

GUVERNUL ROMÂNIEI

COMISIA NAȚIONALĂ PENTRU CONTROLUL ACTIVITĂȚILOR NUCLEARE

ORDIN**pentru aprobarea Ghidului de securitate nucleară
privind codurile și standardele industriale
pentru centralele nucleare electrice**

În conformitate cu prevederile art. 7 alin. (7) din Regulamentul de organizare și funcționare a Comisiei Naționale pentru Controlul Activităților Nucleare, aprobat prin Hotărârea Guvernului nr. 1.627/2003, cu modificările și completările ulterioare, având în vedere art. 5 din Legea nr. 111/1996 privind desfășurarea în siguranță, reglementarea, autorizarea și controlul activităților nucleare, republicată, cu modificările și completările ulterioare;

luând în considerare Referatul nr. 14.670 din 10 martie 2015,

președintele Comisiei Naționale pentru Controlul Activităților Nucleare
emite următorul ordin:

Art. 1. — Se aprobă Ghidul de securitate nucleară privind codurile și standardele industriale pentru centralele nucleare electrice, prevăzut în anexa care face parte integrantă din prezentul ordin.

Art. 2. — Prezentul ordin se publică în Monitorul Oficial al României, Partea I.

Președintele Comisiei Naționale pentru Controlul Activităților Nucleare,
Constantin Popescu

București, 23 martie 2015.

Nr. 51

ANEXĂ

**GHID DE SECURITATE NUCLEARĂ
privind codurile și standardele industriale pentru centralele nucleare electrice****CAPITOLUL I
Domeniu, scop, definiții****SECȚIUNEA a 2-a
Definiții****SECȚIUNEA 1****Domeniu și scop**

Art. 1. — (1) Prezentul ghid este emis în conformitate cu prevederile Legii nr. 111/1996 privind desfășurarea în siguranță, reglementarea, autorizarea și controlul activităților nucleare, republicată, cu modificările și completările ulterioare.

(2) Prin prezentul ghid se stabilesc recomandările Comisiei Naționale pentru Controlul Activităților Nucleare, denumită în continuare **CNCAN**, pentru utilizarea codurilor și standardelor industriale în cadrul activităților de amplasare, construcție, punere în funcțiune și exploatare a unei centrale nucleare electrice.

Art. 2. — Prevederile din prezentul ghid se aplică atât solicitanților, cât și titularilor de autorizație, pentru fazele de amplasare, construcție, punere în funcțiune și exploatare a unei centrale nucleare electrice, după caz.

Art. 3. — (1) Termenii utilizați în prezentul ghid sunt definiți în anexa nr. 1, cu excepția acelor ale căror definiții se regăsesc în textul prezentului ghid.

(2) Centrala nucleare electrică este denumită în continuare prin abrevierea **CNE**.

(3) Abrevierea **SSCE** se utilizează pentru a face referire în mod generic la sistemele, structurile, componentele și echipamentele **CNE**, inclusiv la software-ul pentru instrumentație și control.

**CAPITOLUL II
Utilizarea codurilor și standardelor****SECȚIUNEA 1****Recomandări pentru solicitanții și titularii de autorizații**

Art. 4. — (1) Solicitanții de autorizație pentru fazele de amplasare, construcție, punere în funcțiune și exploatare a unei

CNE întocmesc și prezintă spre aprobare la CNCAN o listă completă de coduri și standarde aplicabile SSCE cu funcții de securitate nucleară și protecție fizică și activităților aferente, precum și domeniile de aplicare a acestora în activitățile de proiectare, procurare, analiză și verificare, execuție, fabricare, montare, instalare, testare, inspecție, întreținere și operare.

(2) La întocmirea listei prevăzute la alin. (1) pentru o CNE se recomandă includerea codurilor și standardelor din anexa nr. 2, cu precizarea ediției propuse pentru aplicare. Este permisă utilizarea unor coduri și standarde diferite sau aflate la ediții diferite de cele din anexa nr. 2, însoțită de o justificare tehnică prin care se demonstrează că se asigură măsuri de securitate nucleară cel puțin echivalente cu cele cerute prin codurile și standarde recomandate de CNCAN.

(3) Acolo unde interpretarea prevederilor din codurile și standardele din anexa nr. 2 depinde de cerințele de reglementare din țările de origine ale codurilor și standardelor respective, solicitanții de autorizație pot solicita la CNCAN clarificări cu privire la modul de aplicare.

Art. 5. — (1) Titularii de autorizație pentru fazele de amplasare, construcție, punere în funcțiune și exploatare a unei CNE mențin la zi lista completă de coduri și standarde aplicabile SSCE cu funcții de securitate nucleară și protecție fizică și activităților aferente, împreună cu domeniile de aplicare a acestora în activitățile de proiectare, procurare, analiză și verificare, execuție, fabricare, montare, instalare, testare, inspecție, întreținere și operare.

(2) La actualizarea listei prevăzute la alin. (1) pentru o CNE se recomandă includerea codurilor și standardelor din anexa nr. 2, cu precizarea ediției propuse pentru utilizare. Este permisă utilizarea unor coduri și standarde diferite sau aflate la ediții diferite de cele din anexa nr. 2, în baza unei justificări tehnice care prezintă modul în care titularul de autorizație asigură măsuri de securitate nucleară echivalente cu cele cerute prin codurile și standardele recomandate de CNCAN.

(3) Acolo unde interpretarea prevederilor din codurile și standardele din anexa nr. 2 depinde de cerințele de reglementare din țările de origine ale codurilor și standardelor respective, titularii de autorizație pot solicita la CNCAN clarificări cu privire la modul de aplicare.

(4) Pentru titularii de autorizație pentru CNE în faza de exploatare se recomandă ca în procesul de revizuire periodică a securității nucleare să se utilizeze cele mai noi ediții în vigoare ale codurilor și standardelor din anexa nr. 2.

SECȚIUNEA a 2-a

Verificarea de către CNCAN a modului de utilizare a codurilor și standardelor

Art. 6. — (1) Îndeplinirea prevederilor din prezentul ghid se verifică de către CNCAN în cadrul procesului de autorizare, precum și prin evaluări și inspecții periodice pe toată durata de valabilitate a unei autorizații.

(2) Cerințele și criteriile din codurile și standardele din lista stabilită conform prevederilor art. 4 pentru solicitanții de autorizație și respectiv conform prevederilor art. 5 pentru titularii de autorizație se utilizează de către personalul CNCAN în activitățile de evaluare și inspecție, ca suport pentru verificarea conformității cu cerințele generale din normele de securitate nucleară și protecție fizică.

(3) În cadrul procesului de autorizare, precum și pe durata de valabilitate a unei autorizații, CNCAN poate solicita utilizarea unor coduri și standarde suplimentare, pentru a ține cont de experiența acumulată, de rezultatele activităților de cercetare și de cele mai noi standarde și bune practici recunoscute la nivel internațional.

(4) Lista de coduri și standarde din anexa nr. 2 nu este exhaustivă și nu scutește solicitanții sau titularii de autorizație de la obligația de a identifica și utiliza toate codurile și standardele necesare pentru asigurarea securității nucleare și protecției fizice pentru instalațiile de care răspund, cu precizarea ediției aplicabile.

Art. 7. — (1) Se recomandă ca, în termen de 240 de zile de la intrarea în vigoare a prezentului ghid, titularii de autorizație pentru CNE aflate în faza de exploatare să transmită la CNCAN spre evaluare lista actualizată a codurilor și standardelor utilizate, împreună cu un raport care să prezinte, pentru fiecare cod și standard în parte, următoarele informații:

- a) ediția utilizată sau propusă pentru utilizare;
- b) domeniul de aplicabilitate al standardului;
- c) procedurile interne ale titularului de autorizație în care se prevede obligativitatea conformității cu codul sau cu standardul respectiv;
- d) alte detalii relevante privind modul de utilizare a codului sau standardului respectiv, după caz.

(2) Lista de coduri și standarde utilizate de titularul de autorizație și raportul prevăzut la alin. (1) se mențin ca documente controlate pe întreaga durată de viață a CNE.

Art. 8. — Anexele nr. 1 și 2 fac parte integrantă din prezentul ghid.

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ANEXA Nr. 1
la ghid

Definiții și abrevieri

ANSI — American National Standards Institute
ASME — American Society of Mechanical Engineers
ANS — American National Standard
BVPC — Boiler and Pressure Vessel Code
CANDU — CANada Deuterium Uranium
CSA — Canadian Standards Association
IEEE — Institute of Electrical and Electronics Engineers

IEC — International Electrotechnical Commission
ISO — International Organization for Standardization
Funcție de securitate nucleară — un scop specific care trebuie îndeplinit pentru asigurarea securității nucleare
Funcție de protecție fizică — un scop specific care trebuie îndeplinit pentru asigurarea protecției fizice

LISTĂ

de coduri și standarde industriale recomandate de Comisia Națională pentru Controlul
Activităților Nucleare pentru centralele nucleare electrice

SECȚIUNEA 1

Standarde CSA

- 1) CSA N290.0-11 — General Requirements for Safety Systems of Nuclear Power Plants;
- 2) CSA N290.1-13 — Requirements for the shutdown systems of nuclear power plants;
- 3) CSA N290.2-11 — Requirements for emergency core cooling systems of nuclear power plants;
- 4) CSA N290.3-11 — Requirements for the containment system of nuclear power plants;
- 5) CSA N290.4-11 — Requirements for reactor control systems of nuclear power plants;
- 6) CSA N290.5-06 (R2011) — Requirements for Electrical Power and Instrument Air Systems of CANDU Nuclear Power Plants;
- 7) CSA N290.6-09 (R2014) — Requirements for monitoring and display of nuclear power plant safety functions in the event of an accident;
- 8) CSA N290.11-13 — Requirements for reactor heat removal capability during outage of nuclear power plants;
- 9) CSA N290.13-05 (R2010) — Environmental Qualification of Equipment for CANDU Nuclear Power Plants;
- 10) CSA N290.14-07 (R2012) — Qualification of Pre-Developed Software for Use in Safety-Related Instrumentation and Control Applications in Nuclear Power Plants;
- 11) CSA N290.15-10 — Requirements for the safe operating envelope of nuclear power plants;
- 12) CSA N285.4-14 — Periodic inspection of CANDU nuclear power plant components;
- 13) CSA N285.5-13 — Periodic inspection of CANDU nuclear power plant containment components;
- 14) CSA N285.0-12/N285.6 SERIES-12 — General requirements for pressure-retaining systems and components in CANDU nuclear power plants/Material Standards for reactor components for CANDU nuclear power plants;
- 15) CSA N285.8-10 — Technical requirements for in-service evaluation of zirconium alloy pressure tubes in CANDU reactors;
- 16) CSA N291-08 (R2013) — Requirements for Safety-Related Structures for CANDU Nuclear Power Plants;
- 17) CSA N287.1-14 — General requirements for concrete containment structures for nuclear power plants;
- 18) CSA N287.2-08 (R2013) — Material requirements for concrete containment structures for CANDU nuclear power plants;
- 19) CSA N287.3-14 — Design requirements for concrete containment structures for nuclear power plants;
- 20) CSA N287.4-09 — Construction, fabrication, and installation requirements for concrete containment structures for CANDU nuclear power plants;
- 21) CSA N287.5-11 — Examination and testing requirements for concrete containment structures for nuclear power plants;
- 22) CSA N287.6-11 — Pre-operational proof and leakage rate testing requirements for concrete containment structures for nuclear power plants;
- 23) CSA N287.7-08 (R2013) — In-service examination and testing requirements for concrete containment structures for CANDU nuclear power plants;
- 24) CSA N293-12 — Fire protection for nuclear power plants;
- 25) CSA N289.1-08 (R2013) — General requirements for seismic design and qualification of CANDU nuclear power plants;
- 26) CSA N289.2-10 — Ground motion determination for seismic qualification of nuclear power plants;
- 27) CSA N289.3-10 — Design procedures for seismic qualification of nuclear power plants;

- 28) CSA N289.4-12 — Testing procedures for seismic qualification of nuclear power plant structures, systems, and components;
- 29) CSA N289.5-12 — Seismic instrumentation requirements for nuclear power plants and nuclear facilities;
- 30) CSA N286-12 — Management system requirements for nuclear facilities;
- 31) CSA N286.0.1-14 — Commentary on N286-12, Management system requirements for nuclear facilities;
- 32) CSA N286.7-99 (R2012) — Quality Assurance of Analytical, Scientific and Design Computer Programs for Nuclear Power Plants;
- 33) CSA N286.7.1-09 — Guideline for the application of N286.7-99, Quality assurance of analytical, scientific, and design computer programs for nuclear power plants;
- 34) CSA N288.1-14 — Guidelines for calculating derived release limits for radioactive material in airborne and liquid effluents for normal operation of nuclear facilities;
- 35) CAN/CSA-N288.2-M91 (R2013) — Guidelines for Calculating Radiation Doses to the Public From a Release of Airborne Radioactive Material Under Hypothetical Accident Conditions in Nuclear Reactors;
- 36) CSA N288.3.4-13 — Performance testing of nuclear air-cleaning systems at nuclear facilities;
- 37) CSA N292.0-14 — General principles for the management of radioactive waste and irradiated fuel;
- 38) CSA N292.2-13 — Interim dry storage of irradiated fuel;
- 39) CSA N292.3-14 — Management of low- and intermediate-level radioactive waste.

SECȚIUNEA a 2-a

Coduri și standarde ASME

- 1) ASME-BPVC-CODE CASES NUC-2013 — Code cases: Nuclear components;
- 2) ASME-BPVC-Section XI-2013 — Section 11 — Rules for in-service inspection of nuclear power plant components;
- 3) ASME-BPVC-Section III DIV 3-2013 — Section 3 — Rules for construction of nuclear facility components — Division 3 — Containments for transportation and storage of spent nuclear fuel and high level radioactive material and waste;
- 4) ASME-BPVC-Section III NCA-2013 — Section 3 — Rules for construction of nuclear facility components — Subsection NCA — General requirements for division 1 and division 2;
- 5) ASME-BPVC-Section III DIV 2-2013 — Section 3 — Rules for construction of nuclear facility components — Division 2 — Code for concrete containments;
- 6) ASME-BPVC-Section III APPENDICES-2013 — Section 3 — Rules for construction of nuclear facility components — Division 1 — Appendices;
- 7) ASME-BPVC-Section III NG-2013 — Section 3 — Rules for construction of nuclear facility components — Division 1 — Subsection NG — Core support structures;
- 8) ASME-BPVC-Section III NE-2013 — Section 3 — Rules for construction of nuclear facility components — Division 1 — Subsection NE — Class MC components;
- 9) ASME-BPVC-Section III NC-2013 — Section 3 — Rules for construction of nuclear facility components — Division 1 — Subsection NC — Class 2 components;
- 10) ASME-BPVC-Section III NF-2013 — Section 3 — Rules for construction of nuclear facility components — Division 1 — Subsection NF — Supports;
- 11) ASME-BPVC-Section III NB-2013 — Section 3 — Rules for construction of nuclear facility components — Division 1 — Subsection NB — Class 1 components;

12) ASME-BPVC-Section III ND-2013 — Section 3 — Rules for construction of nuclear facility components — Division 1 — Subsection ND — Class 3 components;

13) ASME-BPVC-Section III NH-2013 — Section 3 — Rules for construction of nuclear power plant components — Division 1 — Subsection NH — Class 1 components in elevated temperature service;

14) ASME BPVC-Section VIII-1-2013, BPVC Section VIII — Rules for Construction of Pressure Vessels Division 1;

15) ASME BPVC-Section VIII-2 — 2013, BPVC Section VIII — Rules for Construction of Pressure Vessels Division 2 — Alternative Rules;

16) ASME BPVC-Section II, A, B, C, D — 2013, Materials;

17) ASME-BPVC-Section IX — 2013 Welding, Brazing, and Fusing Qualifications;

18) ASME B31.1— 2012, Power Piping;

19) ASME RA-S-2002, Standard for Probabilistic Risk Assessment For Nuclear Power Plant Applications;

20) ASME RA-Sa-2003, Addenda to ASME RA-S-2002 Standard For Probabilistic Risk Assessment For Nuclear Power Plant Applications;

21) ASME RA-Sb-2005, Addenda to ASME RA-S-2002 Standard For Probabilistic Risk Assessment For Nuclear Power Plant Applications;

22) ASME/ANS RA-S—2008 Standard for Level 1/Large Early Release Frequency PRA for NPP Applications;

23) ASME/ANS RA-Sa—2009, Addenda to ASME/ANS RA-S—2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications;

24) ASME/ANS-RA-Sb-2013, Addenda to ASME/ANS RA-S—2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications;

25) ASME NQA-1 — 2012, Quality Assurance Requirements for Nuclear Facility Applications.

SECȚIUNEA a 3-a

Standarde IEEE

1) IEEE Std 1023-2004 — IEEE Recommended Practice for the Application of Human Factors Engineering to Systems, Equipment, and Facilities;

2) IEEE Std 7-4.3.2-2010 — IEEE Standard Criteria for Digital Computers in Safety Systems of Nuclear Power Generating Stations;

3) IEEE Std 933-2013, IEEE Guide for the Definition of Reliability Program Plans for Nuclear Generating Stations and Other Nuclear Facilities;

4) IEEE Std C37.98-2013, IEEE Standard for Seismic Qualification Testing of Protective Relays and Auxiliaries for Nuclear Facilities;

5) IEEE Std 638-2013, IEEE Standard for Qualification of Class 1E Transformers for Nuclear Power Generating Stations;

6) IEEE Std 379-2014, IEEE Standard for Application of the Single-Failure Criterion to Nuclear Power Generating Station Safety Systems;

7) IEEE Std 1205-2014, IEEE Guide for Assessing, Monitoring and Mitigating Aging Effects on Electrical Equipment Used in Nuclear Power Generating Stations and Other Nuclear Facilities;

8) IEEE Std 344-2013, IEEE Standard for Seismic Qualification of Equipment for Nuclear Power Generating Stations;

9) IEEE Std 317-2013, IEEE Standard for Electric Penetration Assemblies in Containment Structures for Nuclear Power Generating Stations;

10) IEEE Std 308-2012, IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations;

11) IEEE Std 420-2013, IEEE Standard for the Design and Qualification of Class 1E Control Boards, Panels, and Racks Used in Nuclear Power Generating Stations;

12) IEEE Std 765-2012, IEEE Standard for Preferred Power Supply (PPS) for Nuclear Power Generating Stations (NPGS);

13) IEEE Std 1792-2011, IEEE Recommended Practice for Nuclear Power Generating Station (NPGS) Preferred Power Supply (PPS) Reliability;

14) IEEE Std 1682-2011, IEEE Standard for Qualifying Fiber Optic Cables, Connections, and Optical Fiber Splices for Use in Safety Systems in Nuclear Power Generating Stations;

15) IEEE Std 692-2013, IEEE Standard for Criteria for Security Systems for Nuclear Power Generating Stations;

16) IEEE Std 535-2013, IEEE Standard for Qualification of Class 1E Vented Lead Acid Storage Batteries for Nuclear Power Generating Stations;

17) IEEE Std 577-2012, IEEE Standard Requirements for Reliability Analysis in the Design and Operation of Safety Systems for Nuclear Power Generating Stations;

18) IEEE Std 628-2011, IEEE Standard Criteria for the Design, Installation, and Qualification of Raceway Systems for Class 1E Circuits for Nuclear Power Generating Stations;

19) IEEE Std 649-2006 (R 2011), IEEE Standard for Qualifying Class 1E Motor Control Centers for Nuclear Power Generating Stations;

20) IEEE Std 338-2012, IEEE Standard for Criteria for the Periodic Surveillance Testing of Nuclear Power Generating Station Safety;

21) IEC/IEEE 62582-1:2011 Edition 1.0 2011-08, Nuclear power plants — Instrumentation and control important to safety — Electrical equipment condition monitoring methods — Part 1: General;

22) IEC/IEEE 62582-2:2011 Edition 1.0 2011-08, Nuclear power plants — Instrumentation and control important to safety — Electrical equipment condition monitoring methods — Part 2: Indenter modulus;

23) IEC/IEEE 62582-3:2011 Edition 1.0 2012-11, Nuclear Power Plants — Instrumentation and control important to safety — Electrical equipment condition monitoring methods — Part 3: Elongation at break;

24) IEC/IEEE 62582-4:2011 Edition 1.0 2011-08, Nuclear power plants — Instrumentation and control important to safety — Electrical equipment condition monitoring methods — Part 4: Oxidation induction techniques;

25) IEEE Std C37.105-2010, IEEE Standard for Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations;

26) IEEE Std 497-2010, IEEE Standard Criteria for Accident Monitoring Instrumentation for Nuclear Power Generating Stations;

27) IEEE Std 603-2009, IEEE Standard Criteria for Safety Systems for Nuclear Power Generating Stations;

28) IEEE Std 650-2006, IEEE Standard for Qualification of Class 1E Static Battery Chargers and Inverters for Nuclear Power Generating Stations;

29) IEEE Std 833-2005, IEEE Recommended Practice for the Protection of Electric Equipment in Nuclear Power Generating Stations From Water Hazards;

30) IEEE Std 336-2010, IEEE Guide for Installation, Inspection, and Testing for Class 1E Power, Instrumentation, and Control Equipment at Nuclear Facilities;

31) IEEE Std 690-2004, IEEE Standard for the Design and Installation of Cable Systems for Class 1E Circuits in Nuclear Power Generating Stations;

32) IEEE Std 323-2003, IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations;

33) IEEE Std 383-2003 (R 2008), IEEE Standard for Qualifying Class 1E Electric Cables and Field Splices for Nuclear Power Generating Stations;

34) IEEE Std 845-1999, IEEE Guide for the Evaluation of Human-System Performance in Nuclear Power Generating Stations;

35) IEEE Std 1082-1997, IEEE Guide for Incorporating Human Action Reliability Analysis for Nuclear Power Generating Stations;

36) IEEE Std 1786-2011, IEEE Guide for Human Factors Applications of Computerized Operating Procedure Systems (COPS) at Nuclear Power Generating Stations and Other Nuclear Facilities;

37) IEEE Std 741-2007, IEEE Standard Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations;

38) IEEE Std 1290-1996, IEEE Guide for Motor Operated Valve (MOV) Motor Application, Protection, Control, and Testing in Nuclear Power Generating Stations;

39) IEEE Std 382-2006, IEEE Standard for Qualification of Safety-Related Actuators for Nuclear Power Generating Stations;

40) IEEE Std 387-1995 (R 2007), IEEE Standard Criteria for Diesel-Generator Units Applied as Standby Power Supplies for Nuclear Power Generating Stations;

41) IEEE Std 334-2006, IEEE Standard for Qualifying Continuous Duty Class 1E Motors for Nuclear Power Generating Stations;

42) IEEE Std 498-1990, IEEE Standard Requirements for the Calibration and Control of Measuring and Test Equipment Used in Nuclear Facilities;

43) IEEE Std 384-2008, IEEE Standard Criteria for Independence of Class 1E Equipment and Circuits;

44) IEEE Std 572-2006 (R 2011) Qualification of Class 1E Connection Assemblies for Nuclear Power Generating Stations;

45) IEEE Std 627-2010, Qualification of Equipment Used in Nuclear Facilities;

46) IEEE Std 1012-2012, IEEE Standard for Software Verification and Validation;

47) IEEE Std C37.105-2010, Qualifying Class 1E Protective Relays and Auxiliaries for Nuclear Power Generating Stations;

48) IEEE Std 829-2008, IEEE Standard for Software and System Test Documentation;

49) IEEE Std 982.1-1998, IEEE Standard Dictionary of Measures to Produce Reliable Software;

50) IEEE Std 1028-2008, IEEE Standard for Software Reviews and Audits;

51) IEEE Std 1044-2009, IEEE Standard Classification for Software Anomalies;

52) IEEE Std 1061-1998, IEEE Standard for a Software Quality Metrics Methodology;

53) IEEE Std 1074-2006, IEEE Standard for Developing a Software Project Life Cycle Process;

54) IEEE Std 1517-2010, IEEE Standard for Information Technology — System and Software Life Cycle Processes — Reuse Processes;

55) IEEE Std 730-2002, IEEE Standard for Software Quality Assurance Plans;

56) IEEE Std 1058-1998, IEEE Standard for Software Project Management Plans;

57) IEEE Std 1228-1994, IEEE Standard for Software Safety Plans;

58) IEEE Std 828-2005, IEEE Standard for Software Configuration Management Plans;

59) IEEE Std 829-2008, IEEE Standard for Software and System Test Documentation;

60) IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications;

61) IEEE Std 1016-2009, IEEE Recommended Practice for Software Design Descriptions;

62) IEEE Std 1016.1-1993, IEEE Guide to Software Design Descriptions;

63) IEEE Std 1008-1987, IEEE Standard for Software Unit Testing;

64) IEEE Std 983-1986, IEEE Guide for Software Quality Assurance Planning;

65) IEEE Std 1059-1993, IEEE Guide for Software Verification and Validation Plans;

66) IEEE Std 982.1-2005, IEEE Standard Dictionary of Measures of the Software Aspects of Dependability;

67) IEEE Std 1002-1987, Taxonomy for Software Engineering Standards;

68) IEEE Standard 1076-2008, IEEE Standard VHDL Language Reference Manual.

SECȚIUNEA a 4-a

Standarde IEC

1) IEC 60515 ed2.0 (2007-02): Nuclear power plants — Instrumentation important to safety — Radiation detectors — Characteristics and test methods;

2) IEC 60568 ed2.0 (2006-01): Nuclear power plants — Instrumentation important to safety — In-core instrumentation for neutron fluence rate (flux) measurements in power reactors;

3) IEC 60671 ed2.0 (2007-05): Nuclear power plants — Instrumentation and control systems important to safety — Surveillance testing;

4) IEC 60709 ed2.0 (2004-11): Nuclear power plants — Instrumentation and control systems important to safety — Separation;

5) IEC 60737 ed2.0 (2010-06): Nuclear power plants — Instrumentation important to safety — Temperature sensors (in-core and primary coolant circuit) — Characteristics and test methods;

6) IEC 60768 ed2.0 (2009-04): Nuclear power plants — Instrumentation important to safety — Equipment for continuous in-line or on-line monitoring of radioactivity in process streams for normal and incident conditions;

7) IEC 60780 ed2.0 (1998-10): Nuclear power plants — Electrical equipment of the safety system — Qualification;

8) IEC 60880 ed2.0 (2006-05): Nuclear power plants — Instrumentation and control systems important to safety — Software aspects for computer-based systems performing category A functions;

9) IEC 60951-1 ed2.0 (2009-06): Nuclear power plants — Instrumentation important to safety — Radiation monitoring for accident and post-accident conditions — Part 1: General requirements;

10) IEC 60951-2 ed2.0 (2009-06): Nuclear power plants — Instrumentation important to safety — Radiation monitoring for accident and post-accident conditions — Part 2: Equipment for continuous off-line monitoring of radioactivity in gaseous effluents and ventilation air;

11) IEC 60951-3 ed2.0 (2009-06): Nuclear power plants — Instrumentation important to safety — Radiation monitoring for accident and post-accident conditions — Part 3: Equipment for continuous high range area gamma monitoring;

12) IEC 60951-4 ed2.0 (2009-06): Nuclear power plants — Instrumentation important to safety — Radiation monitoring for accident and post-accident conditions — Part 4: Equipment for continuous in-line or on-line monitoring of radioactivity in process streams;

13) IEC 60964 ed2.0 (2009-02): Nuclear power plants — Control rooms — Design;

14) IEC 60965 ed2.0 (2009-07): Nuclear power plants — Control rooms — Supplementary control points for reactor shutdown without access to the main control room;

15) IEC 60987 ed2.1 Consol. with am1 (2013-02): Nuclear power plants — Instrumentation and control important to safety — Hardware design requirements for computer-based systems;

16) IEC 60988 ed2.0 (2009-08): Nuclear power plants — Instrumentation important to safety — Acoustic monitoring systems for detection of loose parts: characteristics, design criteria and operational procedures;

17) IEC 61031 ed1.0 (1990-06): Design, location and application criteria for installed area gamma radiation dose rate monitoring equipment for use in nuclear power plants during normal operation and anticipated operational occurrences;

18) IEC 61225 ed2.0 (2005-12): Nuclear power plants — Instrumentation and control systems important to safety — Requirements for electrical supplies;

19) IEC 61226 ed3.0 (2009-07): Nuclear power plants — Instrumentation and control important to safety — Classification of instrumentation and control functions;

20) IEC 61227 ed2.0 (2008-04): Nuclear power plants — Control rooms — Operator controls;

21) IEC 61250 ed1.0 (1994-01): Nuclear reactors — Instrumentation and control systems important for safety — Detection of leakage in coolant systems;

22) IEC 61468 ed1.0 (2000-03): Nuclear power plants — In-core instrumentation — Characteristics and test methods of self-powered neutron detectors;

23) IEC 61468-am1 ed1.0 (2003-06): Amendment 1 — Nuclear power plants — In-core instrumentation — Characteristics and test methods of self-powered neutron detectors;

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