



Completion of the first cycle of insurance inspections at OJSC «Concern Rosenergoatom» facilities

Sergey V. Babenko
Technical Director, Russian Association of Nuclear Insurers



List of Russian Nuclear Power Plants to be insured by RNIP

There are 10 Russian Nuclear Power Plants to be included in Concern Rosenergoatom:

- | | |
|---------------------|---|
| 1. Balakovo NPP | - 4 (B-320) VVER-1000 |
| 2. Beloyarsk NPP | - 1 BN-600 |
| 3. Bilibino NPP | - 4 EGP-6 |
| 4. Kalinin NPP | - 4 (B-338 and B-320) VVER-1000 |
| 5. Kola NPP | - 4 (B-230 and B-213) VVER-440 |
| 6. Kursk NPP | - 4 RBMK-1000 |
| 7. Leningrad NPP | - 4 RBMK-1000 |
| 8. Novovoronezh NPP | - 2 (B-179) VVER-440, 1 (B-187) VVER-1000 |
| 9. Smolensk NPP | - 3 RBMK-1000 |
| 10. Rostov NPP | - 2 (B-320) VVER-1000 |

TOTAL: 33 units

- 17 pressurized water reactors: 10 VVER - 1000 & 6 – VVER - 440;
- 15 Graphite Channel-type reactors : 11 RBMK – 1000;
- 1 fast breeder reactor.

Timeframe for Russian NPP Inspections

1. Leningrad NPP	02 - 04.12.2009 г.	
2. Balakovo NPP	07 - 09.12.2009 г.	
3. Kola NPP	19 - 21.10.2010 г.	
4. Kursk NPP	25 - 27.10.2010 г.	
5. Leningrad NPP	28 - 30.09.2011 г.	follow up Inspection
6. Novovoronezh NPP	03 - 07.10.2011 г.	
7. Beloyarsk NPP	10 - 12.10.2011 г.	
8. Novovoronezh NPP	14 - 15.03.2012 г.	follow up Inspection
9. Balakovo NPP	06 - 07.11.2012 г.	follow up Inspection
10. Rostov NPP	21 - 23.11.2012 г.	
11. Smolensk NPP	26 - 28.11.2012 г.	
12. Bilibino NPP	17 - 18.09.2013 г.	
13. Kursk NPP	03 - 04.10.2013 г.	follow up Inspection
14. Kalinin NPP	07 - 09.10.2013 г.	
15. Kola NPP	11.10.2013 г.	follow up Inspection



Basic provisions for conducting inspections at Russian Nuclear Facilities

Inspection of each Nuclear Facility - **once every 5 years**.

Follow-up inspection on elimination of the revealed areas for improvement- **in 1.5-2 year time**

10-16 inspections a year (NPP, enterprises, institutions, Atomflot and RI).

3-5 experts / 2-4 days.

Adherence to **confidentiality** terms and conditions.

Team Leader – RNIP **certificated inspector**.

Team members – involvement of specialists of inspectorates, enterprises, independent experts is possible.

At the end of inspection – **discussion of results with the management** and inspection counterparts from Nuclear Facilities.

Discussion of results in **Parent organization**.

Presentation of a **preliminary opinion** based on the inspection results.

Submission of the report to RNIP **members**.

In case of International inspection submission of the report of the foreign reinsurance organization.

Follow up the implementation of **corrective measures**

Inspection objective:

- assessment of insurance risk for insurance of third party liabilities, insurance coverage is ensured by Nuclear Insurance Pools;
- inspection is conducted in the following areas:
 - nuclear and radiation safety and operation/ third party liability at NPP (NSO/TPL)
 - Fire protection(FP)
 - Equipment failures (property insurance) (MB)

RANI documents regulating insurance of civil liability at nuclear facilities and conduct of inspection

- ❖ Regulations on insurance of civil liability at nuclear facilities (approved by RNIP Supervisory board on December 19, 2006, Protocol No. 31)
- ❖ Nuclear safety guidelines , Operation/ Third party liability at NPPs
- ❖ International guide for prevention of equipment failure at nuclear power plants
- ❖ International guide for fire protection at nuclear power plants
- ❖ NEW Survey Report Template DRAFT



INTERNATIONAL GUIDELINES
FOR THE
FIRE PROTECTION OF NUCLEAR POWER PLANTS

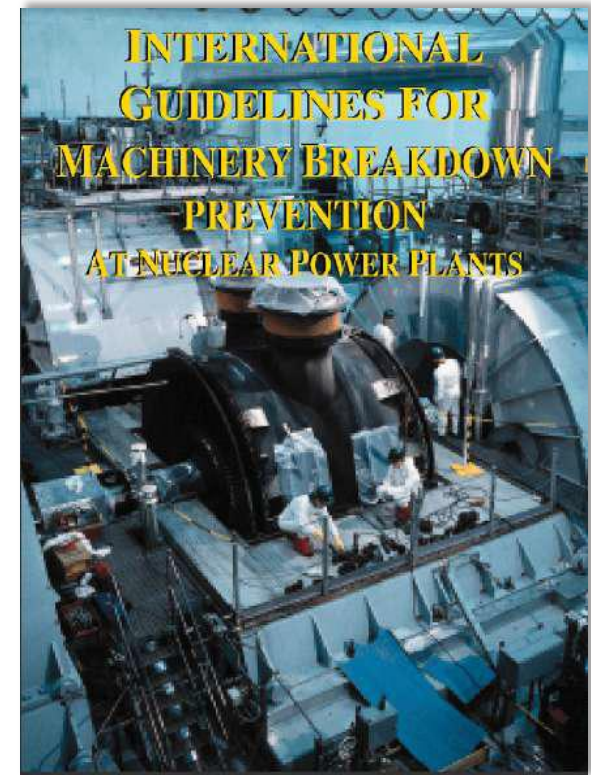
ISSUED IN 2006
ON BEHALF OF THE NUCLEAR POOLS' FORUM
4th EDITION



International Guidelines for
Nuclear Safety • Operations • Third-Party Liability
at Nuclear Power Plants

PUBLISHED ON BEHALF OF THE NUCLEAR POOLS' FORUM

1 July 2010





List of inspector participating in International Insurance Inspection in Russia

Inspectors of International pooling system :

Bruce Kettle	British nuclear insurance pool (till 2012)
Michael Peach	British NIP
Valery Martell	British NIP (since 2012)
Tsyang Pin	Chinese NIP
Lars-Eric Willberg	Scandinavian NIP (till 2012)
Gerd van Vikhelen	French NIP
Michael Sue	French NIP
Artem Zakharov	Ukrainian NIP
Jimmy Nishioka	Japanese NIP
Anatoliy Chukharev	Russian NIP (till 2012)
Sergey Babenko	RNIP (since 2011 - inspector , since 2012 – head of Insurance Inspectorate for Russian NPPs)
Anatoliy Nikitin	RNIP (since 2012 – observer, since 2013 - inspector)
Vladimir Vaschilo	RNIP (since 2012 – observer, since 2013 - inspector)

In 2011-2012 experienced engineers joined RANI

- Sergey Babenko(FIR, MBM, CON)



- Anatoliy Nikitin(MBE, NSO, TPL)



- Vladimir Vaschilo (NSO, TPL, MBM)





Representatives of Russian Nuclear Facilities participating in international surveys

Representatives of State Corporation Rosatom:

- Concern Rosenergoatom , TVEL corporation, General Inspection of Rosatom

JSC “Nuclear insurance broker “ (ASB)

Representatives of Nuclear Facilities

- Director, Chief engineer, Deputy Chief engineers, department heads, specialists.



General approaches to the ongoing assessment of insurance risks at International inspections in 2013

Generic challenges/issues for 2013:

- qualification of buildings/equipment, generic aspects of safety culture, housekeeping, ALARA principle
- probability safety analysis and assessment of fire hazard on reactor safe shutdown, service life, systems upgrade
- fire protection of equipment, buildings, constructions
- APCS, sensors, equipment for signals processing and display, including emergency conditions
- principles/approaches to response to severe accidents

Their current status:

- assessment of seismic stability of buildings, equipment support, maintenance works on depressurized equipment, using protective equipment, PL, dose makeup, and etc.
- RSA updating based on upgrading of systems, safety system trains, reports on implementation of fire protection measures
- implementation of new ASO, ASP, enhancement of forces and resources for respond of fire team
- APCS upgrade, installation of alarm sensors
- assessment of the impacts of external events (flooding, hurricanes, fires, aircraft crashes, shock wave impact and etc.), emergency procedures, availability and applicability of special engineered features to control beyond-design accidents (movable emergency diesel station, monoblock pumps, and etc.)

General findings and assessments

Assessment of organization of inspections

OJSC «Concern Rosenergoatom» and NPP management were well prepared for inspections, however during insurance inspection the inspectors identified some factors at 2 main inspected entities which reflect certain insurance risks: nuclear safety, operation, third party liability, as well as fire protection.

Main approaches to assessment of insurance risks for these NPPs

- in-depth review of the history of technical examination of design and operating decisions, upgrading, PLEX activities;
- assessment of nuclear safety, radiation safety, operation level upon the results of previous inspections (insurance, WANO peer reviews, IAEA missions);
- review of actions undertaken by Operating utility/NPP to collaborate with RANI (events, meetings, reports);
- assessment of ageing and expiration of design life of the plant equipment;
- critiques of operating troubles and deviations from normal plant operation related to human factor, shortcomings in subcontractor performance;
- assessment of operating troubles and deviations from normal plant operation during commissioning of new units, as well as those units which undergone PLEX-related upgrading and major overhauls.

General findings and assessments

Generic challenges/issues reviewed during insurance inspection after 2011 (with consideration for measures taken upon the results of stress-tests following the accident at the Japanese NPP Fukushima Daiichi)

- qualification of buildings/equipment, generic aspects of safety culture, housekeeping, ALARA principle - assessment of seismic stability of buildings, equipment support, maintenance works on depressurized equipment, using protective equipment, PL, dose makeup, and etc.;
- probability safety analysis and assessment of fire hazard on reactor safe shutdown , service life, systems upgrade - RSA updating based on upgrading of systems, safety system trains , reports on implementation of fire protection measures;
- fire protection of equipment, buildings, constructions - implementation of new ASO, ASP, enhancement of forces and resources for respond of fire team;
- APCS, sensors, equipment for signals processing and display, including emergency conditions - APCS upgrade, installation of alarm sensors;
- principles/approaches to response to severe accidents - assessment of the impacts of external events (flooding, hurricanes, fires, aircraft crashes, shock wave impact and etc.), emergency procedures, availability and applicability of special engineered features to control beyond-design accidents (movable emergency diesel station, monoblock pumps, and etc.);
- training of operation and maintenance plant personnel



Number of insurance inspection ecommendations at NPPs of concern Rosenergoatom

Recommendations issued	Implemente d	Being implemented	No information
Nuclear safety and operation			
132	47	28	57
Equipment failures			
11	2	4	5
Fire safety			
68	23	16	29
TOTAL			
211	72	48	91
%	34%	23%	43%
Status of recommendations from re-inspections TOTAL			
124	72	48	4
%	58%	39%	3%

Number of insurance inspection recommendations by areas (continued)

No	Generic description of recommendation of description of inspection areas	Number of recommendations	Number of plants
Fire safety			
1	Fire safety barriers	9	6
2	Fire safety alarms	4	3
3	Standby fire pumps with diesel drive	7	6
4	Trial run of fire pumps	4	4
5	Fire extinguishing of turbine bearings and spills of oil in the turbine building	13	7
6	Protection against hydrogen leaks	4	4
7	Main transformers	12	7



Number of insurance inspection recommendations by areas

No	Generic description of recommendation of description of inspection areas	Number of recommendations	Number of plants
Nuclear safety and operation and equipment failures			
1	Safety systems	9	6
2	Experience exchange	11	7
3	Providing of radiation monitoring	12	7
4	Prevention of intrusion of foreign matter	7	5
5	Implementation and distribution of good practice at NPP	9	6
6	PSA and design validation	18	7
7	Control of integrity of cladding, equipment and pipelines	9	5
8	Vibration monitoring	6	4
9	Personnel training, simulators	8	6
10	Safety culture	29	8
11	Replacement of coverings, improvement of room condition	3	2
12	Use of wooden platforms in scaffolds	4	4
13	Diesel generator stations (SDGS)	15	7
14	Performance indicators	3	2
15	Labeling	13	7
16	Hoist mechanisms and lifting operations	7	3
17	Operation at MCR, ECR	10	6
18	Seismic risks	5	4



New formats of insurance inspection for the next five-year cycle of assessments of insurance risks at Russian NPP from the year of 2014

New goals for insurance inspection

- assessment of the influence on the insurance risks of the human factor in NPP operation
- in-depth approach to assessment of risks of insurance of plant property against breakdowns
- insurance of new constructions (plant units, ice-breakers, nuclear fuel-related entities) – an example of large projected insurance payments – ZA pumped storage power plant-2 after flooding the turbine building and station unit
- acquisition of additional information, analysis, calculation of engineering rating factor

It is deemed reasonable for the following 5-year cycle of insurance inspection of nuclear units

- assess the influence of the human factor on the assurance of nuclear safety, radiation safety and reliability of operating power units (the guidelines need further elaboration, professionals need to be involved in assessment and analysis of events, operating troubles, psychophysiologic examination of personnel);
- additionally to conducted risk assessments, engineering assessments of insurance risks shall be performed for the breakdown of major equipment for plant units (technological and electrical) with consideration for their actual lifetime;
- evaluation of issues related to R&M arrangements at the power units with involvement of outside maintenance organizations –potential beneficiaries;
- arrangements for insurance inspections on the sites of new power units before their physical startup for assessment of construction risks, commissioning of systems and equipment (need for development of a new guide, involvement of professionals/creation of professionals group within RANI structure),
- arrangements for visits to nuclear sites to review the current operating issues, investigation of insured events, and etc.
- population of the list of inspectors invited to participate in insurance inspection at Russian NPPs from French and Japanese pools

Insurance inspections of other nuclear facilities (for information)

Besides insurance inspection of NPP units in 2012, RANI starts in-house insurance inspections at other Russian nuclear facilities:

- nuclear fuel cycle-related entities (in-house insurance inspections are conducted at 4 facilities: OJSC «SKhK», OJSC «UEKhK», FSUE «GKhK», FSUE «PA«MAYAK»)
- research reactor installations (reactors, critical, sub-critical assemblies) (in-house insurance inspections are conducted at 2 entities: OJSC «IRM», OJSC «NIKIET»)

2014-2016 goals:

- organize and conduct the primary in-house insurance inspections at all nuclear fuel cycle-related entities and R&D institutions which insure their performance in RNIP for liability for nuclear damage;
- review of the results of primary in-house insurance inspections and assessment of insurance risks of these entities, elaboration of approaches for in-house insurance inspections ;
- follow-up the recommendations of primary in-house insurance inspections



Insurance inspections of overseas NPPs (for information)

RNIP inspectors took part in insurance inspections at overseas NPPs

1. Bulgaria	Kozloduy NPP
2. Hungary	Paks NPP
3. Spain	Almaraz, Garona NPP
4. China	Ningde NPP, Ling AO, Daya Bay NPP
5. Taiwan	Lungmen NPP
6. Ukraine	Zaporozhje, Rivno, Khmel'nitskaya NPP
7. South Korea	Shin Kori NPP
8. Great Britain	Torness NPP



Thank you for your attention!
Any questions?

Address:

50A/8, building 2, Zemlyanoy val, Moscow 109028

Telephone: 8 (495) 258 92 38 ext.: 104

E-mail: babenko.sergey@ranipool.ru

web: www.ranipool.ru