the existing documentation system;
  - shall hold, on requests from NPPs, regular seminars (training) on OQAP;
  - shall summarize all the comments and recommendations resulting from the introduction of the OQAP typical documents on a continuous basis.
9. The monitoring of the execution of this Directive shall rest with ‘Rosenergoatom’ Vice-president Mr. Antonov B.V.

President of ‘Rosenergoatom’ Utility

Pozdyshev E.N.