**CONTRACT**

**FOR CONSTRUCTION OF**

**BUSHEHR NUCLEAR POWER PLANT**

**(BNPP-2)**

**Risk Management Program**

**for BNPP-2 Construction Project**

Number of pages: 14

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1. **Terms and definitions, accepted abbreviations**

Table 1

|  |  |
| --- | --- |
| **Term** | **Definitions** |
| **Risk owner** | Role acted by Contractor’s employee (manager no less than Head of organization department) in whose scope of duties risk may occur and who is responsible for development and implementation of risk management measures as well as execution control of these measures and risk monitoring within his scope of responsibility |
| **Risk appetite** | Sum of approved limits of deviation from target parameters of project under the influence of risks in worst-case scenario and when these limits are exceeded, risk management measures shall be developed in order to bring deviations from target parameters impacted by risk into limit bounds |
| **Risk identification** | Process of detection of all possible events impacting on target project parameters and recording of their characteristics |
| **Key risks** | Risks having the biggest impact on project |
| **Most probable (medium) scenario** | Scenario when any deviation of target parameter value calculated during quantitative risk assessment from planned under the influence of risks is possible with probability of 50% |
| **Optimistic scenario** | Scenario when further deviation of target parameter value calculated during quantitative risk assessment from planned under the influence of risks is possible with probability of 90% |
| **Residual risk** | Risk left after implementation of control actions on changing probability of occurrence and/or exposure to risk with respect to project targets |
| **Risk parameterization** | Setting numerical evaluation of risk impact on target parameters by means of probability distribution of random value |
| **Worst-case scenario** | Scenario when further deviation of target parameter value calculated during quantitative risk assessment from planned under the influence of risks is possible with probability of 10% |
| **Risk exposure** | Maximum extent of potential losses from risk occurrence at worst-case scenario |
| **Project Office** | All official project participants which are under managerial and operating control of Project Manager and whose work is coordinated by Project Manager |
| **Risk** | Indefinite event whose occurrence has negative or positive impact on project |
| **Risk management strategy** | Priorities and long-term high-level solutions related to risk management in terms of risk appetite |
| **Risk pyramid** | Graphic multi-layer hierarchy structure which enables visual presentation of identified and classified potential risks of project for construction of complex facility |
| **Risk factor** | Root cause of risk occurrence |
| **Expert Board** | Body approving list of key risks and their owners, limits of risk appetite, summary risk management measures plan and plan of actions in case of risk occurrence |

Accepted abbreviations (table 2)

Table 2

|  |  |
| --- | --- |
| **Abbreviation** | **Abbreviation expansion** |
| **RMG** | Risk Management Group performing methodological support of risk management participants |
| **IRMS** | Information Risk Management System |
| **Contractor** | Joint-stock company “Atomstroyexport” |
| **Principal** | Nuclear Power Production and Development Co. of Iran |
| **Program** | Risk Management Program for NPP Construction Project |
| **Project** | Project for construction of BNPP-2 |
| **Instructions** | Instruction on risk management for projects of construction of complex facilities |
| **Expert Board** | Expert Board of JSC NIAEP – JSC ASE on risk management for projects of construction of complex facilities |
| **Project Manager** | Overall management of risks and crisis situations at project implementation |

1. **General Provisions**
   1. This Program defines:
2. Principles of project risk management;
3. Contents and methodology of implementation of risk management procedures;
4. Work process of participants on identification, assessment and mitigation of risks.
   1. Program is developed in compliance with requirement of i. G4.4 of Appendix G. Time Schedule to the Contract for construction of Nuclear Power Plant Bushehr-2 (BNPP-2).
   2. Program takes into account requirements of Project management standard (PMBOK Guide), GOST ISO 21500-2014 “Guidance on project management”, regulatory and methodical document of State Atomic Energy Corporation, Instructions on risk management for projects of construction of complex facilities JSC NIAEP (hereinafter referred to as Instructions) as well as practice of risk management for projects of construction of complex facilities established by the Principal.
   3. Program is an integral part of BNPP-2 Construction Project Management Plan.
   4. Risks are managed in compliance with scheme and requirements to performance of scheme procedures specified by Instructions.
   5. Program can be changed and supplemented during project implementation.
5. **Basic provisions**

**3.1 List of participants and their roles**

3.1.1 Project Manager bears responsibility for implementation of risk management of NPP project construction as related to compliance with agreed deadlines, contract cost and established regulatory and technical requirements.

3.1.2 Cost Management Director bears responsibility for development of regulatory documents for risk management system.

3.1.3 Company’s business unit managers (designing, procurement and supply, construction and installation works, pre-commissioning works and training) bear responsibility for organization and implementation of remedial measures.

3.1.4 Cost Management Director bears responsibility for measures on cost management and price formation.

3.1.5 Senior vice-president for project management bears responsibility for organization of cooperation between project participants as related to risk management and creation of effective project management system.

**3.2 Risk management principles for BNPP-2 construction project**

The main principles of risk management are:

- Compliance with requirements of regulatory documents;

- Usage of information technologies;

- Systematic approach;

- Adherence to balance of interests of all interested project parties;

- Compliance with requirements of contract requirements as related to deadlines, quality and project budget;

- Development of capacity in the field of risk management based on the best practices.

* 1. **Contents and methodology for implementation of risk management measures**

List of risk management processes:

- Risk identification processes;

- Risk assessment processes;

- Identification of key risks and risk owners;

- Processes of remedial measures development;

- Processes of measures implementation;

- Processes of monitoring for measures and assessment of risk consequences;

- Processes of reporting formalization.

* + 1. **Risk identification**

The aim of risk identification is detection and assessment of key risks impacting the most on target parameters of project (cost, deadlines and quality).

Project risks shall be identified **once every six months** during the whole period of NPP construction as related to target project parameters and control events specified by Project Manager.

Experts of organization departments – employees of JSC ASE –JSC NIAEP Project Office perform identification of risks. Experts use information on deadlines, schedules and project key events, current information about project implementation, statistic data, data base on previously occurred risks and etc.

Data sources for project risk identification are:

1. Unified risk pyramid (including several hierarchy levels: 1 - risk categories, 2 – risks, further – risk factors);
2. Activity progress chart, list of key events and other project documentation;
3. List of identified risks in similar projects;
4. Accumulated data on occurred risks.

Project risks are divided into the following groups (Attachment 1):

1. Abandonment of project implementation;
2. Delay in project implementation, nonfulfillment of key events;
3. Not sufficient funds to fulfill project, charging of penal sanctions.
   * 1. **Risk assessment**

Project Manager states risk appetite for project target parameters which is agreed by the Principal and approved by JSC NIAEP President.

Risk assessment methods: qualitative and quantitive methods.

Qualitative method is used to obtain list of identified risks and their further ranking in order of importance so that key risks can be separated. Risk significance level matrix is used for this type of assessment which allows for identifying of risk significance level based on expert analysis.

Quantitive method is used to assess deviations of target parameters under the influence of risks. Quantitive assessment of risks is performed by Risk Management Group with the help of different statistic simulation methods.

Results of calculations under worst-case scenario are accepted as results of calculation of deviations of target parameters.

Information resulting from quantitive assessment of inherent risks is used to solve issue on necessity for development of risk management measures.

A criterion to make decision on development of measures is excess of specified limits of deviations from target project parameters.

* + 1. **Decision taking regarding key risks**

Project Manager states risk appetite for selected project target parameters which is agreed by the Principal and approved by JSC NIAEP President.

Project Office identifies key risks and defines owner of each risk in compliance with risk priority. List of key risks and their owners is approved by Expert Board.

If additional risks are identified during project implementation (between planned identifications) which require urgent risk-reduction measures, then these risks are set as key risks, approved at unscheduled meeting of Expert Board and activities similar to those of key risks are performed.

* + 1. **Development of key risks management measures**

Prior to development of risks management measures owners of risks assess risks management and choose risks management strategy.

Probable risk management strategies:

* 1. Acceptance – making justified decision to consciously accept probable consequences of risk occurrence without performing additional measures aimed at changing of risk level;
  2. Reduction – performing actions aimed at reduction of probability and/or consequences of risk event occurrence prior to a pre-determined level;
  3. Increase – performing actions aimed at increasing of probability and/or consequences of risk event occurrence prior to a pre-determined level;
  4. Planning – development of plan of actions which shall be implemented (achievement of risk limit);
  5. Transfer – transfer of a part of consequences of risk event occurrence to the third person (i.e. insurance company);
  6. Distribution among project participants – is planned at the stage of project plan preparation;
  7. Funds reservation for compensation of unexpected expenses.

With respect to risk management and management strategy chosen by risk owners, risks management measures should be developed with indication of deadlines and responsible persons, amount of expenses and other resources required for development and realization thereof should be assessed and compared with realization effect. Risks management strategy is regularly revised with the aim of support and compliance with external environment of the project.

Risks management measures should be updated by project manager in a summary plan with indication of deadlines and responsible persons and assessment of overall financial expenses and other resources required for development and realization thereof in comparison with effect of realization plan which is subject to approval by Expert Board.

Risk owners should perform qualitative reassessment of residual risks and parameterization thereof for performance of quantitative assessment. Based on the results of quantitative assessment of residual risks, project manager makes a conclusion on sufficiency of risks management measures and necessity of development of additional measures.

* + 1. **Planning actions in case of risks occurrence**

Planning of actions in case of risks occurrence is exercised for risks, predictable consequences of which should be compensated. An obligation on determination of the said risks is a function of the owner of risks.

Plan of actions constitutes the following:

1. Events upon occurrence of which they should be implemented and performance should be aborted;
2. Consequence of actions which should be exercised in accordance with plan with indication of deadlines and responsible persons;
3. Assessment of financial expenses and other resources required for realization and their comparison with effect from realization of plans.

Plan of actions should be approved jointly with summary plan of measures of risks management by Expert Board and submitted to the Principal of the project.

* + 1. **Key risks monitoring**

Monitoring of risks is exercised on a constant basis with the aim to ensure execution control of a plan of measures on risks management, to determine current risks level, to collect and analyze information related to occurred risks, to prepare measures efficiency report.

The following is subject to monitoring:

1. Key risks of the project;
2. Progress of risks management measures;
3. Reasons and circumstances of changes in the course of project implementation;
4. New/under investigated sources of probable project risks;
5. Events which are conditions for execution of plan of actions in case of risks occurrence.

Administration of risks management measures is exercised by risks owners and includes quarterly reporting to project manager. Information regarding performance of risks management measures should be consolidated by project manager.

Information regarding project risks and performance of risks management measures is subject to consideration at briefings of the Contractor’s management, coordination meetings with the participation of the Principal and sub-contractors.

* + 1. **Recording of risks management process**

Recording of information generated by each risks management process procedure should be performed by IRMS in a standard form.

* + 1. **Periodicity of project risks management process procedures performance**

Periodicity of management process procedures performance should be once in a half-year. Upon occurrence of new or earlier unidentified project risks, periodicity of procedures performance may be amended upon project management decision.

Performance of risks management measures should be planned with respect to time reserve of activity progress chart of the project and should be considered in it as they lead to delays in commencement and completion of works of the critical path of the chart.

Risk appetite value should be annually assessed and approved by Expert Board.

* + 1. **Procedure of costs allocation to risks management**

Expenses on performance of summary plan of risks management measures and plan of actions in case of risks occurrence should be planned and considered in project budget.

* + 1. **Generation of occurred risks list**

In the course project risks management process the Contractor should record, periodically analyzes and archives risks-related information with the aim of using it in the following stages of the project and accumulation of risks database for future projects.

Upon completion of the project the Contractor should issue a report containing organized summarized information on project risks management.

1. **Report making**

Upon the results of project risks management cycle the Contractor shall issue a unified project risks management Report.

The project risks management Report shall be submitted to the Principal after approval by the Expert Board.

**Attachment 1**

**А. Abandonment of project**

This category may include the following risks, but not limited to the list below:

|  |  |
| --- | --- |
| **Risk designation** | **Description** |
| Country risk (political/  regulatory) | Change of political environment in country which leads to restriction of activities of State Corporation Rosatom and its companies. |
| Country risk (international commercial activities) | Restriction of State Corporation Rosatom and its companies in part of rendering services, realization of investment projects, projects on acquisition of assets, etc. on territories of foreign countries |
| Technical regulation risk | Change of legislative requirements (requirements of regulatory body) on utilization of NPP or SNF |
| Politico-social risk in presence regions | Significant change of business projects parameters (financing, guaranties, works progress chart, etc.) under influence of politico-social aspects which lead to withdrawal of realization |
| Risks of non-conclusion of contracts | Risk of non-achievement of agreement with the Principal on the basic provisions of contract, price, time or financing |
| Financing-related risks | Risk of construction withdrawal due to absence of financing from the Principal |
| Risk of delayed decision-making | Long-time decision-making process relating to contract realization or signing thereof |
| Risk of refusal of the Principal from project | Risk of refusal of the Principal from realization of project due to economical or political inexpedience or risks related to problems in the Principal’s management structure |

**B. Rescheduling of project implementation**

This category may include the following risks, but not limited to the list below:

|  |  |
| --- | --- |
| **Risk designation** | **Description** |
| Risk of long-time agreement of programs, technical assignments, reports, acceptance of works and equipment | Delay of works due to long-time agreement of required permits and reporting documentation, acceptance of works and equipment |
| Financing-related risks | Risk of construction rescheduling due to lack of funding or absence of funding from the Principal |
| Risk of changing of equipment specification upon the Principal’s requirement after approval of documentation | Delay in fulfillment of schedule of works caused by changes in documentation which leads to rescheduling of equipment supplies |
| Risk of untimely supply of equipment and works from the scope of the Principal’s obligations | Untimely supply of equipment and performance of works from the scope of the Principal’s obligations which prevents further progress |
| Unavailability of materials and unique construction equipment (absence of production facilities) | Risk of delays due to unavailability of construction equipment and materials at the Principal’s site |
| Inefficiency of tendering procedures | Risk of untimely agreement of IMP or agreement of IMP which is below market level |

**С. Risk of deficiency of funds for project completion, charging penalties**

This category may include the following risks, but not limited to the list below:

|  |  |
| --- | --- |
| **Risk designation** | **Description** |
| Risk of non-achievement of capacity | Mistakes in technical design, supply of deficient equipment, faults of operating personnel or pre-commissioning team |
| Risk of non-achievement of thermal output | Mistakes in technical design, supply of deficient equipment |
| Risk of non-achievement of availability factor of NPP | Mistakes in technical design, supply of deficient equipment, malfunction of process equipment, low quality of service and guaranty repair  faults of operating personnel |
| Risk of failure to deliver NPP on time to the Principal | Risk of delays in designing and obtaining required permits for construction, construction and installation works, supplies, pre-commissioning activities |
| Risk of excessive auxiliaries power consumption | Risk of delays in designing and obtaining required permits for construction, construction and installation works, supplies of equipment, pre-commissioning activities, Contractor’s mistakes in construction management |
| Risks of violation of contract | Risks of penalties issue for violation of contract terms |
| Risk of misassessment of contractual expenses | Risk of unaccounted project expenses or underevaluation of specific items of expenditures, wrong assessment of price of works |
| Risks of incorrect planning of price | Occurrence of additional expenses related to amendment of technical design (seismic influence, site climate, service water supply) |
| Risk of advance of financial expenses under the project | Amendment of taxation legislation, exchange rate risk, amendment of bank servicing rate, insurance, etc. |
| Risk of advance of commercial expenses under the project | Advance of expenses on the Contractor’s personnel due to advance of construction period |